ANNUAL REPORT FOR 2000

DBCP Technical Document No. 18

INTERGOVERNMENTAL OCEANOGRAPHIC
COMMISSION (OF UNESCO)

WORLD METEOROLOGICAL
ORGANIZATION

DATA BUOY COOPERATION PANEL

ANNUAL REPORT FOR 2000

DBCP Technical Document No. 18

2001

N O T E

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FOREWORD

I am pleased to present this fourteenth Annual Report for the Data Buoy Cooperation Panel, covering the Panel's activities during 2000.

The Panel has had another successful year, with a considerable amount of work being undertaken. The seven action groups have also been very active during the intersessional period, with the number of buoys deployed and reporting on the GTS continuing to increase each year. The success of the DBCP programmes is dependent on the efforts of many countries, and without their involvement the DBCP would not have been able to progress the cause of surface observations in the manner that it has over the years.

Perhaps the major change affecting the panel during the year was the creation of the Joint Commission for Oceanography and Marine Meteorology (JCOMM). The DBCP will play a key role within the proposed new JCOMM structure, and will form a major component of the new Data Buoy Observations Team. The panel is committed to JCOMM=s successful operation and, in particular, supporting its implementation mechanism for GOOS and the ocean component of GCOS. In the forthcoming year, the panel will be actively involved in various matters associated with the finalization of the JCOMM structure and reporting processes.

I note that the Technical Workshop component of the Panel's annual meetings has continued to be very well received by participants and observers. The sessions have grown each year, since their introduction in 1995 to become an integral part of the Panel's operation. This year's sessions had over twenty-four papers for presentation, and they were well attended by people from the private sector, as well as by various governmental organizations. The DBCP will again publish these presentations as a document in the DBCP report series.

Finally, I would like to thank all those people who have participated in the activities of the Panel, and whose work is essential for the continuing success of the Panel. In particular, I would like to thank the organizer of this year's annual meeting, Mr Ron McLaren from Canada, and also the organizer of the Technical Workshop, Mr Wynn Jones from the UK.

Graeme Brough
Chairman, DBCP

SUMMARY

Introduction

The Drifting Buoy Cooperation Panel was established in 1985 by WMO Resolution 10 (EC-XXXVII) and IOC Resolution EC-XIX.7. In 1993 the governing bodies of IOC and WMO agreed to change the name of the panel to the Data Buoy 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)).

1. Current and Planned Programmes

Ten countries, seven action groups and two data management centres submitted reports on their data buoy activities to the annual meeting. This session was hosted by Meteorological Service of Canada (MSC) in Victoria, British Columbia, Canada, from 16 to 20 October 2000.

2. Real-time Data Flow

The data from buoys available in real-time on the GTS increased over the past year. In July 2000 807 buoys (58.3% of the total operational buoys) were reporting on the GTS. While the total number of active buoys increased moderately, (the actual increase being 9.1% compared to the same period last year), the number of buoys reporting via the GTS increased only slightly (1.0%) compared to the previous year.

3. Data Quality

The Panel's QC methods continue to be extremely effective in ensuring data quality is maintained at the highest level. The quality control system that operates in near real-time via an Internet mailing list is widely used and has been most successful. However the panel took steps to encourage four of the twelve designated Principal Meteorological or Oceanographic Centres (PMOCs) responsible for Quality Control of GTS buoy data, to resume their active participation in this scheme.

4. Data Archival

The Marine Environmental Data Service (MEDS) in Canada has acted as the RNODC for drifting buoys on behalf of the IOC and WMO since 1986. The average number of messages MEDS archived per month increased from 141,000 to 194,000 during the year, this represented an increase of over 35% in the data received. The Specialized Oceanographic Centre (SOC) for Drifting Buoys operated by Meteo France also collects and archives buoy reports daily. The French SOC produces a range of products including monthly global maps of the distribution of ship and drifter reports of wind, pressure, air temperature and sea surface temperature. The SOC reported that data amounts collected by buoys now are generally higher than that obtained through the Voluntary Observing Ship (VOS) scheme, even within zones well covered by the VOS fleet.

5. Organizational and Coordination Aspects

The new Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) was established by WMO Congress and the IOC Assembly in 1999 as the reporting and coordination mechanism for all operational marine bodies and activities of the two organizations. It is also now the primary implementation mechanism for GOOS and the ocean component of GCOS. The panel noted with interest a report on the status of implementation of JCOMM, including the position of the DBCP within the proposed new JCOMM structure, with the panel providing the major component of the new Data Buoy Observations Team. Coordination and integration of buoy operations with other components of the overall ocean observing system will be effected through the Observations

Coordination Group, whose membership will include the chairs of the DBCP and TIP and the DBCP/SOOP Technical Coordinator. The panel supported this overall concept, as well as its own role within it.

The panel reaffirmed its belief that JCOMM represents a very significant and potentially far reaching step on the road to truly operational oceanography. The integrating role of JCOMM was again acknowledged as being of primary importance, with the panel itself providing an excellent model as a forum and mechanism for coordination and integration in a specific field among meteorologists and oceanographers, research and operations. In addition, the technical coordinator, particularly in his dual role as DBCP/SOOP coordinator, now offered an example and basis for the future technical coordination of all operational ocean observing systems under JCOMM. In this context, the panel supported the proposal from the technical coordinator and Secretariats for the establishment of a JCOMM Observing Systems Operations Support Centre (JCOMMOPS), based initially on the DBCP/SOOP and Argo coordinators.

The panel noted that the first session of JCOMM would take place in Akureyri, Iceland, in June 2001. The panel further agreed that it should be formally represented at the session, and requested the chairman to make the necessary arrangements for this representation, in consultation with the technical coordinator and Secretariats.

6. Communications System Status

The Argos system has continued to provide a reliable service for recovery and processing of data buoy real-time data. Various minor system enhancements were undertaken during the year and future developments of the system were discussed at the annual meeting. The NOAA satellite constellation was recently updated when NOAA-L was launched during September this year. This satellite has an increased frequency spectrum capability and will be valuable in low power applications. Discussions were also held on emerging alternative communications systems utilizing Low Earth Orbiting (LEO) satellites, however these systems are not yet at the stage of being a viable option for routine buoy communications.

7. Publications

The Panel produced three technical documents in the DBCP series, covering the DBCP Annual Report for 1999, and the 1999 DBCP Technical Workshop's report from the fifteenth session held in Wellington, NZ.

8. Administrative Matters

The Panel now has seven action groups: the European Group on Ocean Stations (EGOS); the International Arctic Buoy Programme (IABP); the International Programme for Antarctic Buoys (IPAB); the International South Atlantic Buoy Programme (ISABP); the International Buoy Programme for the Indian Ocean (IBPIO); the Global Drifter Programme (GDP); and the TAO Implementation Panel (TIP).

Twelve countries contributing on a voluntary basis to the financial support of the Panel in 2000 were: Australia, Canada, France, Greece, Iceland, Ireland, Netherlands, New Zealand, Norway, South Africa, United Kingdom and USA.

The Panel's technical coordinator, Mr Etienne Charpentier, has continued to be employed by UNESCO/IOC as a **fund-in-trust** expert and located with CLS/Service Argos in Toulouse, France.

For the Panel's next financial year (1 June 2001 to 31 May 2002), a total budget of US$157,495 is planned to be allocated as follows:

	US$
Salary/travel of technical coordinator	111,000
CLS/Service Argos contract	15,000
Travel of Chair/Vice-chairs	10,000
WMO Costs	2,000
JTA Chairman	5,000
Programme Development DBCP/SOOP	5,000
Publications	6,000
Consultancies/Experts	2,000
Contingencies	1,495
	157,495

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 REAL-TIME DATA FLOW

2.1 Number of buoys reporting over the Global Telecommunication System (GTS)

During October 2000, data from a total of 1570 buoys were collected and processed at the Argos Global Processing Centres in Toulouse, France, and Largo, Maryland, USA, for distribution in real time and delayed mode to the respective Principal Investigators. These buoys were operated by 19 countries. (A detailed breakdown by countries is given for the month of April 2000 in Annex IV).

Some 54% (849) of the 1570 buoys transmitted their data over the GTS in real- or quasi real-time. At the same time, in 1999, the total number of buoys was 1256 and 69.2% of them (869) were transmitting data over the GTS. (The number and location of BUOY reports received in Toulouse during November 2000 is given in Annex V).

The 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 areas for each kind of geophysical variable. 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.

2.2 Data reception

The Argos Global Processing Centres (GPCs) in Toulouse and Largo receive:

(i) the global data sets (i.e. data stored during a 101 minute orbit of the operational satellites) from the global receiving stations in the USA (Fairbanks and Wallop Island) and France (Lannion). Figure 1 shows how the GPCs receive the global data sets from NOAA-11, NOAA-12, NOAA-14 and NOAA-15, respectively;

(ii) a number of regional data sets (i.e. those data received by global or regional stations when an operational satellite is in view of both the station and one or more Platform Transmitter Terminal (PTT)) from regional receiving stations (see table 1).

In addition, three regional processing centres are in operation in Melbourne, Tokyo and Lima. Annex IX shows the data flow between the receiving stations and the users.

In terms of timeliness, the system performance can be measured by the throughput times for delivery of data (i.e. time elapsed between the recording of the message on-board the satellite and the delivery of the results to the end user). Some 37% of the data are available within two hours while 64% of the data are available within three hours. Only 30% of the data are available within three hours from NOAA-11 and NOAA-12 as opposed to 64% for the NOAA-14 and NOAA-15. This delay is due to the data set delivery times.

Figure 1

Table 1

3 DATA QUALITY

One of the principal aims of the panel is to encourage operators of data buoys and users of buoy data to improve the quality of data at source and through the processing chain. The statistics gathered through the year show that the quality of air pressure data (including SVPB), and sea surface temperature, from drifting boys is excellent. Mean RMS (Obs-FG) field for air pressure using the ECMWF model is now in the order of 1.05 hPa (see Annex VI). The evolution of mean RMS for drifting buoy air pressure data based on ECMWF buoy monitoring statistics for the period January 1990 to July 2000 shows that RMS increased during the Northern Hemisphere winter of 1999/2000 to about 1.5 hPa and then dropped to about 1 hPa in July 2000 (Annex VI,p.1). Annex VI, p.2 shows that about 62% (51% in 1999, 44% in 1998) of the RMS values are now lower then 1 hPa; another 34% between 1 and 2 hPa; 4% between 2 and 3 hPa; and only about 1% above 3 hPa. Model and air pressure observations from buoys agree very well.

RMS for SST data remained quite stable in the last few years when using the NCEP model (Annex VI, p.3). Mean RMS is in the order of 1 Celsius. 81% (72% in 1999, 65% in 1998) of the data are within 1 Celsius, and 95% (90% in 1999, 85% in 1998) within 2 Celsius (Annex VI, p.4). SST data from buoys are generally accepted as excellent quality data.

RMS for wind speed data improved substantially since the end of 1993 (5m/s RMS) to reach a level between 2 and 3 m/s. (Annex VI, p.5). However, RMS is slightly increasing since 1998 (of about

0.4 m/s in average). 40% (54% in 1999, 62% in 1998) of the data are within 2 m/s and 78% (76% in 1999, 92% in 1998) within 3 m/s (Annex VI, p.6).

Annex VI, p.7 also shows that a seasonal pattern with higher RMS for air temperature data values in winter except perhaps for winter 1995/1996. This is probably due to the NCEP model, which was used here for the comparison, rather than additional observational errors in winter. Mean RMS values are now in the order of 2 Celsius (2.2 Celsius last year). About 57% (50% in 1999, 57% in 1998) of the air temperature data are within 2 Celsius, and about 83% (85% in 1999, 84% in 1998) within 3 Celsius (Annex VI, p.8).

The quality control status information as graphics is available through the DBCP Web Server and the Quality Control Guidelines are also detailed on the web site. The server is maintained at the NOAA National Ocean Service since February 1995 at the URL:

http://dbcp.nos.noaa.gov/dbcp/monstats.html.

4 DATA ARCHIVAL

The Marine Environmental Data Service (MEDS) in Canada became the Responsible National Oceanographic Data Centre (RNODC) for drifting buoy data on behalf of IOC and WMO in January 1986. The full report of MEDS is given in Annex III.

5 TECHNICAL DEVELOPMENTS

5.1 Lifetime of drifting buoys

As during previous years, the technical coordinator made a study of the lifetime of drifting buoys based on that of their air-pressure sensor. The histogram reproduced in Annex VII shows the results of this study.

5.2 SVPB Evaluation Subgroup

During the intersessional period, a DBCP Evaluation Subgroup continued to analyze the performance of the SVP drifters equipped with barometers and/or wind measuring devices. All members of the Subgroup contributed to the better understanding of the SVP drifter series. Some new insights have been gained, and some worthwhile recommendations have been proposed.

The report of the Evaluation Sub-group is given as Annex VIII. The panel agreed that the subgroup should continue its work on SVP drifters and that Elisabeth Horton of the US Navy would continue as chairperson.

6. COMMUNICATION SYSTEM STATUS

Argos system

6.1.1 SPACE SEGMENT

The new satellite NOAA-16(L) was launched on 20 September 2000, and will replace NOAA-14(J) as one of the two NOAA operational satellites. Satellites NOAA-15(K) and NOAA-14(J) have been operating nominally, as primary satellites, since 1 December 1998 and 30 December 1994, respectively. NOAA-11(H) is the secondary satellite. Its global data are transmitted according to the third satellite transmission characteristics. NOAA-12(D) is on standby status with normal Argos equipment operating in direct transmission mode. Satellites NOAA-9(F) and 10(G) were decommissioned. Table 2 describes the present status of the space segment.

6.1.2 GROUND SEGMENT

The three global receiving ground stations of Fairbanks, Wallops Island and Lannion are fully operational and give complete satisfaction. They provide the Argos system with global coverage and the data are processed by the French and US Global Processing Centres (GPCs). Those stations also receive data in near-real time from platforms in their regional coverage areas. In addition CLS and Service Argos Inc. pursued their efforts in 1999 and 2000 to secure new cooperation agreements with a number of organizations to increase the number of receiving stations able to provide TIP data sets from the NOAA satellites. Today, 21 stations deliver TIP data sets to CLS and Service Argos Inc. This is an increase of 3 stations from last year. Annex IX shows the network and the regional coverage areas for near-real time data collection.

Table 2

6.1.3 ARGOS ENHANCEMENT

A great deal of work was done by Arg os Service in 1999 to ready software for the 42K transition. This task involved checking over two million lines of code. Two new services were added to enhance ADS data distribution:

(i) automatic transmission of data from a platform as soon as it enters a specified zone, and
(ii) secure data transmission via a PGP protocol.

In addition to these software activities, work continued on two major projects ARGOS 2001 and ARGOS/NEXT to improve Argos System performance (Figure 2).

ARGOS 2001 - The purpose of the ARGOS 2001 project is to upgrade the entire Argos processing system. This ambitions project is vital for the long-term continuity of the Argos system and to better serve users. This project is scheduled in three phases:

(i) Development and implementation of a new user interface allowing users to access data and view and update technical files via a Web server. The system Use Agreements data base will also be implemented during this phase. Data will be stored and managed by a database management system designated to be responsive to users' needs. The objective is to give users more versatility in using the systems. Consequently, it is expected to offer them quick and efficient support;
(ii) Improvement and development of value-added services;
(iii) Redesign of the Argos processing system.

Phase I began at the end of 1998 and is underway. The user management application is operational. Development of the User Office application has been completed and rollout is scheduled for the end of 2000. The Web user interface is in development and rollout is also scheduled for the end of 2000.

ARGOS/NEXT - The downlink messaging capabilities provided by the ADEOS II/Argos DCS equipment requires the addition of two new components to the current Argos ground segment such as a Downlink Message Management Center (DMMC) and a network of Argos master beacons. DMMC is located at CLS premises in Toulouse, France. The DMMC's role is to centralize, validate, and schedule downlink message requests from users before transmitting downlink message to the satellite (via a Master Beacon).

The Argos Web server developed within the scope of the Argos 2001 project will allow users to enter requests and compile downlink messages for platforms carrying an Argos NEXT/ARGOS3 receiver and to monitor request status until completion. A backup DMMC will be installed at SAI Largo (USA). DMMC development will be completed by the end of 2000. A network of four master beacons is located at strategic points around the globe, acting as the link between satellites and the DMMC (Fig.3).

The four locations foreseen for these beacons are Toulouse, Hatoyama, Fairbanks and Spitsberg (TBC). Development of the prototype is complete. The first two beacons will be installed in Toulouse and Hatoyma (Japan) before the end of 2000.

Figure 2

Figure 3

7 ADMINISTRATIVE MATTERS

Action groups

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

7.1.1 EUROPEAN GROUP ON OCEAN STATIONS (EGOS)

EGOS was formally established on 1 December 1988 and was *de facto* an action group of the panel as the successor to COST-43. EGOS now has the following membership:

Denmark	Danish Meteorological Institute
Germany	German Weather Service
France	Météo-France
Iceland	Icelandic Meteorological Office
Ireland	Irish Meteorological Service
Netherlands	Royal Netherlands Meteorological Institute
Norway	Norwegian Meteorological Institute
Sweden	Swedish Meteorological and Hydrological Institute
United Kingdom	United Kingdom Meteorological Office

The full report by EGOS is reproduced in Annex II.

7.1.2 INTERNATIONAL ARCTIC BUOY PROGRAMME (IABP)

IABP was formally established on 18 September 1991 and became officially an action group of the panel at the seventh session of the DBCP (Toulouse, October 1991). The following organizations are participating in IABP:

Canada	Environment Canada, Canadian Coast Guard, Institute of Ocean Sciences, Marine Environmental Data Service
China	Institute of Oceanology of the China Academy of Sciences
Finland	Arctic Centre of the University of Lapland
France / USA	Service Argos
Germany	Alfred-Wegener Institute for Polar and Marine Research
Japan	Japan Marine Science and Technology Centre
Norway	Chr. Milchelsen Research Institute, Nansen Environmental and Remote Sensing Centre, Norsk Polarinstitutt, Norwegian Meteorological Institute
Russian Federation	Arctic and Antarctic Research Institute, Russian Federal Service of Hydrometeorology and Environmental Monitoring
United Kingdom	Scott Polar Research Institute, United Kingdom Meteorological Office
USA	National Ice Centre (representing the National Aeronautics and Space Administration, the Nation Science Foundation, the National Oceanic and Atmospheric Administration, the Office of Naval Research and the US Coast Guard), Pacific Marine Environmental Laboratory (of NOAA), Polar Science Centre of the Applied Physics Laboratory of the University of Washington, Woods Hole Oceanographic Institution, Naval Oceanographic Office, Naval Meteorology and Oceanography Command
International Organizations	World Climate Research Programme of WMO, IOC and ICSU

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

7.1.3 INTERNATIONAL PROGRAMME FOR ANTARCTIC BUOYS (IPAB)

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

Australia	Antarctic Cooperation Research Centre, Australian Antarctic Division, Commonwealth Bureau of Meteorology
Brazil	National Institute for Space Research (INPE)
Canada	Marine Environmental Data Service
Finland	Finnish Institute of Marine Research, University of Helsinki
France / USA	CLS/Service Argos
Germany	Alfred Wegener Institute for Polar and Marine Research, Institute für Meteorologic und Klimaforschung Universität Karlruhe
Italy	Programma Nazionale di Ricerche in Antardtide
Japan	Hydrological Department of the Maritime Safety Agency, National Institute of Polar Research
Russian Federation	Arctic and Antarctic Research Institute
South Africa	South African Weather Bureau

United Kingdom	British Antarctic Survey, Scott Polar Research Institute, United Kingdom Meteorological Office
USA	National Ice Centre (see above under IABP), Polar Science Centre, Geophysical Institute, University of Alaska Fairbanks, World Data Centre A for Glaciology

The full report by the IPAB is reproduced in Annex II

7.1.4 INTERNATIONAL SOUTH ATLANTIC BUOY PROGRAMME (ISABP)

The ISABP was established in 1993 and became an action group of the panel in November 1994. The following organizations are participating in the ISABP:

Argentina	Servicio Meteoroligico, Servicio de Hidrografia Naval
Brazil	Diretoria de Hidrografia e Navegacao
Canada	Marine Environmental Data Service
France / USA	CLS/Service Argos
Namibia	The Meteorological Service
South Africa	South African Weather Bureau, Sea Fisheries Research Institute
Ukraine	Marine Hydrophysical Institute of National Academy of Science
United Kingdom	United Kingdom Meteorological Office
USA	Atlantic Oceanographic and Meteorological Laboratory, National Data Buoy Center, Naval Meteorology and Oceanography (COMNAVMETOCCOM)
International Organizations	Caribbean Meteorological Organization

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

7.1.5 INTERNATIONAL BUOY PROGRAMME FOR THE INDIAN OCEAN (IBPIO)

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

Australia	Australian Bureau of Meteorology
France	Météo-France
France / USA	CLS/Service Argos
India	National Institute of Oceanography
South Africa	South African Weather Bureau
USA	Global Drifter Center of NOAA/AOML

Some other institutes expressed their willingness to participate:

India	India Meteorological Department
Indonesia	Faculty of Fisheries
Mauritius	Mauritius Meteorological Service
South Africa	University of Cape Town
USA	Navoceano

The full report by IBPIO is reproduced in Annex II.

7.1.6 GLOBAL DRIFTER PROGRAMME (GDP)

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

7.1.7 TAO IMPLEMENTATION PANEL (TIP)

The Tropical Atmosphere-Ocean (TAO) Implementation Panel(TIP) became an Action Group of the Data Buoy Cooperation Panel (DBCP) in 1999. This annual report is reproduced in Annex II.

7.1.8 NORTHEAST PACIFIC COOPERATIVE PROGRAMME (NPCP)

The NPCP was developed by the United States and Canada to prepare accurate forecasts for the coastal areas of the Northeast Pacific. Although the Northeast Pacific is apparently well served by the USA and Canadian moored buoys, and Voluntary Observing Ships, large expanses of ocean still exist where little meteorological information is available to forecasters.

7.2 Membership

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

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

Twelfth session (Henley-on-Thames, October 1996):Australia, Brazil, Canada, China, France, Iceland, Netherlands, South Africa, United Kingdom, USA;

- Thirteenth session (Saint-Denis, La Réunion, France, October 1997): Australia, Brazil, Canada, France, Iceland, Netherlands, New Zealand, South Africa, Spain, United Kingdom, USA;

- Fourteenth session (Marathon, Florida, USA, October 1998): Australia, Brazil, Canada, France, Iceland, India, Netherlands, New Zealand, South Africa, United Kingdom, USA;

- Fifteenth session (Wellington, New Zealand, October 1999): Australia, Brazil, Canada, France, Iceland, India, Netherlands, New Zealand, South Africa, Thailand, Ukraine, United Kingdom, USA;

- Sixteenth session (Victoria, BC, Canada, October 2000): Australia, Brazil, Canada, France, India, Japan, Netherlands, New Zealand, South Africa, Ukraine, United Kingdom, USA.

7.2.2 NATIONAL FOCAL POINTS

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

7.3 Technical coordinator

The panel's technical coordinator continues to be Mr Etienne Charpentier (France). Since 1 June 1993, he has been employed by UNESCO/IOC as a *fund-in-trust expert* and located at Collecte-Localisation-Satellite (CLS)/Service Argos in Toulouse, France. Since 1 January 1999, he is also discharging the functions of technical coordinator of the Ship-of-Opportunity Programme (SOOP).

7.4 Finances

Overall management of the panel's finances has continued to be undertaken by WMO during 2000, while IOC has arranged contracts for the employment of the technical coordinator as well as for his logistic support. Annex X contains financial statements as follows:

(a) Finalized IOC Statement of Account for the period 1 June 1999 to 31 May 2000;
(b) Interim WMO Statement of Account as at 3 October 2000;
(c) Final Statement of Account as at 31 December 1999.

For the financial year 2001-2002, the panel agreed the following draft budget (which encompasses the expenditures and contributions relating to SOOP):

A. Expenditures	**US$**
Technical coordinator (salary, travel, logistic support)	126,000
Travel of Chairman, Vice-chairmen & JTA chairman	10,000
Experts	2,000
JTA chairman (contract)	5,000
Programme development	5,000
Publications	6,000
WMO Costs	2,000
Contingencies	1,495
TOTAL	**157,495**

B. Income	
Contributions	156,250
Carry-over 1999-2000	1,245
TOTAL	**157,495**

The following fourteen countries are contributing to the DBCP-SOOP funding: Australia, Canada, France, Germany, Greece, Iceland, Ireland, Japan, Netherlands, New Zealand, Norway, South Africa, United Kingdom and USA. Some countries may indicate that their contributions are earmarked for DBCP only or for SOOP only.

NATIONAL REPORTS ON DATA BUOY ACTIVITIES

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

Country: Australia

Purpose

1. This report describes the Australian Bureau of Meteorology's buoy activities for the period July 1999 - June 2000, and the proposed deployment plans for the period July 2000 - June 2001. The report also summarizes the GTS delays in the reception of buoy data at NMOC Melbourne.

Background

2. The Australian Bureau of Meteorology (BoM) has deployed drifting buoys since the late 1970s. Commencing with FGGE, the Bureau has maintained a modest buoy programme in the Indian and Southern Oceans, utilizing merchant, passenger and research vessels and the Royal Australian Navy.

3. During TOGA (1985 - 1994), the BoM deployed up to six buoys annually, purchased from its own Capital programme. The US NDBC provided an equivalent number of buoys for deployment as part of the Bureau's logistic support for TOGA. The BoM continues to provide logistic support for other agencies (e.g. AOML) requiring buoy deployments in the Southern and Indian Oceans.

4. Since 1993/94, the BoM has deployed a mix of FGGE/TOGA and SVP-B style buoys. The standard FGGE/TOGA buoy with sensors for air pressure, air temperature, sea temperature and pressure tendency has a nominal life of two years, although the BoM has several recorded cases of FGGE/TOGA buoys surviving between 3 1/2 to 4 years. Our experience with SVP-B type buoys (air pressure, sea temperature and pressure tendency) has provided variable success.

5. The BoM's buoy programme is funded separately for purchases and communications, where the latter usually governs the number of buoys that can be deployed each financial year.

1999/2000 Deployments

6. Twenty buoy deployments were completed during 1999/2000, comprising ten Bureau owned buoys and ten SVP-B buoys supplied by AOML (Atlantic Oceanographic and Meteorological Laboratory, USA) and fitted with barometers sponsored by the Bureau.

7. Two of the BoM buoys were fitted with wind speed and wind direction sensors. One was deployed to the northwest of Australia and the other was a replacement for the moored buoy in the Gulf of Carpentaria.

8. Two of the BoM sponsored SVP-B buoys were deployed from the S.A. Agulhas en route from Capetown to Marion Island. The BoM appreciates the kind assistance of PMO Capetown for arranging the shipping to accommodate these deployments.

9. A map showing the 1999/2000 deployment locations is at Figure 1.

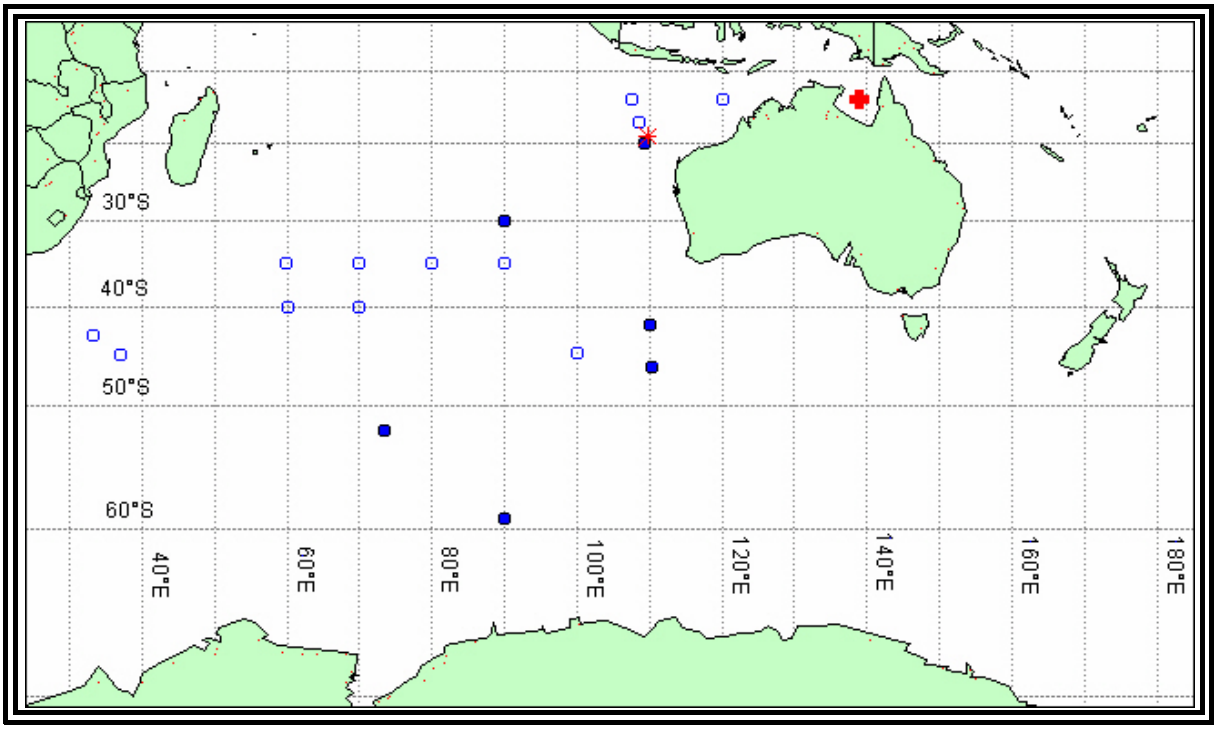


Figure 1. Drifting buoys deployed by the Bureau of Meteorology during 1999/2000

Key to buoy types	
blue dot	standard FGGE
open circle	standard SVP-B
red cross	standard FGGE + WS/WD
red star	standard SVP-B + WS/WD

2000/2001 Deployment Plans

10. The planning for drifting buoy deployments in 2000/2001 allows for several strategic deployments as follows:

    (1) Up to four buoys deployed to the northwest of Australia, including two FGGE wind speed and wind direction buoys for the coming Tropical Cyclone season. The present moored buoy in the Gulf of Carpentaria is expected to last for another season.

    (2) Two buoys routinely deployed in early December from the R.V. Shirase at 44^{o}S 110^{o}E and 48^{o}S 110^{o}E, to assist the forecasting of severe weather events over south eastern Australia during Summer.

    (3) A number of Southern Ocean deployments from the Antarctic resupply vessels, including two high latitude deployments to assist Antarctic Operations.

11. Details of the Bureau=s *Drifting Buoy Deployment Plan for 2000/2001* are given in Table 1 and Figure 2, and are restricted to drifting buoys owned and funded by the Bureau. The plan does not include the possible deployment of buoys for other agencies such as AOML, which would be accommodated on an opportunity basis.

Num	Type	Date	Lat	Long	Vessel
1	F	Sep 2000	19 S	109 E	P&ONL La Spezia
2	F	Oct 2000	53 S	74 E	Polar Bird
3	F	Nov 2000	50 S	88 E	Aurora Australis
4	FW	Nov 2000	14 S	120 E	Navy
5	F	Nov 2000	63 S	68 E	Aurora Australis
6	F	Nov 2000	60 S	70 E	Aurora Australis
7	FW	Nov 2000	19 S	109 E	TBA
8	F	Dec 2000	44 S	110 E	Shirase
9	F	Dec 2000	48 S	110 E	Shirase
10	F	Feb 2001	19 S	109 E	TBA
11	F	May 2001	30 S	90 E	TBA

Table 1. Planned deployments of Bureau funded drifting buoys in 2000/2001.

Key to buoy type

F = FGGE FW = FGGE + WS/WD

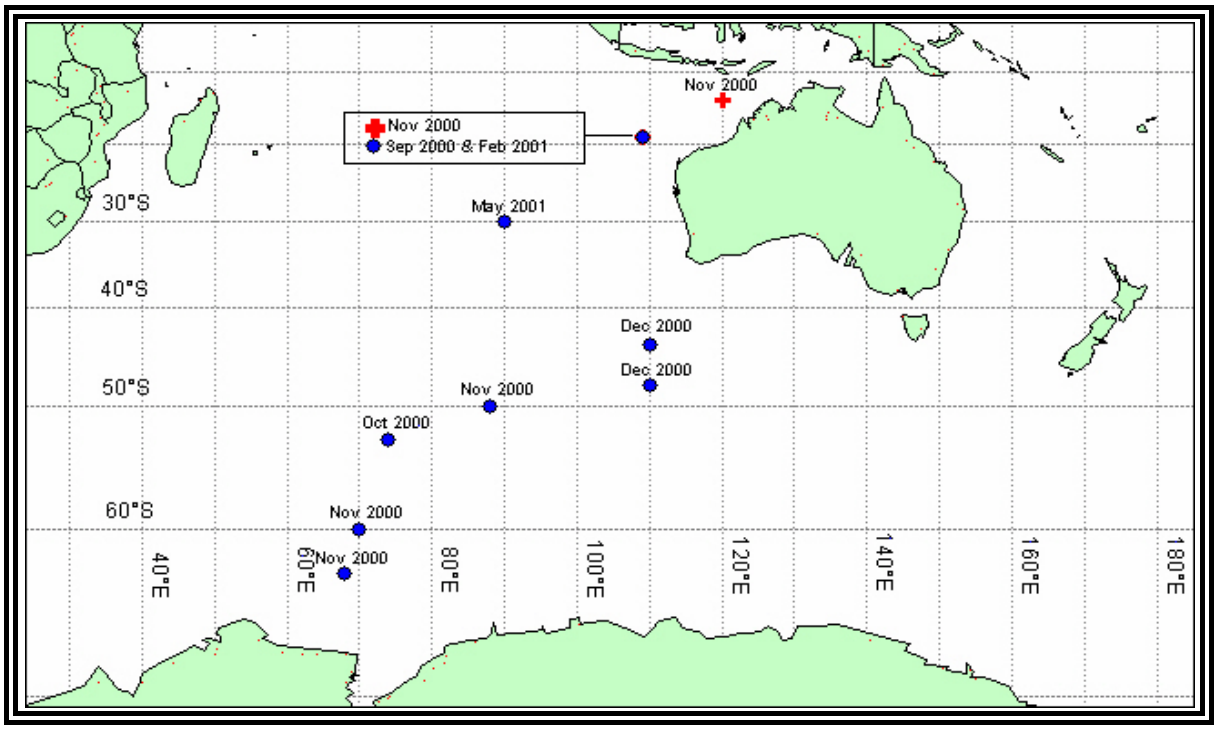


Figure 2. Planned deployment locations of Bureau funded drifting buoys in 2000/2001

Message reception at NMOC

12. NMOC Melbourne conducted a survey of buoy messages received in bulletins between 0000 UTC 24 Sept 2000 - 0000 UTC 2 October 2000 to show the delay between the time of observation and the time of reception.

13. The results of the survey are graphed in Figure 3 and show that almost 80% of the 65753 individual BUOY messages received during the survey period were received within 4 hours, increasing to almost 90% within 6 hours. A total of 60 messages were received in excess of 25 ours after the observation time.

14. These results consistent with a similar survey conducted in 1999 prior to DBCP-15 in Wellington.

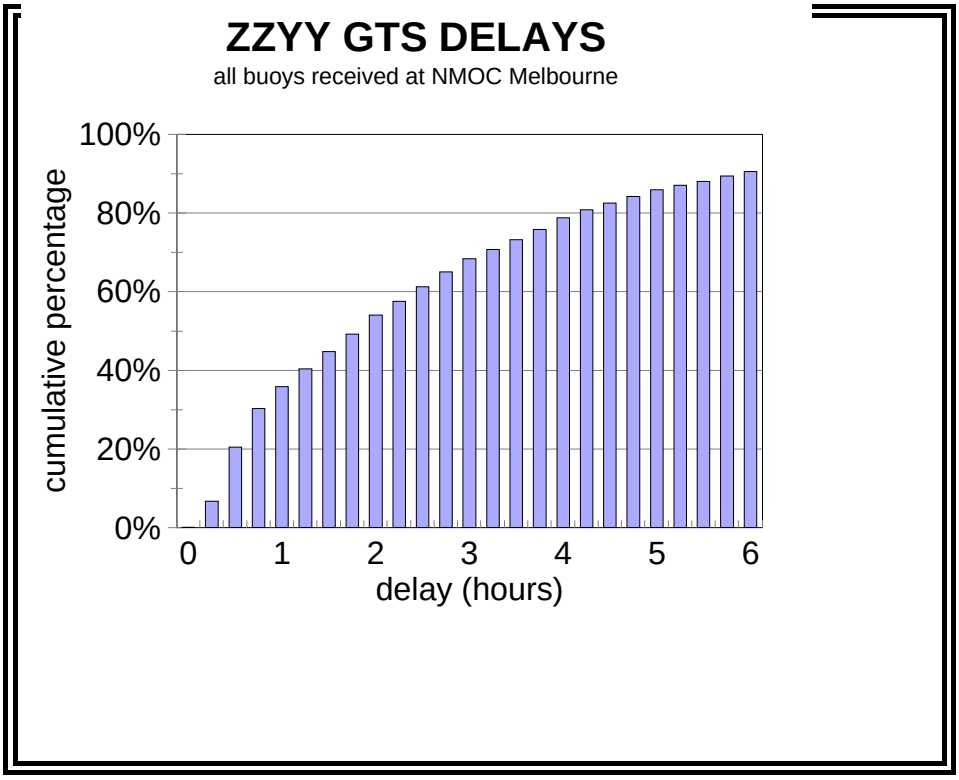


Figure 3. GTS delay in the reception of BUOY messages at NMOC Melbourne between 0000 UTC 24 Sep 2000-0000 UTC 2 Oct 2000

Country: Brazil

I - General Information

During 1996 a special task group (with experts in meteorology and oceanography) was established to prepare the guidelines of the Brazilian buoy programme. In the beginning of the 1997, the final document was presented at the National GOOS Committee like the National Buoy Programme – PNBOIA. This document was approved by the government during the 133rd session of the Marine Resource Inter-Ministerial Committee on 30 April 1997.

On 9 May 1997, during the 2nd Extraordinary Session of the Executive Committee for the GOOS/Br, the PNBOIA became an activity of the GOOS Brazil Pilot Programme and the Buoy Subcommittee was created to develop the buoy programme.

The Diretoria de Hidrografia e Navegação (DHN) was given the responsibility, by the Navy Ministry, to coordinate all the actions for the **PNBOIA**'s development. After 27 December, the Centro de Hidrografia da Marinha took over the DHN's technical tasks and is now in charge of the buoy programme.

PNBOIA supports the coastal mooring and drifting buoys. The purpose of the coastal moorings and drifters is to collect data to support the requirements of the national meteorological and oceanographic centres to sustain operational activities. The Coordinator of the Buoy Subcommittee received from WMO Ocean Affairs 40 numbers to use for Brazilians buoys and soon the meteorological data will be available on the GTS. A file containing the control of the WMO and ARGOS number is placed in the annex "A".

II - Actions in the intersession period 1999/2000.

a) Deployment of 11 barometric drifters;

b) Deployment of 8 SST drifters (INPE/PETROBRÁS) - manufactured by Neuron Eletrônica;

c) Creation (still in development) of the PNBOIA HOME-PAGE (link) http://www.mar.mil.br/~dhn/dhn.htm; The goal is to make data (tables and plots) available per buoy for one month;

d) Revision of the scope of PNBOIA project;

e) Deployment of a like Atlas (INPE/UNIVAP and NEURON ELETRÔNICA - Project) moored buoy for a test period. At first it was placed inside Guanabara Bay and afterwards about 6 miles out of Guanabara Bay mouth, near a lighthouse/meteorological station island where it was kept until beginning of August. The buoy data was compared with the island station data and have presented relatively good results. The pressure and the temperature comparison plots are placed in the annex "B". The buoy is now in a maintenance period and will be deployed next November off the coast of Cabo Frio – RJ; See annex "C" for picture;

f) We are also continuing the cooperation with National Space Research Agency (INPE-DSA) to use Brazilian Satellites to read buoy data (positioning in test) and internet divulgation site (http://www.astme.inpe.br/dsr/satboia);

g) A 3.4 m discuss moored buoy (# Argos 32056 and # WMO 31978) was deployed on 17 September off the coast of southern Brazil at the position 32º 52.95' S and 050º 50.78' W. The buoy was made by Axys Environmental Systems www.axystechnologies.com –

Canada. Besides the Argos system, the data is being received by Brazilian satellites and is on the GTS. See annex “D” for picture.

III - Goals to achieve in the next one year period (2000/2001)

a) Deployment of 8 SVP-B drifters

b) Deployment of 1 like TOGA

c) Refit of 2 like Toga buoys

d) Acquisition of:

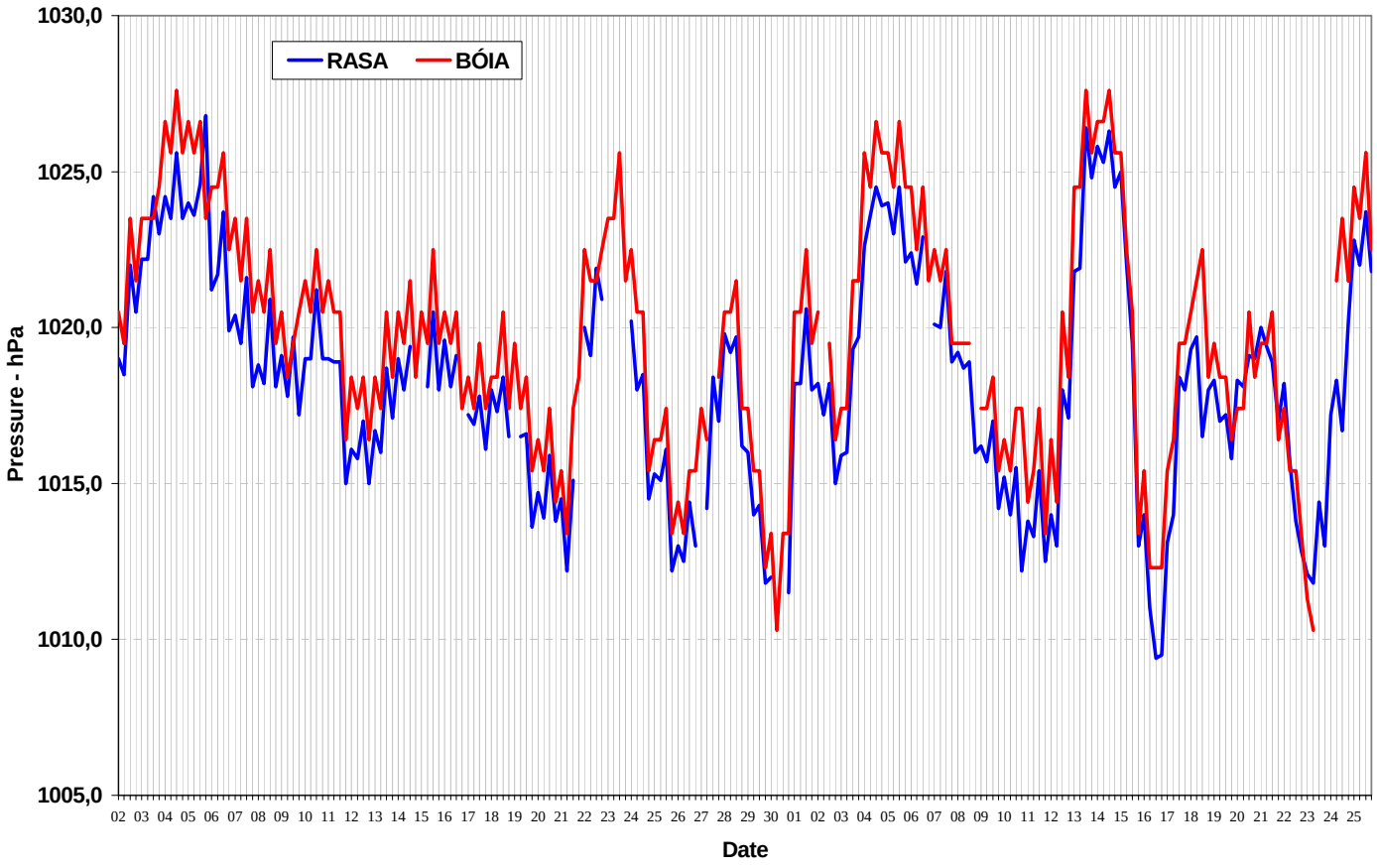
1 Palace profiler drifter buoy
24 barometric drifter buoys
1 Moored buoy with directional wave meter

ANNEX A

# WMO	# ARGOS	Deployment date	Deployment position	D(drifter)/ M(moored)	Sensors
31947	32425	07/dez/98	15S/036W	D	P/SST
31948	32429	06/jan/98	13S/034W	D	P/SST
31949	32428	20/jan/99	21S/039W	D	P/SST
31950	32427	21/jan/99	18S/038W	D	P/SST
31951	32426	09/mar/99	05S/023W		P/SST
31952	32424	17/mar/99	13S/034W		P/SST
31953	32423	18/mar/99	17S/035W	D	P/SST
31954	32422	27//mar99	21S/033W	D	P/SST
31955	32421	12/jun/99	29S/046W	D	P/SST
31956	32420	07/jul/99	13S/035W	D	P/SST
31957	9001				
31958	3193				
31959	32461	26/fev/00	26S/041W		P/SST
31960	32462	27/fev/00	29S/037W		P/SST
31961	32463	11/out/99	08S/031W		P/SST
31962	32430	30/jun/00	28.5S/045W		
31963	32431	11/mai/00	26S/041.5W	D	
31964	32432	09/fev/00	27S/046W	D	P/SST
31965	32433	05/nov/99	45S/057W	D	P/SST
31966	32434	07/jun/99	16S/034W	D	P/SST
31967	32435	17/set/00	32º 53'S/ 050º 51' W	D	P/SST
31968	32046				Waiting for deployment
31969	32047				Waiting for deployment
31970	32048				Waiting for deployment
31971	32049				Waiting for deployment
31972	32050				Waiting for deployment
31973	32051				Waiting for deployment
31974	32052				To be deployed next October
31975	32053				To be deployed next September
31976	32054				To be deployed next October
31977	32055				
31978	32056	17/set/2000	32 52,9S/050 50,7W	M	P/SST/T/TW/RH/WIND/PERIOD-HEIGHT WAVES/SOLAR RADIATION /)
31979	32057			D	
31980	32439			M	P/SST/T/TW/WIND/RH - in maintenance period
	32058				Ordered at Metocean
	32059				

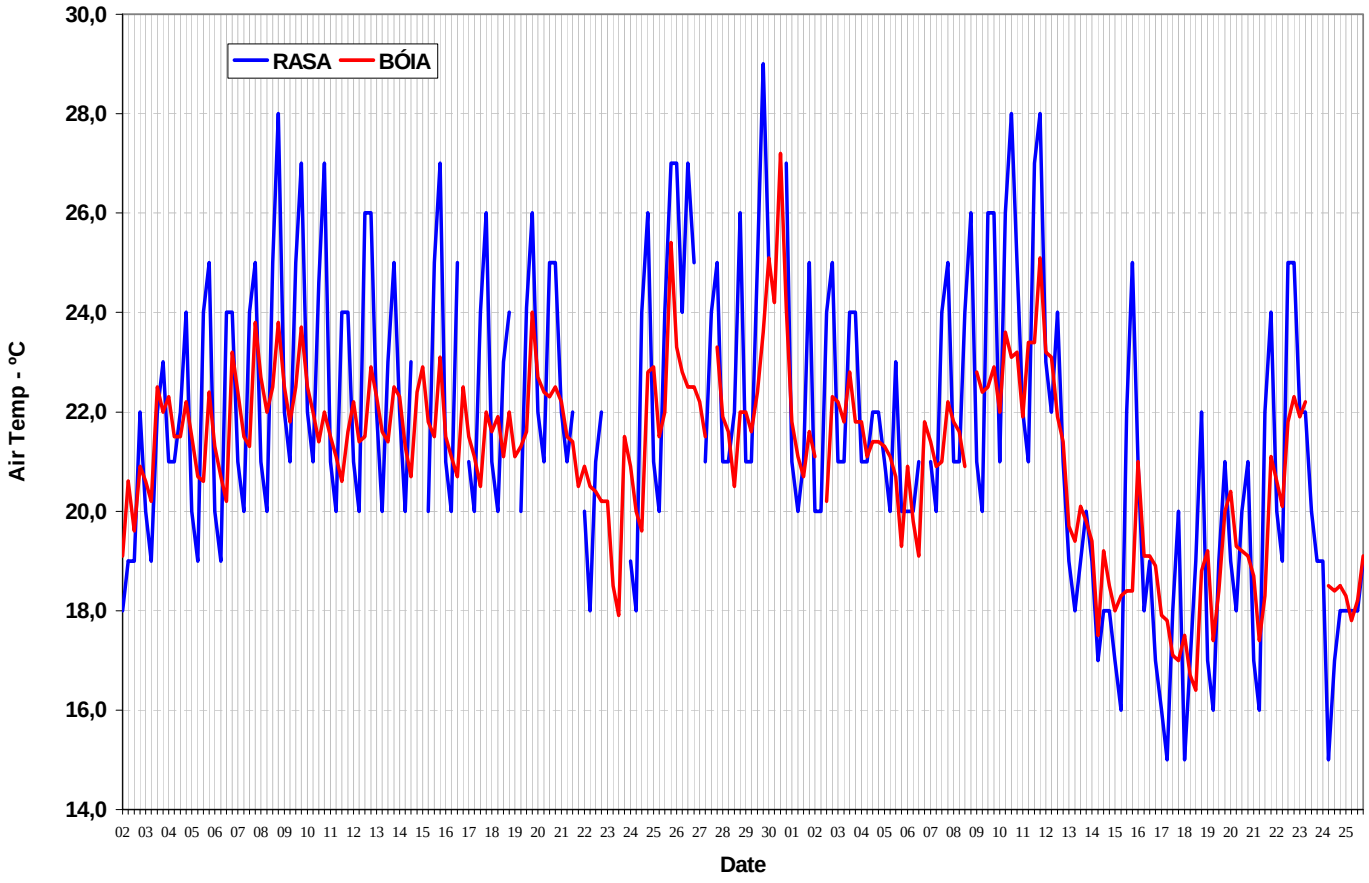
ANNEX B

PRESSURE - FROM 02/JUN THROUGH 25/JUL/2000



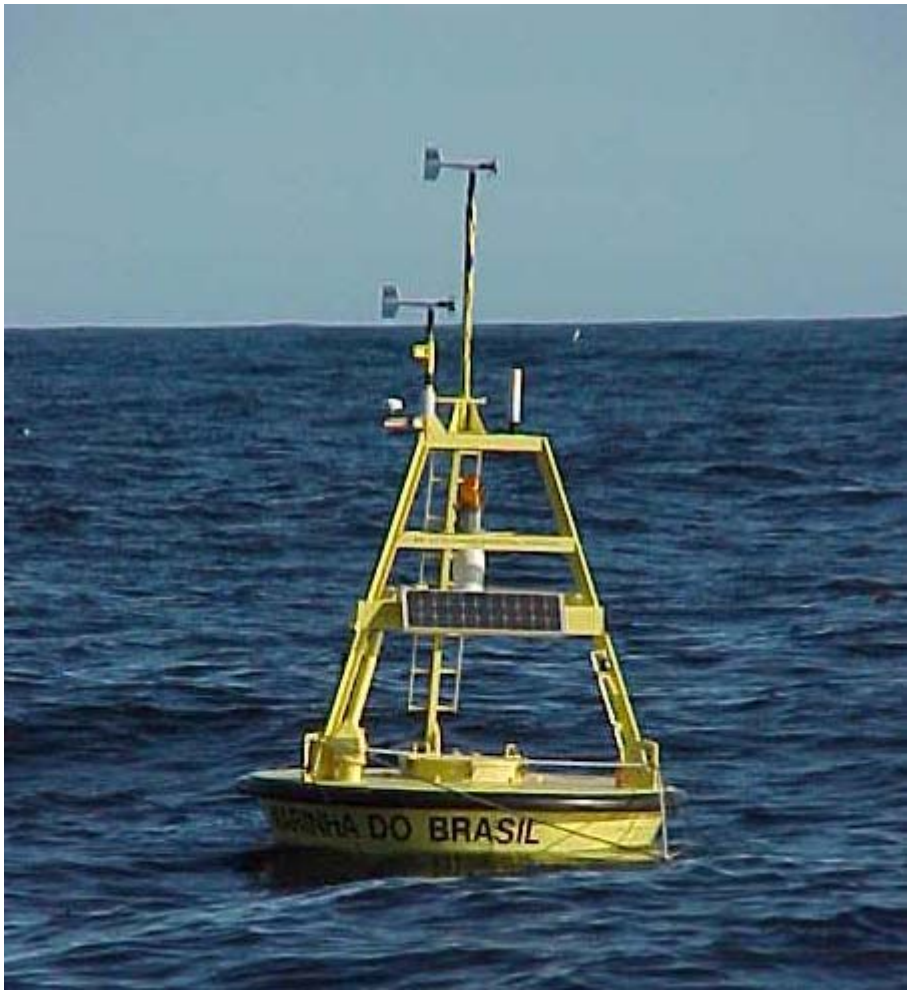
ANNEX B (continued)

TEMPERATURE - FROM 02/JUN THROUGH 25/JUL/2000



ANNEX C

ANNEX D



Country: Canada

OVERVIEW

Marine tragedies in the early 1980's on the Pacific and Atlantic coasts provided significant impetus for the improvement of marine weather services. To address this need, over forty automated moored buoy stations and up to sixteen drifting buoys and ice beacons now provide over 300,000 hourly observations annually from previously unmonitored marine environments. Since the first buoy deployment in 1986, the Canadian ODAS (Ocean Data Acquisition System) buoy program has expanded to become the second largest national buoy program in the world.

Each Region is responsible for maintaining their own buoy programs, using full time Buoy Specialists, Port Meteorological Officers, Meteorological Inspectors, and specialized support from contractors. Environment Canada buoys are equipped with solar power systems, reliable sensors, low power electronics, and high quality coatings and are designed to remain at sea for up to 5 years before refurbishing.

Pacific and Yukon Region has been designated as the Buoy Technical Centre and provides general direction and technical assistance to the other Regions as in Figure 1. Buoy data is quality controlled and distributed from Vancouver using an interactive computer system known as Poseidon.

The Buoy Technical Centre is also managing the National Buoy Payload Replacement Project. The new electronic payloads, manufactured in Canada by AXYS Environmental Systems, have replaced the older systems dating from the mid 80's and provide additional capacity for new sensor suites.

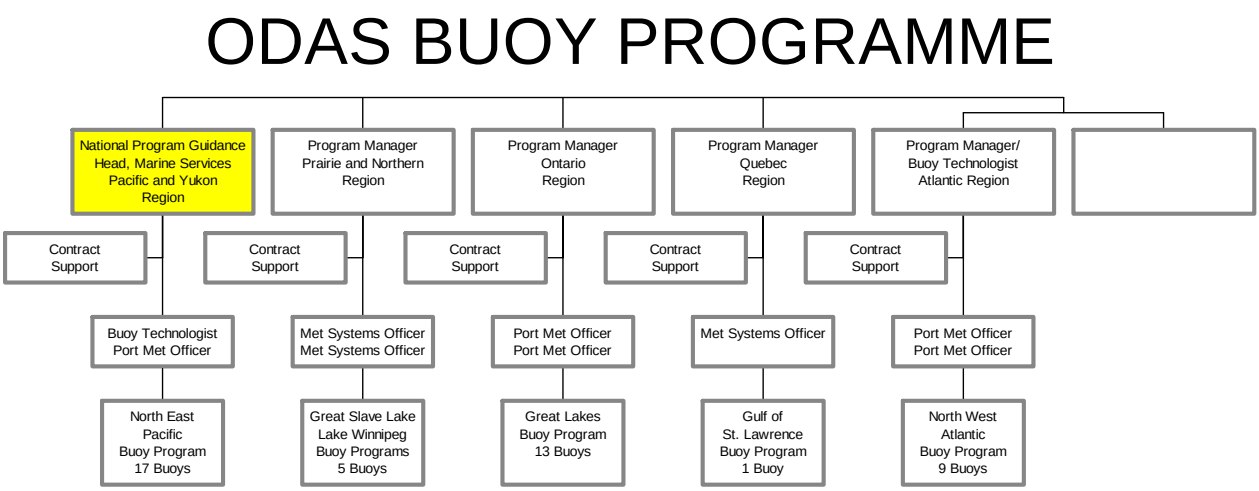


Figure 1

Canadian ODAS Buoy Locations - August 2000

Figure 2:
Canadian ODAS buoy locations

YEAR: 1999/2000 (Sept. 1/99 - Aug. 31/00)

CURRENT PROGRAMMES:

A AGENCY OR PROGRAMME: CANADA **- Pacific and Yukon Region** - North East Pacific Ocean

Number and type of buoys:

a) Deployed during year:	· 5 Standard WSD Metocean drifters
b) Operational (31/08/00):	· 3 moored six meter NOMAD buoys · 13 moored three meter Discus buoys · 1 Developmental three metre Discus buoy · 6 standard WSD drifters
c) Reporting on GTS (31/08/00):	· 16 moored buoys · 6 standard WSD drifters
Main deployment area:	· North Eastern Pacific Ocean

B AGENCY OR PROGRAMME CANADA - **Prairie and Northern Region**

Number and type of buoys:

a) Deployed during year:	· 5 moored buoys in inland lakes
b) Operational (31/08/00):	· 5 inland moored buoys · 2 buoys in the Arctic basin (IABP)
c) Reporting on GTS (31/08/00):	· all 7 buoys
Main deployment area:	· Great Slave Lake*: one hexoid buoy and one 3 meter · Lake Winnipeg North Basin*: one moored buoy (MetOcean drifter)
***seasonal only (~~May - October)**	· Lake Winnipeg South Basin*: one Axys WatchKeeper · Lake Winnipeg Narrows*: one Axys WatchKeeper. · Arctic Basin west of the Canadian Arctic Islands - 2 to 5 drifters

C AGENCY OR PROGRAMME CANADA - **Canadian Ice Service**

Number and type of buoys:

a) Deployed during year:	· 6 CALIB, one having pressure sensor · 4 Ice Beacons with GPS
b) Operational (31/08/00):	· None
c) Reporting on GTS (31/08/00):	· None
Main deployment area:	· West Baffin bay: to track southward motion of old ice. · Gulf St.-Lawrence: ice beacons with GPS (ice pressure experiment). · Labrador Coast: to validate sea ice and iceberg models.

D AGENCY OR PROGRAMME: CANADA - **Atlantic Region**

Number and type of buoys:

a) Deployed during year:	·	One 1 3 METER BUOY
	·	One TriAxys directional waverider buoy
b) Operational (31/08/00):	·	Eight 6 meter NOMAD buoys
	·	One DATAWELL
	·	One TriAxys Directional Wave rider Buoy
c) Reporting on GTS (31/08/00):	·	8 NOMADS
Main deployment area:	·	North West Atlantic

E AGENCY OR PROGRAMME: CANADA - **Ontario Region**

Number and type of buoys:

a) Deployed during year:	·	5 three meter buoys
	·	2 twelve meter buoys
	·	6 lightweight WatchKeeper buoys
b) Operational (31/08/00):	·	13 buoys
c) Reporting on GTS (31/08/00):	·	all
Main deployment area:	·	Great Lakes
	·	Large Lakes and bodies of water other than the Great Lakes

F AGENCY OR PROGRAMME: CANADA - **Quebec Region**

Number and type of buoys:

a) Deployed during year:	·	1 moored 3-meter discus buoy
b) Operational (31/08/00):	·	1 buoy
c) Reporting on GTS (31/08/00):	·	1
Main deployment area:	·	Gulf of St. Lawrence

G AGENCY OR PROGRAMME: CANADA - **Fisheries and Oceans (BIO)**

Purposes of the 2000 programme:

Extensive programs continued on the ice fields of the Labrador Shelf and Gulf of St. Lawrence using beacons measuring drift, pressure, stress, convergence/divergence and wind profiles. Data were provided to the Canadian Ice Centre for forecasting and to the Canadian Coast Guard to support ice breaking. GPS beacons were used to empirically indicate and validate models of transport and dispersal pathways for salmon aquaculture sites in the Bay of Fundy.

Number and type of buoys:

a) Deployed during year:	·	Several GPS beacons Several types of drifter
b) Operational (31/08/00):	·	n/a
c) Reporting on GTS (31/08/00):	·	n/a
Main deployment area:	·	Labrador Shelf and Gulf of St. Lawrence
	·	Bay of Fundy

PLANNED PROGRAMMES:

Purpose of programme and number and type of buoys planned for deployment in next 12 months:

A AGENCY OR PROGRAME: CANADA - **Pacific and Yukon Region** - North East Pacific Ocean

a) Operational:	· 0 moored buoys · 6 standard wind speed and direction drifters.
b) Developmental:	· 1 updated developmental buoy to replace an earlier generation optical sensor 3 metre discus buoy.
c) Met/Ocean research:	· As above.
Main deployment area:	· Drifting buoys will be deployed in the North East Pacific Ocean along approximately 160 degrees west between 43 to 52 degrees north.

B AGENCY OR PROGRAMME: CANADA - **Prairie and Northern Region**

1. To support operational marine forecasting programme for Great Slave Lake and Lake Winnipeg
2. To actively participate in the International Arctic Buoy Programme (IABP).

a) Operational:	· **Inland lakes**: 5 buoys · **IABP**: 3 to 5 buoys depending on 'holes' in the buoy array and deployment opportunities
b) Developmental:	· **IABP:** experiment with the assembly of buoys in house including making combination battery / solar panel power supplies
c) Met/Ocean research:	· **IABP:** Endeavouring to have oceanographic temperature/salinity profiles done at sites where buoys are deployed via Twin Otter landing on ice.
Main deployment area:	· 2 in Great Slave Lake and 3 in lake Winnipeg · Arctic Basin ice east of 141W and south of about 83N

C AGENCY OR PROGRAMME: CANADA - **Canadian Ice Service**

a) Operational:	· 1 Metocean Lithium Battery with air Pressure sensor CALIB to be deployed in Eastern Arctic to support Environment Canada data acquisition program. · 1 CALIB to be deployed on request to support operations.
b) Developmental:	· Nil.
c) Met/Ocean research:	· 4 Ice beacons with GPS for the research project called: "Improved Routing Methodologies in the St Lawrence System" · 6 standards CALIB for model verification off Labrador coast.
Main deployment area:	· Eastern Arctic. Gulf of St-Lawrence and Newfoundland/Labrador waters.

D AGENCY OR PROGRAMME: CANADA - **Atlantic Region**

a) Operational:	·	One 3 meter disc buoy
b) Developmental:	·	None
c) Met/Ocean research:	·	3 WOCE drifters for UK Met Service
Main deployment area:	·	North West Atlantic

E AGENCY OR PROGRAMME: CANADA - **Ontario Region**

a) Operational:	·	0
b) Developmental:	·	nil
c) Met/Ocean research:	·	One 12 meter buoy is equipped with a chemistry laboratory on board with several on going experiments (mass spec). The buoy is powered by two diesel (6kw) engines and solar power.
Main deployment area:	·	Experiments to examine the air-lake exchange of gaseous pesticides, of CO, water vapour, momentum and heat fluxes and a biological study of the isotope fixation during primary productivity involving phytoplankton.
	·	12 meter buoy Lake Ontario

F AGENCY OR PROGRAMME: CANADA - **Quebec Region**

a) Operational:	·	n/a
b) Developmental:	·	n/a
c) Met/Ocean research:	·	Current meter to be installed in co-ordination with DFO Maurice Lamontagne Institute
Main deployment area:	·	n/a

G AGENCY OR PROGRAMME: CANADA - **Fisheries and Oceans (BIO)**

Purpose of programme

- To provide data to the Canadian Ice Centre for forecasting and to the Canadian Coast Guard to support ice breaking.
- To validate models of transport pathways for salmon aquaculture sites in the Bay of Fundy.

a) Operational:	·	Extensive programs will continue on the ice fields of the Labrador Shelf and Gulf of St. Lawrence using beacons measuring drift, pressure, stress, convergence/divergence and wind profiles. GPS beacons will be used to empirically indicate and validate models of transport pathways for salmon aquaculture sites in the Bay of Fundy.
b) Developmental:	·	n/a
c) Met/Ocean research:	·	n/a
Main deployment area:	·	Gulf of St Lawrence and Labrador shelf
	·	Bay of Fundy

TECHNICAL DEVELOPMENTS:

A Moored Buoy Systems: CANADA - **Pacific and Yukon Region** - North East Pacific

a) **Buoy design:**	· Deployment of updated solar powered buoys completed. · Improvements to wind mast design to simplify exchange of anemometers at sea completed. · Experimental application of environmentally friendly anti-fouling paint.
b) **Instrumentation**:	· Global Positioning Systems installed on all moored buoys. · Conversion to new Watchman 100 buoy payload systems completed April/00. · Ultrasonic anemometer continues on test at an operational buoy station and on the developmental buoy. · Installation of transmitter reset circuits to begin on test buoy fall/00. · Installation of backup ARGOS transmitters to be installed over next 3 years. · Optical sensors for biological monitoring installed on 2 buoys. · High accuracy water temperature system to be tested on developmental buoy. · High Data Rate GOES transmitter to be tested on developmental buoy.

B Moored Buoys and drifting buoys: CANADA - **Prairie and Northern Region**

a) **Buoy design**:	· **Inland Lakes**: nil · **IABP**: Continue to try various buoy components and in-house assembly of components in pursuit of cost effective buoy packages that will provide the basics of reliable and accurate pressure and temperature readings through continuous real time operation in the Arctic Basin environment and have a power system that will last 2 or 3 years
b) **Instrumentation:**	· **Great Slave Lake:** air pressure, air temperature, water surface temperature, wind speed and direction, and wave height sensors/ data. · **Lake Winnipeg South Basin and Narrows buoy:** air pressure, water surface temperature, wind speed and direction sensors/data & wave heights · **Lake Winnipeg North Basin buoy:** air pressure, water surface temperature, wind speed and direction sensors/data · **IABP**: air-deployed CALIBs: surface atmospheric air pressure sensor surface-deployed buoys : air pressure and air temperature sensors

C Drifting Buoy system: **CANADA -** Canadian Ice Service

a) **Beacon design**	· Using Lithium batteries for northern beacon deployments. · Using Alkaline batteries for southern beacon deployments.
b) **Instrumentation:**	· Atmospheric Pressure and temperature sensors on 1 CALIB in North-western Baffin Bay (temperature sensor data is available on raw data only). Temperature data not included on GTS due to unreliability of data when beacon is insulated by increasing snow cover during fall / winter months.

D Moored Buoy Systems: CANADA - **Atlantic Region**

a) **Buoy design:**	·	Forward masts shortened on 9 Nomads
	·	New design for Solar panel mounts 9 hulls
	·	Solar panel upgrades and new battery configuration completed on 9 NOMAD buoys.
b) **Instrumentation**:	·	Watchman 100 Payloads installed in10 Nomads
	·	'Blipper Radar Detectors' installed on 4 buoys

E Moored Buoy Systems : CANADA - **Ontario Region**

a) **Buoy design:**	·	NIL

F Moored Buoy Systems: CANADA - **Quebec Region**

a) **Buoy design:**	·	3 Metre Discus
b) **Instrumentation**:	·	Buoy upgrade to Watchman 100 completed Spring 99

G AGENCY OR PROGRAMME: CANADA - **Fisheries and Oceans (BIO)**

a) **Buoy design:**	·	n/a
b) **Instrumentation** :	·	n/a

PUBLICATIONS:

A CANADA - **Pacific and Yukon Region** - North East Pacific

- λ Monthly WMO Moored and Drifting Buoy Status Reports for all Canadian Buoys.
- λ On line Moored Buoy Status Reports at: http://yvrwww1.pyr.ec.gc.ca/
- λ Buoy data available at: http://www.weatheroffice.com/
- λ Annual ODAS Buoy Service Reports - Pacific and Yukon Region (Internal distribution)

B CANADA - **Prairie and Northern Region**

- λ Inland lakes
- λ None

IABP

- λ International Arctic Buoy Programme Data Reports published by the Applied Physics Laboratory, University of Washington,
- λ Data is also available from the IABP web site http://iabp.apl.washington.edu**.**

C CANADA - **Canadian Ice Service**

- λ Fourth internal CIS beacon report delivered on April 11th, 2000.
- λ Adopted new format on report due Y2K constraint.

D CANADA - **Atlantic Region**

- λ none

E CANADA - **Ontario Region**

- λ none

F CANADA - **Quebec Region**

- λ none

G AGENCY OR PROGRAMME: CANADA - **Fisheries and Oceans (BIO)**

- λ none

SPECIAL COMMENTS:

A CANADA - **Pacific and Yukon Region** - North East Pacific

a) **Quality of buoy data:**	·	Good
b) **Communication:**	·	Good. Over 95% of all possible moored buoy data delivered to users
c) **Buoy Lifetimes:**	·	New solar buoys should increase service interval for battery replacement up to 5 years.
	·	Drifting buoys - Over 2 years
d) **Other:**	·	Nil

B CANADA - **Prairie and Northern Region**

a) Quality of buoy data:	·	**Inland lakes:** Good and reliable.
	·	**IABP**: Good and reliable. Unreliable data is not put on GTS.
b) Communication:	·	**Inland Lakes**: Great Slave lake: n/a. Lake Winnipeg: GOES in South Basin buoy and Narrows area. ARGOS in North Basin Buoy.
	·	**IABP**: Good. Environment Canada operates a Local Users Terminal at their Edmonton facility. Data is accessed, processed and input to GTS directly from Edmonton.
c) Buoy Lifetimes:	·	**Inland lakes:** Great Slave lake: n/a. Lake Winnipeg: Moored buoys - up to 3 years between battery changes.
	·	**IABP**: air-deployed CALIBs with lithium batteries have an expected life of about 1 year. Surface deployed buoys have an expected life of about 2 years. Summer melt of ice and the break up of ice throughout the year factor into buoy lifetimes!
d) Other:	·	**Inland lakes**: nil.
	·	**IABP**: because of the melt and drift occurring in the Beaufort sea, use of CALIB is preferred (provides position and air pressure but not temperature data). Ice floe are normally on the outer edge of the Beaufort gyre.

C CANADA - **Canadian Ice Service**

a) **Quality of buoy data:**	·	Good and reliable.
b)		
c) **Communication:**	·	Good and reliable.
d) **Buoy Lifetimes:**	·	3-4 months for Alkaline batteries, up to 1 year for Lithium batteries.
e) **Other:**	·	2 CALIBs deployed last winter along the Labrador Coast died upon deployment ...no data available.
	·	2 of the 4 CALIBs deployed by MLI for the ice pressure experiment were retrieved.

D CANADA - **Atlantic Region**

a) **Quality of buoy data:**	·	Good
b) **Communication:**	·	80% of transmitters operating
c) **Buoy Lifetimes**:	·	n/a
d) **Other:**	·	n/a

E CANADA - **Ontario Region**

a) **Quality of buoy data:**	·	Excellent this season - recent modifications to overcome lightning problems seem to be working.
b) **Communication:**	·	90 % plus
c) **Buoy Lifetimes**:	·	The three meter buoys are deployed and retrieved annually with the battery system being replaced every 5 years. The 12 meter buoys are year round platforms, with the power system being replaced every 5 years. The lightweight buoys will follow the same cycle as the three meter buoys.
d) **Other:**	·	n/a

F CANADA - **Quebec Region**

a) **Quality of buoy data:**	·	90%
b) **Communication:**	·	GOES
c) **Buoy Lifetimes**:	·	n/a
d) **Other:**	·	position ARGOS

G AGENCY OR PROGRAMME: CANADA - **Fisheries and Oceans (BIO)**

a) **Quality of buoy data:**	·	n/a
b) **Communication:**	·	n/a
c) **Buoy Lifetimes**:	·	n/a
d) **Other:**	·	n/a

CONTACT POINTS

A CANADA **- Pacific and Yukon Region** - North East Pacific

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Meteorological Service of Canada
Atmospheric Monitoring Division
Suite 700-1200 W. 73rd Ave.
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B CANADA **- Prairie and Northern Region**

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Edmonton, AB
T6B 2X3
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Attn: Edward Hudson

phone: 780 951-8878 fax: 780 951-8872 E-Mail: edward.hudson@ec.gc.ca

C CANADA **- Canadian Ice Service**

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D CANADA - **Atlantic Region**

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G CANADA - **Fisheries and Oceans (BIO)**

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H CANADA **- Environment Canada National Marine Program**

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Country: France

Year: 1 September 1999 - 31 August 2000

This report concerns surface buoys only. Programmes using profilers are not described here.

PROGRAMMES

A. MÉTÉO-FRANCE

Number and type of buoys:

(a) 17 drifting buoys (most of them drogued) + 3 moored buoys were deployed in last 12 months. Drifting buoys are :
- Marisonde B (FGGE type) ;
- Marisonde G (wind FGGE type) ;
- 14 SVP barometer drifters (including 3 with wind measurement capabilities and 5 with salinity) ;

(b) 24 buoys[1] were operational at 31 August ;

(c) 24 buoys[1] were reporting on GTS at 31 August.

Purposes of programme:

(a) Operational: to provide oceanographic and meteorological observations in real time to Weather Forecast Centres (EGOS programme, French West Indies, IBPIO programme...);

(b) Technical: to improve present materials (tests of new buoys, new sensors (compasses, barometers, conductivity probes)). 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:

Operational : Meteo-France will continue to operate its drifting buoy networks in the Atlantic and Indian oceans. The co-operation with the Global Drifter Center of NOAA and Navoceano will be pursued. Meteo-France will continue to operate three ocean weather stations (two in West Indies and one in the Mediterranean Sea) and a new station will be implemented in the Mediterranean Sea. The co-operation with the UK Meteorological Office to maintain the Brittany and Gascogne moored buoys will continue.

Research: Meteo-France will participate in the POMME[2] experiment (Multidisciplinary Programme on Mesoscale Oceanography), in the North of Azores (Oct. 2000 - Oct 2001) with about 24 Marisonde GT buoys. Marisonde GT is a wind-FGGE type buoy fitted with a thermistor chain.

B. LODYC (DYFAMED, CARIOCA, IMCORP programmes)

Number and type of buoys:

(a) CARIOCA buoy and 1 prototype of Carbon buoy were deployed in last 12 months;

(b) None was operational at 31 August ;

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

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[1] Including two DATAWELL waveriders in French West Indies and the two UK/French moored buoys.

[2] http://www.ipsl.jussieu.fr/POMME/site_gi_frame.html

Purposes of programmes :

(a) Research: to understand, quantify and monitor the CO2 fluxes exchanged at the air-sea interface;
(b) Technical: to develop a buoy able to measure CO_2 concentrations at the ocean-atmosphere interface (Programme CARIOCA) and another one to measure the distribution of carbon compounds at the same interface (Programme IMCORP). Such buoys will be used in the frame of GOOS.

Deployment areas:

North and Tropical Atlantic;
Western Mediterranean Sea;
Southern Indian Ocean.

Plans:

Six new drifters will be deployed in the next 12 months; 4 of them in the frame of the POMME programme (see above).

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

Number and type of buoys:

(a) CETMEF operates a network of 11 omnidirectional wave moored buoys and three directional (DATAWELL). In addition, CETMEF implemented wave measurement systems on two Aid-to-Navigation moored buoys;
(b) 16 buoys were operational at 31 August;
(c) One was reporting on GTS at 31 August.

Purpose of programme:

(a) Operational: to maintain a long duration wave measurement network along the French coasts and 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 will complete it with one new omnidirectional waverider at least.

D. IRD (ex ORSTOM) - French participation to PIRATA programme – cooperation with Meteo-France and CNRS)

Number and type of buoys:
Four Atlas buoys were operational at 31 August;
Four Atlas buoys were reporting on GTS at 31 August.

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 oceanographical and meteorological observations in real time to Weather Forecast Centres;
(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.

Deployment area:
Tropical Atlantic Ocean

Plans for the next 12 months:
IRD will continue to maintain four stations in next 12 months.
More information on http://www.ifremer.fr/orstom/pirata/pirataus.html

E. IFREMER (MAREL programme)

Number and type of buoys:
(a) Three buoys were operational at 31 August;
(b) 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;

Deployment area:
French coasts

Plans for the next 12 months:
Ifremer will continue to maintain three buoys in the Bay of Seine in next 12 months.

F. SHOM (Hydrographic and Oceanographic Service of the Navy)

Number and type of buoys :
(a) Four Surdrift buoys (lagrangian drifters drogued at 400m depth) were deployed in last 12 months;
(b) Four buoys were operational at 31 August;
(c) None was reporting on GTS at 31 August.

Purposes of programme:
To get oceanic data (current and temperature in depth) that could be introduced in real time into prediction models for defence applications.

Deployment area:
North Atlantic

Plans for the next 12 months:
16 Surdrift buoys will be deployed in the POMME experiment (see above);
Twelve Metocean XAN-3 drifters will be deployed in North Atlantic too.
Data will be reported on the GTS.

TECHNICAL DEVELOPMENTS

(a) Instrumentation

(i) Meteo-France continues to participate in the evaluation of SVP pressure drifters developed by the Global Drifter Center (USA). 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. Three SVP-BW drifters, owned by Meteo-France, were deployed during the 12 past months

(iii) Meteo-France also evaluates SVP-B drifters fitted with conductivity sensors in cooperation with LODYC (France) and MRI (Iceland). Five buoys were tested during the 12 past months, off France and Iceland. Four new drifters will be tested in 12 next months.

(iv) The project of CO_2 concentration measurements from drifting buoys, managed by LODYC is continuing. Five buoys, called CARIOCA (CARbon Interface OCéan Atmosphère) and one Carbon buoy will be deployed in next 12 months.

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

Météo-France - Centre de Météorologie Marine, Monthly statistics on buoys data transmitted on GTS in BUOY and SHIP codes (Air pressure, SST, wind speed and direction, air temperature).

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). Statistics on comparisons with analysis fields are set up for each buoy and each LUT (when several are used for transmitting the data of a buoy). Monthly statistics are sent to the buoy-qc@vedur.is mailing list too.

(ii) **New**: Buoy data QC tools have been developed on the Internet to help buoy operators to check their buoys (see http://www.shom.fr/meteo/qctools). Monthly statistics provided by four centres using buoy data, are still available for individual buoys or for a list of buoys. Data and differences with model outputs can be now plotted over the 3 past weeks. Blacklist of buoys reporting dubious air pressure values or being perhaps ashore can be displayed too.

(b) Other

For the fifth consecutive year, Meteo-France funded 10 barometers to be added to SVP drifters. These will be deployed in the Indian Ocean in November 2000. The action will be renewed in 2001 if possible

Country: Iceland

Year 2000:

Current Programmes:

A. Programme number: 00588 Icelandic Met Office
Number and type of buoys deployed: The Met Office provides 1 PTT year for use in EGOS drifting buoy programme and this PTT is managed by the EGOS Secretariat in Bergen.

B. Programme number: 01119 Marine Research Institute.
Number and type of buoys deployed: 8 SVP were deployed for larvae drift research. Of these three were furbished with barometers funded by Meteo France and they transmitted on GTS.

Planned programmes.

a) The Icelandic Met Office will as before provide one PTT year for use within the EGOS buoy programme in the North Atlantic
b) The Marine Research Institute: Still not decided.

Country : India

Year : 1st September '99 to 31st August 2000

CURRENT PROGRAMMES

A. Agency or Programme : National Data Buoy Programme (Moored Buoys)
National Institute of Ocean Technology
Department of Ocean Development
Government of India

Number and type of buoys :	(a) deployed during the year	:12	Moored buoys
	(b) operational at 31 August	: 8	Moored buoys
	(c) reporting on GTS at 31 August	: 8	Moored buoys
Purpose of programme	(a) Operational	:	✓
	(b) met/ocean research	:	✓
	(c) developmental	:	✓

B. Agency or Programme : National Institute of Ocean Technology,
(as above, repeat as often as necessary) Department of Ocean Development

PLANNED PROGRAMMES

A. Agency or Programme: National Institute of Ocean Technology,
Department of Ocean Development

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

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

Main deployment areas : Bay of Bengal, Arabian sea, Indian Ocean

B. Agency or Programme : National Institute of Ocean Technology,
(as above, repeat as often as necessary) Department of Ocean Development)

TECHNICAL DEVELOMENTS

(a) Buoy design : Tamper proof arrangements have been incorporated into the data buoys to avoid pilferage of components.

(b) Instrumentation : Nil

(c) Others : New design buoys for application in Indian seas are on the anvil

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

1. Current Science issue on 10th Feb 2000 has brought out the " First results from a new observational system over the Indian seas' which is about the SST observations collected by the moored met-ocean buoys (NDBP) in Bay of Bengal.

2. Carried out "Inter comparison of sea surface meteorological data between two data buoys". The results indicates that the data collected from the sensors of both the buoys compares very closely and within the sensors tolerance limits.

3. The buoys have acquired important data during the super cyclone in Bay of Bengal. The information will be presented during DBCP

SPECIAL COMMENTS (if any)

(a) Quality of buoy data : Good

(b) Communications : Good

(c) Buoy lifetime : Unable to decide, as frequent damages to data buoys due to act of vandalism.

(d) Others : Nil

Country : INDIA

Year : 1st September '99 to 31st August 2000

CURRENT PROGRAMMES

A. Agency or Programme : National Drifting Buoy Programme
National Institute of Oceanography
Department of Ocean Development
Government of India

Number and type of buoys : (a) deployed during the year :11 SVP–B & 2 SVP

(b) operational at 31 August : 11

(c) reporting on GTS at 31 August : 11

Purpose of programme (a) Operational : ✓

(b) met/ocean research : ✓

(c) developmental : -

B. Agency or Programme : National Institute of Oceanography
(as above, repeat as often as necessary) Department of Ocean Development

PLANNED PROGRAMMES

A. Agency or Programme: National Institute of Oceanography
Department of Ocean Development

Number and type of buoys planned for deployment in next 12 months: 7 to 10 SVP –B &two buoys with additional sensors for wind speed, wind direction and air temperature

Purpose of programme: (a) operational : ✓

(b) met/ocean research : ✓

(c) developmental : -

Main deployment areas : Tropical Indian Ocean

B. Agency or Programme : National Institute of Oceanography,
(as above, repeat as often as necessary) Department of Ocean Development)

TECHNICAL DEVELOPMENTS

(a) Buoy design : --

(b) Instrumentation : --

(c) Others : --

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

(1) Shenoi S.S.C, .P.K. Saji, A.M Almeida (1999) Near – surface circulation and kinetic energy in the tropical Indian Ocean derived from Lagrangian drifters, J.Mar.

(2) P.K. Saji, S.S.C Shenoi, A.M. Almeida and L.V.G. Rao (2000) Inertial currents in the Indian Ocean derived from satellite – tracked surface drifters, Oceanologica Acta (in press).

SPECIAL COMMENTS (if any)

(a) Quality of buoy data }

(b) Communications }

(c) Buoy lifetime } Further report on National Drifting Buoy Programme will be presented during DBCP

(d) Others }

Country: Japan

Year: 2000

CURRENT PROGRAMMES

A. Japan Meteorological Agency

Number and type of buoys:
(a) deployed during year:
(Type 1) 3 moored buoys with 11 maritime meteorological and oceanographic sensors
(Type 2) 4 drifting buoys with 4 maritime meteorological and oceanographic sensors
(Type 3) 2 PALACE
(b) operational at 31 August:
(Type 1) 1
(Type 2) 3
(Type 3) 5
(c) reporting on GTS at 31 August:
(Type 1) 1
(Type 2) 3
(Type 3) 5
Purpose of programme:
(Type 1 and 2) operational meteorological and oceanographic observation
(Type 3) ocean research and operational observation
Main deployment areas:
(Type 1 and 2) seas around Japan
(Type 3) western North Pacific

B. Meteorological Research Institute, JMA

Number and type of buoys:
(a) deployed during year: 5 APEX
(b) operational at 31 August: 15 (10 PALACE and 5 APEX)
(c) reporting on GTS at 31 August: 15 (10 PALACE and 5 APEX)
Purpose of programme: ocean research (subarctic intermediate circulation)
Main deployment areas: Oyashio-Kuroshio Mixed Water Region

C. Japan Coast Guard

Number and type of buoys
(a) deployed during year: 11 surface drifters with holey sock drogues and SST sensors
(b) operational at 31 August: 11
(c) reporting on GTS at 31 August: None
Purpose of programme: operational
Main deployment areas: North Pacific and Antarctic Oceans

D. Japan Marine Science and Technology Center

Number and type of buoys:
(a) deployed during year:
(Type 1) 1 meteorological and subsurface oceanographic drifter (J-CAD)
(Type 2) 10 meteorological and subsurface oceanographic surface moorings (TRITON buoys)

(Type 3)	1 meteorological and subsurface oceanographic surface mooring (TRITON buoy: mid-latitude test buoy)
(Type 4)	2 subsurface drifters with CTP sensor (PALACE)
(b) operational at 31 August:	
(Type 1)	1
(Type 2)	10
(Type 3)	1
(Type 4)	2
(c) reporting on GTS at 31 August	
(Type 2)	10
(Type 4)	2
Purpose of programme:	
(Type 1)	met/ocean research
(Type 2)	met/ocean research, ENSO monitoring
(Type 3)	met/ocean research/developmental
(Type 4)	ocean research
Main deployment areas:	
(Type 1)	Arctic Ocean (North Pole)
(Type 2)	western tropical Pacific
(Type 3)	Kuroshio Extension region
(Type 4)	North Pacific

E. Ocean Research Institute, University of Tokyo

Number and type of buoys:	
(a) deployed during year:	
(Type 1)	0 ALACE
(Type 2)	0 PALACE
(Type 3)	10 compact surface drifters with drogues
(b) operational at 31 August:	
(Type 1)	2
(Type 2)	4
(Type 3)	10
(c) reporting on GTS at 31 August:	
(Type 1)	None
(Type 2)	2
(Type 3)	None
Purpose of programme:	ocean research
Main deployment areas:	
(Type 1 and 2)	Japan Sea
(Type 3)	Kuroshio Extension and Kuroshio-Oyashio transition region

F. Tokai University

Number and type of buoys:	
(a) deployed during year:	2 surface drifters with holey sock drogues and SST sensors
(b) operational at 31 August:	2
(c) reporting on GTS at 31 August:	None
Purpose of programme:	ocean research
Main deployment areas:	North Pacific

G. Central Research Institute of Electric Power Industry

Number and type of buoys:	
(a) deployed during year:	5 PALACE
(b) operational at 31 August:	17 (1 ALACE, 16 PALACE)

(c) reporting on GTS at 31 August: None
Purpose of programme: observation of sub-surface circulation
Main deployment areas: western North Pacific

PLANNED PROGRAMMES

A. Japan Meteorological Agency

Number and type of buoys planned for deployment in next 12 months:
- (Type 1) 1 moored buoys with 11 maritime meteorological and oceanographic sensors
- (Type 2) 12 drifting buoys with 4 maritime meteorological and oceanographic sensors
- (Type 3) 6 PALACE

Purpose of programme:
- (Type 1 and 2) operational meteorological and oceanographic observation
- (Type 3) ocean research and operational observation

Main deployment areas:
- (Type 1 and 2) seas around Japan
- (Type 3) western North Pacific

B. Meteorological Research Institute, JMA

Number and type of buoys planned for deployment in next 12 months: 4 isopycnal APEX floats
Purpose of programme: ocean research (subarctic intermediate circulation)
Main deployment areas: Oyashio-Kuroshio Mixed Water Region

C. Japan Coast Guard

Number and type of buoys planned for deployment in next 12 months: 29 surface drifters with holey sock drogues and SST sensors
Purpose of programme: operational
Main deployment areas: North Pacific and Antarctic Oceans

D. Japan Marine Science and Technology Center

Number and type of buoys planned for deployment in next 12 months:
- (Type 1) 1 meteorological and subsurface oceanographic drifter (J-CAD)
- (Type 2) 8 meteorological and subsurface oceanographic surface moorings (TRITON buoys)
- (Type 4) 20 subsurface drifters with CTP sensor (PALACE)

Purpose of programme:
- (Type 1) met/ocean research
- (Type 2) met/ocean research, ENSO monitoring
- (Type 4) ocean research

Main deployment areas:
- (Type 1) Arctic Ocean (North Pole)
- (Type 2) western tropical Pacific, eastern Indian Ocean
- (Type 4) North Pacific

F. Tokai University

Number and type of buoys planned for deployment in next 12 months:	2 surface drifters with holey sock drogues and SST sensors
Purpose of programme:	ocean research
Main deployment areas:	North Pacific

G. Central Research Institute of Electric Power Industry

Number and type of buoys planned for deployment in next 12 months:	6 PALACE
Purpose of programme:	observation of sub-surface circulation
Main deployment areas:	western North Pacific

Country: The Netherlands

Year: 2000

CURRENT PROGRAMMES

A. Agency or programme Royal Netherlands Meteorological Institute (KNMI)

Number and type of buoys
(a) deployed during year 3 SVP
(b) operational at 31 August 2
(c) reporting on GTS at 31 August 2

Purpose of programme Participating in the EGOS drifting buoy programme for operational meteorology and oceanography

Main deployment areas North Atlantic

B. Agency or programme Netherlands Institute for Sea Research (NIOZ)

Number and type of buoys
(a) deployed during year 4 Clearwater
(b) operational at 31 August 3
(c) reporting on GTS at 31 August 3

Purpose of programme The main objective of the MARE (Mixing of Agulhas Rings Experiment) project is to determine the proportion of Agulhas leakage that contributes to the northward branch of the thermohaline circulation. This Agulhas leakage occurs mainly through the shedding and resulting mixing and decay of Agulhas Rings. The drifters indicating the location of the Agulhas Rings remain in these Rings. After some time the drifters subsequently enter the Antarctic Circumpolar Current.

Main deployment areas Indian Ocean (south)

PLANNED PROGRAMMES

A. Agency or programme **KNMI**

Number and type of buoys planned for deployment in next 12 months: 3 SVP-B

Purpose of programme EGOS

Main deployment areas North Atlantic

B. Agency or Programme NIOZ

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

Purpose of programme	MARE
Main deployment areas	Indian Ocean

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 EGOS programme are published in quarterly reports (UKMO) and monthly statistics (Météo-France); Monthly Report by the Technical Secretariat of EGOS.

2. For information on MARE, see http://www.nioz.nl/projects/mare

SPECIAL COMMENTS *(if any)*

(a)	Quality of buoy data	see under Publications
(b)	Communications	all buoys are tracked by Argos System
(c)	Buoy lifetimes	see relevant EGOS documents
(d)	Others	

Country: New Zealand

Year: 2000

CURRENT PROGRAMMES

A. Agency : **Meteorological Service of New Zealand Ltd**

Number and type of buoys:
(a) deployed during the year : 2 FGGE Drifters
(b) operational at 31 August : 6 Drifters
(c) reporting on GTS as at 31 August : 6 Drifters

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

Main deployment areas: Tasman Sea

B. Agency : **Meteorological Service of New Zealand Ltd for Global Drifter Centre**

Number and type of buoys:
(a) deployed during the year : 9 SVPB (Technocean)
(b) operational at 31 August : 9 SVPB
(c) reporting on GTS as at 31 August : 9 SVPB

Purpose of programme: Weather Forecasting & Oceanographic Research

Main deployment areas: Southern Pacific Ocean

PLANNED PROGRAMMES

A. Agency : **Meteorological Service of New Zealand Ltd**

Number and type of buoys planned for deployment in next 12 months: 3 drifters, or as many as required to maximize 7 PTT years.

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

Main deployment areas: Tasman Sea

PUBLICATIONS Nil

SPECIAL COMMENTS

A. Quality of buoy data: see recovered buoys below

B. Communications: All buoys are tracked by the Argos system.

C. **Buoy Lifetimes**:

MetService still uses FGGE type buoys in its operational buoy programme. These buoys have given long service, with buoys being recycled through several deployments. MetService has an active Buoy

Recovery policy. Buoy positions are monitored as they near the NZ coast and where possible buoys are recovered just before, or after beaching. This has resulted in many buoys being recovered, refurbished and redeployed, with some buoys being deployed three or four times. All buoys are deployed in the Tasman Sea, where the prevailing westerly currents eventually carry buoys back towards New Zealand, enabling around 80% of buoys to be recovered.

Since 1988 (13 years) MetService has recycled 24 buoys through 51 deployments, whilst maintaining an operational network of 7 buoys. Of the six buoys operational on 1 October 2000, two buoys are on their first deployment, one is on its second deployment, two are on their third deployment and one buoy is on its fifth deployment.

The average lifetime from deployment until beaching for buoys deployed in the Tasman Sea is about eighteen months. To better assess the total lifetime per buoy it is more representative to look at the Cumulative Lifetime achieved by buoys over several deployments. Lifetime is counted until barometer failure, transmission failure or recovery. The Average Cumulative Lifetime of the twenty-four buoys, including the six operational buoys at 1 October 2000 is 35.9 months. Looking at individual buoys, #7176 is on its fifth deployment, and is still operational after 62 months of cumulative service, #20721 achieved 58 months over two deployments, and buoy #6439 was deployed three times achieving a cumulative lifetime of 80 months.

D. Recovered Buoys:

In the twelve months to 1 October 2000, five buoys (#22187, #8584, #8583, #22186 and #20721) have been recovered. Three of these buoys were still operational when recovered, whilst the other two had stopped reporting many months earlier when their batteries ran down.

Buoy 22187 was still operational when recovered by a fisherman off the Fiordland coast after eighteen months at sea on its second deployment. Post recovery calibrations of the pressure and temperature sensors revealed they were almost identical to the pre-deployment calibrations. #22187 will be redeployed.

Buoy 8584 was also operational when recovered by a fisherman off the Fiordland coast after twenty-one months at sea on its third deployment. The pressure data had been removed from GTS five months before recovery and post deployment tests confirmed the pressure output to be bottom of range, whilst temperature data was still good. The buoy will be used to provide spare parts for the refurbishment of other buoys.

Buoy 8583 was recovered from the Queensland coast by an Air Sea Rescue Coastguard team. The buoy had been at sea for seventeen months on its fourth deployment and was still fully operational when found. Post recovery calibration tests have not been done yet, but it is likely the buoy will be suitable for refurbishment and future redeployment.

Buoy 22186 was found east of Northland, NZ by a fisherman. This buoy had transmitted reliable data from all sensors until its batteries failed after twenty-seven months on its first deployment. The buoy then drifted at sea for another thirteen months until it was found. It is in good condition and should be suitable for refurbishment and future redeployment.

Buoy 20721 was recovered just off Bowen, Queensland. This buoy had operated without problem for thirty-six months on its second deployment, and had been at sea for a further nine months before it was found. The base of the hull was holed and the finder confirmed that the electronics had been destroyed by salt water. This buoy was scrapped.

Country: South Africa

SOUTH AFRICAN WEATHER BUREAU: PRESENT ACTIVITIES AND FUTURE PLANS

South Africa started the year (inter-sessional period August 1999 - July 2000) with 28 drifters operational. The South African Weather Bureau (SAWB) drifter programme is maintained mainly to supply data for operational forecasting. The deployments are done in data sparse areas, but also where these positions compliment deployments by other agencies. The majority of deployments done by the SAWB are a mixture of SAWB and AOML drifters. This inter-sessional period we also deployed drifters on behalf of Meteo-France and Bureau of Meteorology -Australia (BOM).

1999					2000						
Aug	**Sept**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**March**	**April**	**May**	**Jun**	**Jul**
nil	10	nil	nil	3	nil	8	nil	6	nil	nil	nil

DEPLOYMENT TEMPO OF 27 DRIFTERS

All the above deployments were done from the SA Agulhas on its relief voyages to Gough and Marion Island as well as to Antarctica, with no failures during the deployments.

The Port Meteorological Officer in Cape Town and Durban also gave assistance to other organisations with the storage and the placing of drifters on board vessels for deployment in the Atlantic and Indian oceans. 21 drifters were deployed in the Indian Ocean from Durban on behalf of AOML and 18 drifters in the Atlantic from Cape Town on behalf of NOAA and Scripps.

Due to problems with the DCP on Tristan da Cunha and the AWS on Southern Thule the equipment was removed and replaced with an anchored SVPB in 1998. During 1999/2000 these drifters were replaced with new SVPB s and are still operating. The data is placed on the GTS as a synoptic station and not in a buoy message.

A TOGA drifter from the UK was deployed in January 2000 on 41S, 09E. We hoped that the drifter will remain in the Southern Atlantic giving valuable pressure and wind data for operational weather forecasting. Unfortunately the drifter moved fairly rapidly eastwards and is now in the Indian Ocean at 40S, 50E.

Since August 1999 two drifters stopped transmitting after 104 and 94 days respectively. Two additional drifters pressure readings became unstable and was removed from the GTS.

Since 1997 the SAWB had 71 drifters that stopped transmitting with an average life of 454 days. The highest life time was a drifter that stopped transmitting after 1117 days on 30 January 2000 and the lowest 2 days.

The LUT's on Gough and Marion Islands are still operational and are transmitting processed buoy data to South Africa. Due to present bandwidth limitations the raw data can not be send to Argos for processing and distribution on the GTS.

FUTURE PLANS

SAWB has ordered 10 SVPB drifters from Metocean. These drifters will mainly be used to maintain the existing network of drifters in the South Atlantic. Approximately 6 drifters will be deployed during the routine voyage to Gough Island in September 2000. During this voyage it is planned to replace the drifter on Tristan da Cunha, while the present drifter on the Island, which is still operational will deployed in the ocean. The remainder 5 will be deployed during the voyage to Antarctica in December 2000 and January 2001. During this voyage the drifter will be replaced on Southern Thule, while the AWS will be re-installed on Zavadovski. See the attached map on deployment opportunity on the SA Agulhas during September 2000 and December 2000/January 2001.

Three remaining drifters from AOML will be deployed in the Indian ocean from Durban. SAWB also committed to support and deploy drifters in the South Atlantic for the ARGO program.

The SAWB will continue, as in the past, to provide support by means of the Port Meteorological Officer in Cape Town and Durban.

Country: United Kingdom

CURRENT PROGRAMMES

Institute: **CEFAS**
Programme: UK shelf pathways
Number & type of buoys:
a) deployed during year 24
b) operational at 31 August:
c) reporting on GTS at 31 August: 0
Purpose of programme: Oceanographic research
Main deployment areas: UK coastal waters

Institute: **Dunstaffnage Marine Laboratory / Scott Polar Research Inst**
Programme: Short Timescale Motion of Pancake Ice (STiMPI)
Number & type of buoys:
a) deployed during year 6
b) operational at 31 August: 3
c) reporting on GTS at 31 August: 3
Purpose of programme: Sea ice research
Main deployment areas: Weddell Sea

Institute: **The Met. Office**
Programme: EGOS
Number & type of buoys:
a) deployed during year: 32 (21 SVP-B, 4 SVP - BW, 2 TOGA, 5 TOGA WSD) drifters
b) operational at 31 August: 32 drifters + 15 moored
c) reporting on GTS at 31 August: 32 drifters + 14 moored
Purpose of programme: Operational meteorology, oceanography and climate research
Note: 2 of the 16 moored buoys are joint projects between The Met. Office and Météo-France.

An experimental buoy has been operated in St Bride's Bay.

Main deployment areas: North Atlantic, Bay of Biscay and the North Sea

Institute: **The Met. Office**
Programme: IABP/IPAB
Number & type of buoys:
a) deployed during year 1 ice buoy + 2 SVP-Bs contributed to IPAB
b) operational at 31 August: 3 (1 ice buoy + 2 SVP-Bs)
c) reporting on GTS at 31 August: 3 (1 ice buoy + 2 SVP-Bs)
Purpose of programme: Operational meteorology, oceanography and climate research
Main deployment areas: Arctic /Antarctic

Institute: **The Met. Office**
Programme: ISABP
Number & type of buoys:
a) deployed during year 1 WSD TOGA
b) operational at 31 August: 1 WSD TOGA

c) reporting on GTS at 31 August: 1 WSD TOGA
Purpose of programme: Operational meteorology, oceanography and climate research
Main deployment areas: South Atlantic

Institute: **Plymouth Marine Laboratory**
Programme: SF_6 patch tracking
Number & type of buoys:
a) deployed during year 2 drifters
b) operational at 31 August: 0
c) reporting on GTS at 31 August: 0
Purpose of programme: Biological oceanography
Main deployment areas: Southern Ocean

Institute: **Southampton Oceanography Centre**
Programme: WOCE physical oceanography
Number & type of buoys:
a) deployed during year 6 floats
b) operational at 31 August: 6
c) reporting on GTS at 31 August: 0
Purpose of programme: Physical oceanography
Main deployment areas: North Atlantic

Institute: **Southampton Oceanography Centre**
Programme: Acoustic rain measurements
Number & type of buoys:
a) deployed during year 1
b) operational at 31 August: 1
c) reporting on GTS at 31 August: 0
Purpose of programme: Technology development
Main deployment areas: Scottish sea loch

PLANNED PROGRAMMES

All of the above programmes are expected to continue in 2001. Additional activities planned are as follows.

Institute: **British Antarctic Survey**
Programme: Bellingshausen sea ice study
Number & type of buoys planned: 4 Metocean CALIB ice drifters
Purpose of programme: Sea ice research
Main deployment areas: Bellingshausen Sea

Institute: **Proudman Oceanographic Laboratory**
Programme: MYRTLE
Number & type of buoys planned: 1 data capsule with 6 IDs
Purpose of programme: Deep ocean research
Main deployment areas: Southern Ocean

PUBLICATIONS

Brown, J, Hill, A E, Fernand, L and Horsburgh, K J, 1999. Observations of a seasonal jet-like

circulation at the central North Sea cold pool margin. Estuarine Coastal and Shelf Sciences, 44, 343-355.

Burrows, M, Thorpe, S A and Meldrum, D T, 1999. Dispersion over the Hebrides and Shetland shelves and slopes. Continental Shelf Research, 19, 49-55.

Horsburgh, K J, Hill, A E, Brown, J, Fernand, L, Garvine, R W and Angelico, M M P, 2000. Seasonal evolution of the cold pool gyre in the western Irish Sea. Progress in Oceanography 46, 1-58.

Meldrum, D T, 1999. Recent developments at Dunstaffnage: the GPS-Argos drifter, the Smart Buoy and the Mini Drifter. In: *Proceedings of the Sixth Working Conference on Current Measurement, San Diego*, pp 75-81. IEEE.

Meldrum, D, Doble, M, Mercer, D, Peppe, O, Wadhams, P and Wilkinson, J, 2000. A study of the winter Antarctic marginal ice zone using an innovative ice drifter. In: *Proceedings of Oceanology International 2000, Brighton*, pp 73-85. Spearhead Exhibitions Ltd, Kingston upon Thames.

Sherwin, T J, Turrell, W R, Jeans, D R G and Dye, S, 1999. Eddies and a mesoscale deflection of the slope current in the Faroe-Shetland Channel. Deep-Sea Research I, 46, 415-438.

Country: United States of America

Year: 2000

CURRENT PROGRAMMES

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

Number and type of buoys:
(a) deployed during year: 70 (moored on station)
(b) operational at 31 August: 69
(c) reporting on GTS at 31 August: 70

Purpose of programme:
(a) operational: 68
(b) met/ocean research: 1
(c) developmental: 1

Main deployment areas: Atlantic and Pacific Oceans (northern hemisphere); Great Lakes; Gulf of Mexico; Bering Sea.

PLANNED PROGRAMMES

Number and type of buoys planned for deployment in next 12 months: 72 (moored on station)

Purpose of programme:
(a) operational: 68
(b) met/ocean research: 1
(c) developmental: 3

TECHNICAL DEVELOPMENTS

(a) Buoy design: Prototype buoy communications moored buoys in Gulf of Mexico supporting aviation undergoing testing.

(b) Instrumentation:

(c) Others:

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

SPECIAL COMMENTS (if any)

(a) Quality of buoy data: QC of data in real-time for operations

(b) Communications: Through NOAA GOES

(c) Buoy lifetimes: Moored buoy exchanges scheduled every 2 years.

(d) Others:

B. Agency or programme: Pacific Marine Environmental Labs (PMEL)/NOAA/Tropical Atmosphere Ocean (TAO) Array

Number and type of buoys: (a) deployed during year: 58 surface toroids, 3 subsurface

(b) operational at 31 August: 56

(c) reporting on GTS at 31 August: 56

Purpose of programme: (a) operational: ✓

(b) met/ocean research:

(c) developmental:

Main deployment areas: Tropical Pacific

C. Agency or programme: NOAA/PMEL/Pilot Research Array for the Tropical Atlantic (PIRATA)

Number and type of buoys: (a) deployed during year:12 surface toroids

(b) operational at 31 August: 10

(c) reporting on GTS at 31 August: 10

Purpose of programme: (a) operational:

(b) met/ocean research: ✓

(c) developmental:

Main deployment areas: Tropical Atlantic

PLANNED PROGRAMMES

B. Agency or programme: NOAA/PMEL/TAO

Number and type of buoys planned for deployment in next 12 months: 58

Purpose of programme: (a) operational: ✓

(b) met/ocean research:

(c) developmental:

Main deployment areas: Tropical Pacific

C. Agency or programme: NOAA/PMEL/PIRATA

Number and type of buoys planned for deployment in next 12 months: 10

Purpose of programme: (a) operational:

(b) met/ocean research: ✓

(c) developmental:

Main deployment areas: Tropical Atlantic

TECHNICAL DEVELOPMENTS

(a) Buoy design: Taut-line toroidal buoys.

(b) Instrumentation: Added long wave radiation and barometric pressure at selected sites

(c) Others:

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

Plimpton, P.E., H.P. Freitag, and M.J. McPhaden, 2000: Correcting moored ADCP data for fish-bias errors at 0°, 110° W and 0°, 140° W from 1993 to 1995. NOAA Tech. Memo. ERL PMEL-117, 35 pp.

SPECIAL COMMENTS (if any)

(a) Quality of buoy data: Monitored daily

(b) Communications: Argos

(c) Buoy lifetimes: 1 year

(d) Others:

CURRENT PROGRAMMES

D. Agency or programme: NOAA/PMEL/Tsunami DART

Number and type of buoys: (a) deployed during year: 4 moored surface. buoys

(b) operational at 31 August: 4 moored surface. buoys

(c) reporting on GTS at 31 August: none

Purpose of programme: (a) operational: Real-time reporting tsunami network

(b) met/ocean research: N/A

(c) developmental: N/A

PLANNED PROGRAMMES

D. Agency or programme: NOAA/PMEL/Tsunami DART

Number and type of buoys planned for deployment in next 12 months:6 moored surface. buoys

Purpose of programme: (a) operational: Real-time reporting tsunami network

(b) met/ocean research: N/A

(c) developmental: N/A

Main deployment areas: North Pacific, US West Coast, Equatorial Pacific

TECHNICAL DEVELOPMENTS

(a) Buoy design: Moored surface buoy with nearby bottom pressure recorder.

(b) Instrumentation: acoustic modem provides communication between surface buoy and bottom package

(c) Others:

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

Milburn, H.B., A.I. Nakamura, and F.I. Gonzalez. 1996. “Real-Time Tsunami Reporting from the Deep Ocean” Proceedings of the Oceans 96 MTS/IEEE Conference, 23-26 September 1996, Fort Lauderdale, FL, 390-394.

SPECIAL COMMENTS (if any) NONE

(a) Quality of buoy data:

(b) Communications:

(c) Buoy lifetimes:

(d) Others:

CURRENT PROGRAMMES

E. Agency or Programme: NOAA Atlantic Oceanographic and Meteorological Laboratories (AOML)/ Global Ocean Observing System (GOOS)/Global Drifter Center (GDC)

Number and Type of Buoys: (a) deployed during year: 433 SVPs

(b) operational at 31 August: 665 SVPs

(c) reporting on GTS at 31 August: 521 SVPs

Purpose of Programme:

Main deployment areas: Tropical and Southern Oceans

PLANNED PROGRAMMES

E. Agency or Programme: NOAA/AOML/GOOS/GDC

Number and Type of Buoys: 419 SVPs

Purpose of Programme: Met/ocean research and operational

Main Deployment areas: Tropical and Southern Oceans - 205 Tropical Pacific; 87 Tropical Atlantic; 50 Tropical Indian; 77 Southern Ocean

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

Hansen, D.V. and P. -Marie Paulain, 1996. Quality Control and Interpolations of WOCE/TOGA Drifter Data. J. Atmos. Oceanic Tec., 13, 900-909.

CURRENT PROGRAMMES

F. Agency or Programme: National Ocean Partnership Programme (NOPP)/ARGO

Number and Type of Buoys: (a) deployed during year: 7 profiling floats

(b) operational at 31 August: 6

(c) reporting on GTS at 31 August: 6

Purpose of Programme: Met/Ocean Research: 6

Main deployment areas: Atlantic and Pacific Ocean

PLANNED PROGRAMMES

F. Agency or programme: NOPP/ARGO

Number and Type of Buoys planned for deployment in next 12 months: 174

Purpose of Programme: Met/ocean research: 174

Main deployment areas: Global

TECHNICAL DEVELOPMENTS: N/A

CURRENT PROGRAMMES

G. Agency or programme: Naval Oceanographic Office (NAVOCEANO)/Department of Defense (DOD)

Number and type of buoys: (a) deployed during year: 153 SVP-B, SVP-BW, APEX

(b) operational at 31 August: 75

(c) reporting on GTS at 31 August: 75

Purpose of programme: (a) operational: 153

(b) met/ocean research: 1

(c) developmental: 1

Main deployment areas: Global

PLANNED PROGRAMMES

G. Agency or programme: NAVOCEANO/DOD

Number and type of buoys planned for deployment in next 12 months: 150 Davis/code, XAN, SVP

Purpose of programme: (a) operational: 150

(b) met/ocean research:

(c) developmental:

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:

(d) Others:

CURRENT PROGRAMMES

H. Agency or programme: International Arctic Buoy Programme (IABP)/Polar Science Center (PSC)/Applied Physics Laboratory (APL)/University of Washington

Number and type of buoys: (a) deployed during year: 16 Tube-type ice drifters

(b) operational at 31 August: 8

(c) reporting on GTS at 31 August: 8

Purpose of programme: (a) operational:

(b) met/ocean research: 16

(c) developmental:

Main deployment areas: Arctic Ocean

PLANNED PROGRAMMES

H. Agency or programme: IABP/PSC/AOL/University of Washington

Number and type of buoys planned for deployment in next 12 months: 8

Purpose of programme: (a) operational:

(b) met/ocean research: 8

(c) developmental:

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:

(d) Others:

Annex II

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 and development and transfer of appropriate technology.

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

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

5. 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, its technical coordinator and the Secretariats of WMO and IOC as far as resources allow.

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

Panel has at present seven action groups, the reports of which follow:

EGOS Technical Document. No. 218

INTERSESSIONAL REPORT
OF
THE EUROPEAN GROUP ON OCEAN STATIONS
September 1 1999 – September 1 2000

Issued by

The EGOS Technical Secretariat

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EXECUTIVE SUMMARY

The European Group on Ocean Stations (EGOS) was established in 1988, with the objective of maintaining a network of operational ocean stations for observation of oceanographic and meteorological data on a near real-time basis.

The number of EGOS members is 9. The operational costs of the programme are borne by the members. Financial contributions to a common fund are made on a voluntary basis. The programme activities are co-ordinated through the Technical Co-ordinator and a Technical Secretariat, managed by the Management Committee, composed of one representative from each of the participating states.

The EGOS Technical Subgroup was merged into the EGOS Management Committee at the summer meeting in Brest during May 26-27 1999. At the same meeting, the Principal GTS Co-ordinator functions and deployment co-ordination was transferred from the Technical Secretariat to the EGOS Technical Co-ordinator. The Management Committee has appointed Mr. Pierre Blouch as Technical Co-ordinator. EGOS is currently reviewing its Basic Documents accordingly.

Reports on the status of the EGOS buoy programmes are issued by the EGOS Technical Secretariat on a monthly basis in the EGOS Technical Document series.

The number of drifting buoys operating in the EGOS programme at the end of each month in the intersessional period varied between 31 and 55. The latter, is the highest number ever since EGOS was established. A total of 62 drifting buoys were deployed and 47 buoys ceased to operate in the intersessional period. The corresponding numbers for 1998 were 50 deployments and 60 ceased. In 1999 71 buoys were deployed and 57 ceased to operate. The average operational lifetime of the EGOS drifting buoys in 1999 was 204 days, however if the buoys that suffered very early failure are excluded the average operational lifetime increases to 242 days. In 1998 the average operational lifetime was 281 days and in 1997, 252 days. The average lifetime of the buoys that ceased to operate during the intersessional period was 210 days. If the early failures are excluded, the average lifetime for the intersessional period is 251 days.

In addition to the drifting buoys 13 moored buoys were part of EGOS. 9 of these are operated by UKMO, two are operated jointly by UKMO and Météo-France, and two are operated by Météo-France.

All EGOS drifting buoys observe air pressure and sea surface temperature. About half of the buoys also observe air temperature. The observation programme for the moored buoys is more comprehensive, and includes data such as waves and humidity. The calculated air pressure tendency and housekeeping data are also in the routine reports, which include the last synoptic observation together with stored (synoptic) observations.

Drifting buoy data are transmitted via the Argos satellite system and processed by Service Argos and two Local User Terminals, Located in Søndre Strømfjord and Oslo. The data are further disseminated via the GTS on a near real-time basis. Moored buoy data are transmitted on GTS via the Meteosat geo-stationary satellite.

Data quality and data regularity are controlled and monitored on a near real-time basis, mainly by the Technical Co-Ordinator, and via the GTS bulletin board buoy-qc@vedur.is, supported by the Icelandic Met. Office. About 40 % of the data are received at the meteorological centres within 90 minutes after the observation was made.

The group has formalised its extended area of primary interest to the area bonded by 30ºN in the South, -65ºN in the North, 50ºW in the west and the European Continent in the East, including the adjacent seas; the Baltic Sea, the North Sea and the Mediterranean Sea. The group is also discussing mechanisms for formalising the closer collaboration that has developed in recent years with operational buoy operators in North America, and at the request of the DBCP, is investigating possibilities for closer collaboration with climate research institutions with interests in the North Atlantic.

The EGOS brochure that was issued in 1996 has continued to help stimulate relations with other data buoy groups and organisations. The brochure was updated in 2000. EGOS is listed on the DBCP server as one of its action groups.

1 INTRODUCTION

A list of commonly used acronyms is in Annex 1. A list of buoy types is found in Annex 2.

The European Group on Ocean Stations (EGOS) was established in 1988 by a number of European organisations, as a joint operational project. Its objective was to co-ordinate their activities, particularly in respect of buoy based observations, in the North Atlantic as a follow up to COST 43.

EGOS became later an Action Group of the DBCP. The main objective of the group is to maintain a network of operational stations for observation of meteorological and oceanographic data from the North Atlantic on near real-time basis.

The project is managed by the EGOS Management Committee, composed of one representative from each of the participating states. The costs of the operation of the group are borne by the participants. Financial contributions to a common fund are made on a voluntary basis.

Participation in the EGOS is based on Letters of Agreement signed by the directors of the respective participating institutions. The Summary of Agreements and the Rules of Procedures have been deposited with the Secretary-General of WMO and the Secretary of IOC.

The EGOS Technical Document No. 178 ('EGOS Basic Documents') contains relevant background information on formal issues such as the 'Summary of Arrangements', the EGOS Project and the Joint Programmes maintained and co-ordinated by EGOS.

As a formalisation of its recent deployment strategies the Management Committee agreed to extend the EGOS primary area of interest to cover the sea area from the European coastline out to 50 °W, between 30°and 65°N, including adjacent seas, the Baltic Sea, the Mediterranean Sea and the North Sea.

2. THE MANAGEMENT COMMITTEE OF EGOS

2.1 Meetings

The Management Committee met twice in the intersessional period:

- The winter meeting was held at the IOC headquarters in Paris on December 7-8, 1999. At this meeting the Management committee re-elected Mr Wynn Jones and Mr. Wil C.M. van Dijk as respectively Chairman and Vice-Chairman. KNMI offered to host the summer meetings of EGOS in year 2000. A report on the conclusions and recommendations of the December 99 meeting is in EGOS Tech. Doc. No. 209.
- The summer meeting was held at the Royal Dutch Meteorological Institute (KNMI) in De Bilt, during May 30 and 31 2000. A report on the conclusions and recommendations of this meeting is in EGOS Tech. Doc. No. 215.

3. THE TECHNICAL SUBGROUP OF EGOS

3.1 Meetings

The Technical Subgroup of EGOS met once in the intersessional period, in combination with the Management Committee meeting in December 1999 (see above):

The Technical Subgroup of EGOS was formally dismantled at the winter meeting at the IOC headquarters in Paris on December 7-8, 1999. This was a formalisation of the Management Committee's decision to merge the EGOS Technical Subgroup with the Management Committee. It was, however, noted that the technical work would still require a focal point, but that this could be achieved through the appointment of a Technical Co-ordinator. The Management Committee appointed Mr. Pierre Blouch as Technical Co-Ordinator of EGOS, with responsibility for deployment co-ordination and GTS matters. Mr Pierre Blouch continued to act as Chairman of the EGOS Technical Subgroup until the December 99 meeting.

4. ADMINISTRATIVE AND FINANCIAL MATTERS

4.1 Membership of EGOS

The current active members of EGOS are:

Denmark	Danish Meteorological Institute
France	Météo-France
Germany	German Weather Service
Iceland	The Icelandic Meteorological Office
Ireland	Irish Meteorological Service
The Netherlands	Royal Netherlands Meteorological Institute
Norway	The Norwegian Meteorological Institute
Sweden	Swedish Meteorological and Hydrological Institute
United Kingdom	The Met Office

4.2. Financial Matters

The EGOS Common Fund is based on voluntary contributions, mainly to cover the service of the Technical Secretariat. WMO handles the EGOS Common Fund on behalf of the EGOS Management Committee.

Calls for national contributions for 1999 were issued by WMO.

On behalf of the EGOS Management Committee WMO established a contract with Christian Michelsen Research A/S (CMR) in Bergen, for the continued service of the EGOS Technical Secretariat for 1999. The contract sum was GBP 24 543.

During its meeting in December 1999 the Management Committee agreed that the calls for voluntary contributions to the Common Fund for year 2000 should be unchanged relative to 1999.

On June 29th 1999, the Chairman of the Management Committee made an invitation to Christian Michelsen Research AS to continue its service of the Technical Secretariat in 2000, excluding all PGC tasks and deployment co-ordination.

The German Weather Service contributes to the work of EGOS through a bilateral contract with CMR.

5. EGOS TECHNICAL CO-ORDINATION AND SECRETARIAT

5.1 The EGOS Technical Secretariat

The Technical Secretariat has in the intersessional period continued its functions according to the Terms of Reference and the instructions given by the Management Committee and on the basis of the contract.

The contract for the Technical Secretariat is a contract between WMO and CMR, and all main secretariat functions lie with Christian Michelsen Research, Norway, represented by Mr. Torleif Lothe.

The Technical Secretary has continued to report and monitor the activities in the EGOS drifting buoy programme, following the established routines. The status of the operating buoys has been closely monitored and reported in close co-operation with the Technical Co-Ordinator. The duties of the Technical Secretary Includes;

Preparation for meetings, including preparing and issuing the relevant documents and reports
Provision of advice and technical assistance to participants in the EGOS programmes
As directed by the Management Committee, act as the focal point for information on EGOS programmes and their status.
In the absence of the Technical Co-ordinator, undertake any urgent GTS related matters.
Reporting to the Management Committee on the progress of programs and the results of missions carried out.
Maintenance of the EGOS buoy metadatabase.
Preparation and publication of the EGOS Monthly reports
Preparation and publication of the EGOS Annual report, and intersessional reports for CGC and DBCP.

Discussions have continued on the possibilities of sharing work task between CMR and CMM, during 1999. At the EGOS summer meeting in Brest, the EGOS Management Committee decided to appoint Mr. Pierre Blouch as Technical Co-ordinator of EGOS, with responsibility for deployment co-ordination and Principle GTS Co-ordinator (PGC) tasks. The transfer of the tasks was effective from 15 July 1999.

Reports

The following EGOS reports and documents have been completed in the intersessional period (A complete list is found in Annex 3)

- The EGOS Annual report for 1999. A draft version was revised by the Management Committee during the winter meeting in December 1999, and subsequently amended and issued as Techn. Doc. No. 206.

- The report on the EGOS meeting in Brest in May 1999 (EGOS Techn. Doc No 200), and on the EGOS Meeting in De Bilt May 2000 (EGOS Technical Doc. No 215, draft).

- Annual reports on EGOS for the DBCP and CGC meetings in 2000 (EGOS Techn. Doc. No 213 and 218).

- Monthly reports on the status of the EGOS programme during 1999 and 2000. These reports describe the operational status of the programme, the performance of the buoys and the data quality based on statistics provided by Météo-France and on drift track maps provided by the Danish Met. Office.

- All Reports issued by the EGOS Technical Secretariat later than January 1 2000 is available on the web at http://www.cmr.no/conmar/egos. Some older reports are also available.

5.2 The Technical Co-ordinator of EGOS

At the EGOS summer meeting in Brest 99, the EGOS Management Committee decided to appoint Mr. Pierre Blouch as Technical Co-ordinator of EGOS, with responsibility for deployment co-ordination and Principle GTS Co-ordinator (PGC) tasks. The transfer of the tasks was effective from 15 July 1999. Terms of reference for the Technical Co-ordinator have been established by the Management Committee of EGOS.

The Technical Co-ordinator is in charge of the technical and operational activities of contributors to EGOS programmes . He or she will be appointed by the committee from Parties to the programme, normally on an annual basis

The duties of the Technical Co-ordinator include making proposals for the deployment strategies, to co-ordinate the deployments of all available drifting buoys ,and to arrange for the insertion of their data onto the GTS. The Technical Co-ordinator shall, where appropriate, make arrangements for changes of the status of drifting buoys reporting on the GTS, with the agreement of the contributor.

The Technical Co-ordinator also provides monthly statistics and status tables of buoy performance for inclusion in the EGOS monthly report.

The Technical Co-ordinator may make proposals for new ODAS programmes to meet requirements for marine meteorological and oceanographic data and make proposals on scientific, engineering and operational matters relating to ODAS programmes. He or she may co-ordinate the exchange of information on these matters.

The Technical Co-ordinator reports to the Management Committee of EGOS.

6. LIAISON WITH INTERNATIONAL ORGANISATIONS

EGOS maintains a close co-operation with international organisations working in the same field.

WMO and IOC
WMO manages the EGOS Common Fund and financial matters on behalf of the EGOS Management Committee. WMO and IOC were represented at the EGOS meeting in December 1999 by Mr. Yves Tréglos.

DBCP
Mr. Etienne Charpentier, Technical Co-ordinator of the DBCP, presented reports on behalf of the DBCP at the winter meeting in Paris. Quality control of EGOS buoy data is regularly monitored in the context of the DBCP quality control guidelines.

The mail distribution list for data quality control *buoy-qc@vedur.is* is actively used for communication and information exchange.

EUCOS
EUCOS was represented by its Programme Manager, Mr. François Gerard at the summer meeting in Brest.

International Meetings
Mr. Wynn Jones represented EGOS at the DBCP-XIV meeting in Wellington, New Zealand in October 1999.
Mr. Hreinn Hjartarson represented EGOS at the CGC meeting in Geneva, in August 2000.

In September 1999 EGOS was represented at the CLIVAR 99 in Vancouver, Canada by Dr. Volker Wagner.

Reports on EGOS were presented at these meetings by the EGOS representatives (EGOS Technical Docs. No 197 and 213).

7. EGOS DRIFTING BUOYS

7.1 Development of the operational programme

The annual average for the number of operational EGOS drifting buoys in each month increased significantly in 1997 and 1998. 1999 was very similar to 1998 in terms of the average number of operational buoys. In this context, the word operational is used for a buoy transmitting useable air pressure data on GTS. The large number of buoys deployed during the FASTEX experiment in January 1997 gave a total of 36 operational buoys by the end of January 1997. The number of operational drifting buoys reached a second maximum of 43 in December the same year. The high number of operational drifting buoys continued during 1998, with a maximum of 50 operational drifting buoys in April 1998. This figure remained the largest number of operational drifting buoys ever in the EGOS history until May and June 2000, when the number of operational buoys reached 55. The most dramatic increase is seen in EGOS South. The fact that France began contributing buoys to the Programme in 1997 is reflected in the increased number. The minimum number of operational drifting buoys by the end of each month in the intersessional period was 36, maximum was 55.

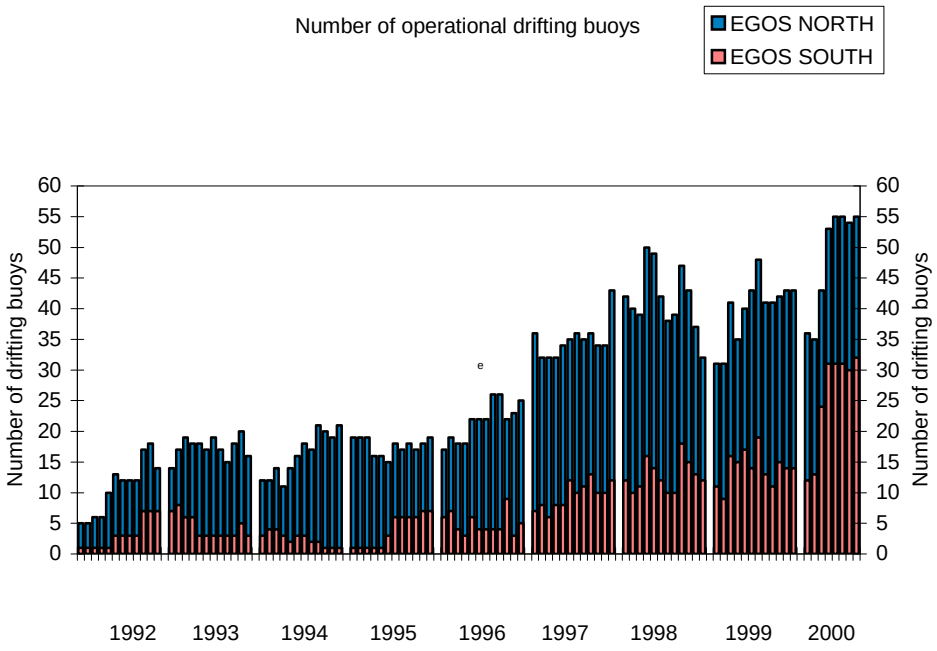


Figure 1. The number of operational EGOS drifting buoys by the end of each month 1992-August 2000.

The annual average number of operational drifting buoys in 1999 was 40. In 1998 this number was 42. The corresponding values for 1997 and 1996 were 35 and 21 respectively. For the intersessional period it was 46.

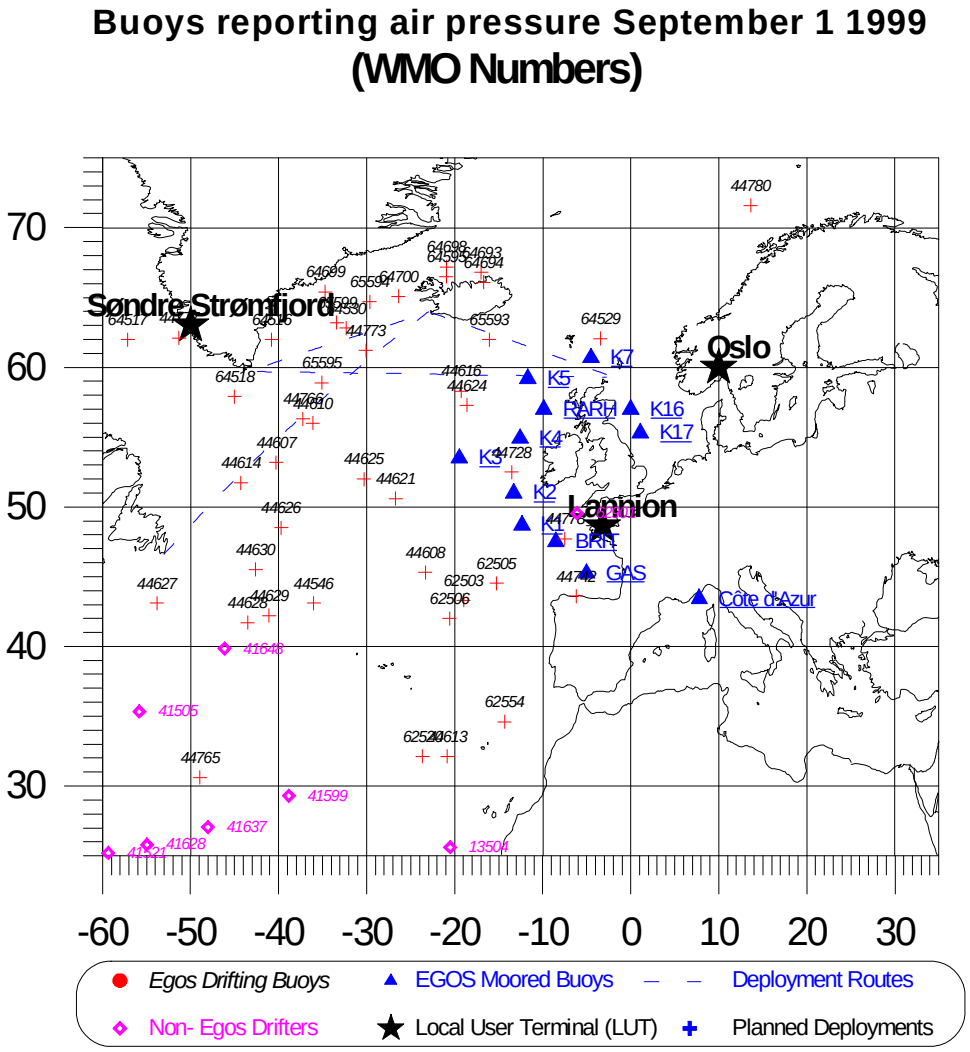


Figure 2. Distribution of EGOS buoys at September 1st , 1999.

As at September 1st 1999, a total of 41 Drifting buoys were operating in EGOS, 28 in EGOS North and 13 in EGOS South (Figure2).

As at September 1st, 2000 a total of 55 drifting buoys were operating in EGOS, 23 in EGOS North and 32 in EGOS South area (Figure 3). In addition, two EGOS buoys were transmitting SST data only. The North / South division refers to where the buoy was originally deployed, and not where it operates at a given time. See map in Figure 3. Very few (typically 1-2,up to 5-6) non-EGOS drifters have operating north of the southern boundary of the EGOS area of interest (30ºN) in the intersessional period.

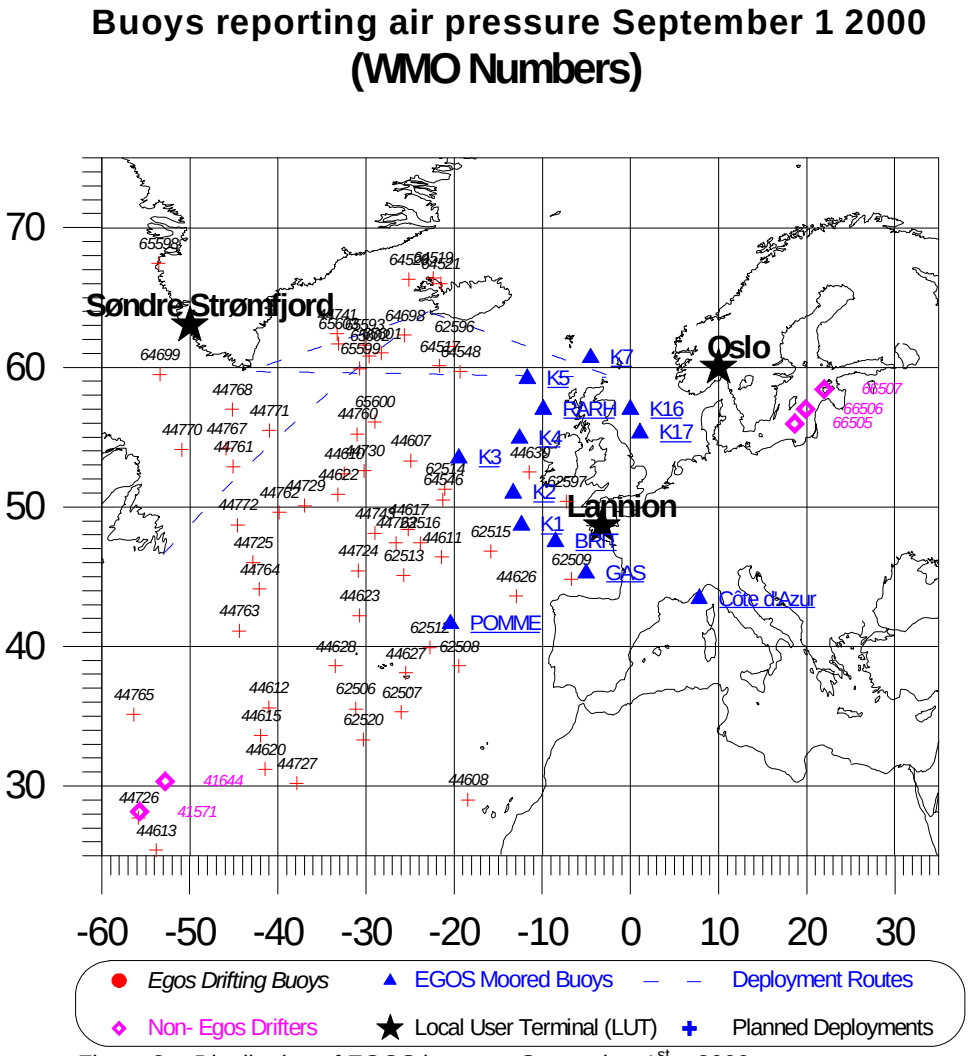


Figure 3. Distribution of EGOS buoys at September 1st , 2000.

7.2 Deployment of new buoys

Drifting buoys are supplied by most EGOS members. Most members supply 1 or 2 buoys per year. UKMO and Météo-France were been the largest contributors in the intersessional period, with respectively 32 and 12 deployments. In addition to the buoys supplied by the EGOS members, 2 CMOD Drifters and 3 SVP- Drifters were supplied by NAVOCEANO.

Pre-deployment testing and deployment of buoys in EGOS is organised through UKMO, the Icelandic Meteorological Office in Reykjavik, CMR in Bergen, and Météo-France in Brest, depending of which buoy is being deployed.

A total number of 62 drifting buoys were deployed in EGOS in the intersessional period.. The corresponding number for the previous years are 71 1999, 50 in 1998 , 53 in 1997 it was 53, 22 in 1996 . These were either ConMar buoys (11), Metocean TOGA (FGGE) type buoys (7), Marisonde buoys (2), SVP-B type buoys (40) or CMOD Drifters (2). 5 of the SVP-B buoys had wind sensors (SVP-BW), and 4 had Salinity Sensor (SVP-BS). Five of the Metocean TOGA (FGGE) buoys had wind sensors. 5 of the ConMar buoys had a GPS receiver. See Table 1 and Fig. 4 for other details.

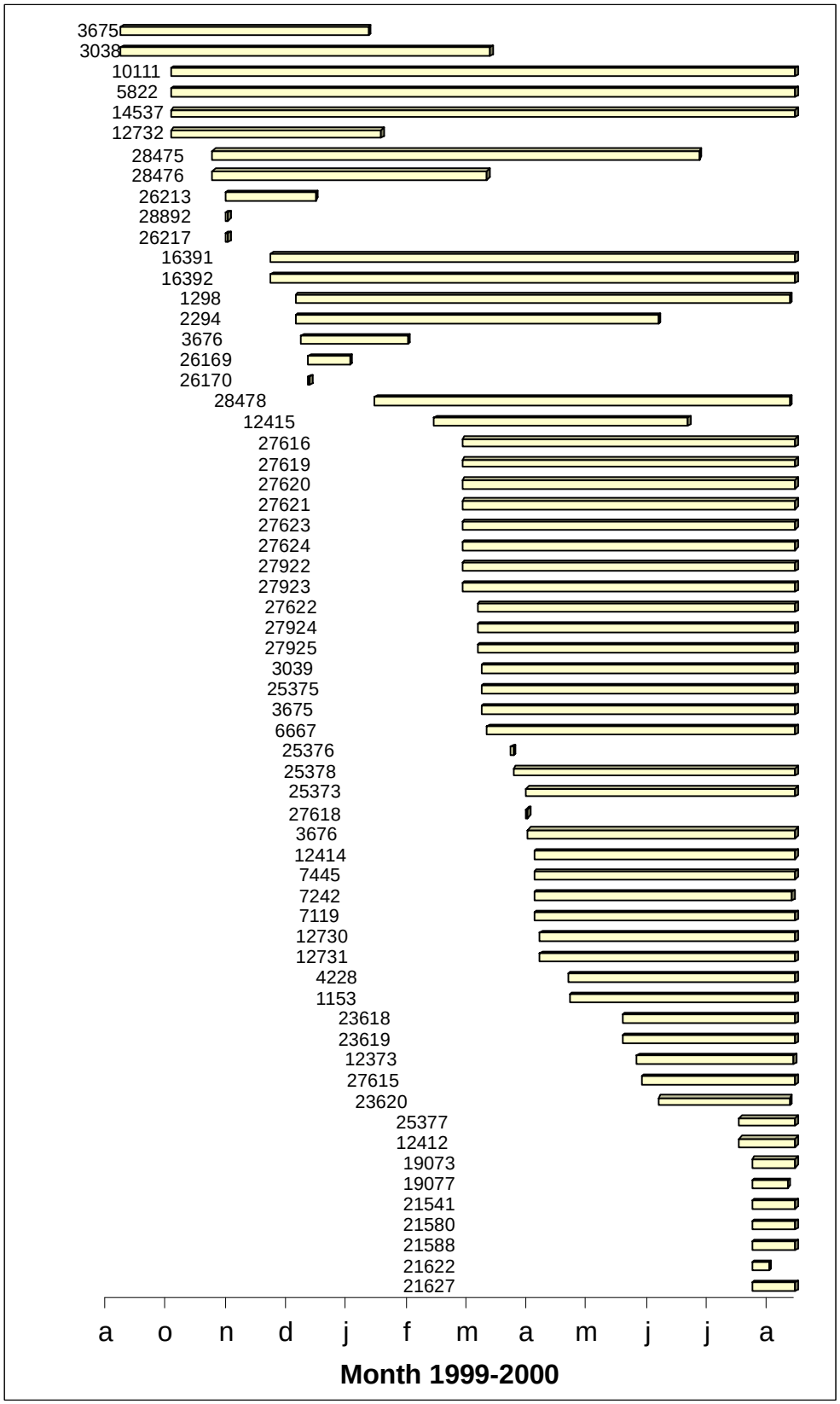


Figure 4. Diagram showing the successive deployments and operational periods of EGOS buoys in the intersessional period. Only buoys deployed between September 1 1999 and September 1 2000 are shown.

Table. 1. List of all EGOS drifting buoys deployed September 1st 1999-September 1st 2000.

WMO	ARGOS	Owner	Buoy	DepDate	Deployed from	Status Sept 1 2000	Comment
64546	3675	NO	C/S	05.09.99	Bergen-RAL	Ashore	Redepl Recov
65596	3038	IR	C/S	06.09.99	Bergen-RAL	Ashore	Redepl
62507	10111	FR	MS-B	02.10.99	Fr(Alycon)	Operating	
62508	5822	FR	MS-Gi	03.10.99	FR(Alycon)	Operating	
62509	14537	FR	SVP-B	03.10.99	FR(Alycon)	Operating	
62510	12732	FR	SVP-BW	04.10.99	FR(Alycon)	Faded	AP Rem24.1.00
44721	28475	UK	MO-W	26.10.99	Iceland	Pickup	
44722	28476	UK	MO	26.10.99	Iceland	Ashore	
44514	28892	US	SVP-B	02.11.99	Air Depl.	Failed	AP Noisy
44515	26217	US	SVP-B	02.11.99	Air Depl.	Failed	Failed
44513	26213	US	SVP-B	02.11.99	Air Depl.	Faded	
62596	16391	NL	SVP-B	25.11.99	Iceland	Operating	
44723	16392	NL	SVP-B	26.11.99	Iceland	Operating	
65600	3676	NO	C/B	07.12.99	Bergen-RAL	Ashore	Recovered
64547	2294	GE	C/B-GPS	07.12.99	Bergen-RAL	Ashore	Redepl
65598	1298	GE	C/B-GPS	08.12.99	Bergen-RAL	Ashore	
44516	26169	US	CMOD	16.12.99	Air Depl	Failed	Failed
44517	26170	US	CMOD	16.12.99	Air Depl	Failed	Failed
62597	28478	UK	MO-W	18.01.00	Iceland	Pickup	
44773	12415	UK	MO-W	20.02.00	Iceland	Faded	Redeployed
44611	27616	UK	SVP-B	05.03.00	Air Depl	Operating	Drogue Lost
44612	27619	UK	SVP-B	05.03.00	Air Depl.	Operating	
44615	27620	UK	SVP-B	05.03.00	Air Depl.	Operating	
44617	27621	UK	SVP-B	05.03.00	Air Depl.	Operating	
44724	27922	UK	SVP-BW	05.03.00	Air Depl	Operating	
44725	27923	UK	SVP-BW	05.03.00	Air Depl	Operating	
44622	27623	UK	SVP-B	06.03.00	Air Depl	Operating	
44623	27624	UK	SVP-B	06.03.00	Air Depl	Operating	
64546	3675	NO	C/S	15.03.00	Iceland	Operating	Redepl(2)
44620	27622	UK	SVP-B	15.03.00	AirDepl	Operating	
44726	27924	UK	SVP-BW	15.03.00	Air Depl	Operating	
44727	27925	UK	SVP-BW	15.03.00	Air Depl	Operating	Drogue Lost
44729	25375	UK	SVP-B	16.03.00	Iceland	Operating	
65601	3039	GE	C/B-GPS	17.03.00	Bergen-RAL	Operating	
65602	6667	IR	C/S-GPS	18.03.00	Bergen-RAL	Operating	
44730	25378	UK	SVP-B	01.04.00	Iceland	Operating	
	25376	UK	SVP-B	02.04.00	Iceland	Failed	Failed
44741	25373	UK	SVP-B	10.04.00	Iceland	Operating	
65600	3676	NO	C/B	10.04.00	Iceland	Operating	Redepl
65603	27618	UK	SVP-B	11.04.00	Iceland	Operating	AP Failed
44743	12414	UK	MO-W	12.04.00	Iceland	Operating	
62514	7119	FR	SVP-B	13.04.00	France	Operating	
62515	7242	FR	SVP-B	14.04.00	France	Faded	Double Barometer
62512	12730	FR	SVP-BS	14.04.00	France	Operating	
62516	7445	FR	SVP-B	14.04.00	France	Operating	Double Barometer
62513	12731	FR	SVP-B	14.04.00	France	Operating	
64548	1153	IR	C/B-GPS	30.04.00	Bergen-RAL	Operating	
65593	4228	NL	C/S	01.05.00	Bergen-RAL	Operating	Redeployed
64519	23618	FR	SVP-BS	31.05.00	Icel-IMRI	Operating	Prototype
64520	23619	FR	SVP-BS	31.05.00	Icel-IMRI	Operating	Prototype
44760	12373	UK	MO	07.06.00	Iceland	Faded	Unstable PTT
44761	27615	UK	SVP-B	09.06.00	Iceland	Operating	
64521	23620	FR	SVP-BS	19.06.00	Icel-IMRI	Ashore	
44771	25377	UK	SVP-B	31.07.00	Iceland	Operating	
44772	12412	UK	MO-W	01.08.00	Iceland	Operating	
44763	19077	UK	SVP-B	08.08.00	Air Depl	Failed	Failed
44769	21622	UK	SVP-B	08.08.00	Air Depl.	Failed	Failed
44762	19073	UK	SVP-B	08.08.00	Air Depl	Operating	Drogue lost
44764	21541	UK	SVP-B	08.08.00	Air Depl.	Operating	
44767	21580	UK	SVP-B	08.08.00	Air Depl.	Operating	
44768	21588	UK	SVP-B	08.08.00	Air Depl	Operating	
44770	21627	UK	SVP-B	08.08.00	Air Depl	Operating	

7.3 Operational lifetime statistics

47 EGOS-buoys ceased to operate in the intersessional period. A complete list of all the buoys that ceased to operate September 1 -1999-September 1 2000. is found in table 2. This includes buoys that completely failed to transmit due to technical failure or battery exhaustion, buoys with air pressure sensor failure and buoys that ran ashore. In 1999,18 of 57 buoys ran ashore (32%). In 1998, 10 of 60 buoys ran ashore (17%). For the intersessional period 22 of 47 buoys ran ashore (or 47 %). The number of SVP-B failures was 8 of 28 (or 29 %) in 1999. For the intersessional period it was 6 of 17 (or 35%).. The lifetime of all buoys that ceased to operate in the intersessional period is shown in Figure 5.

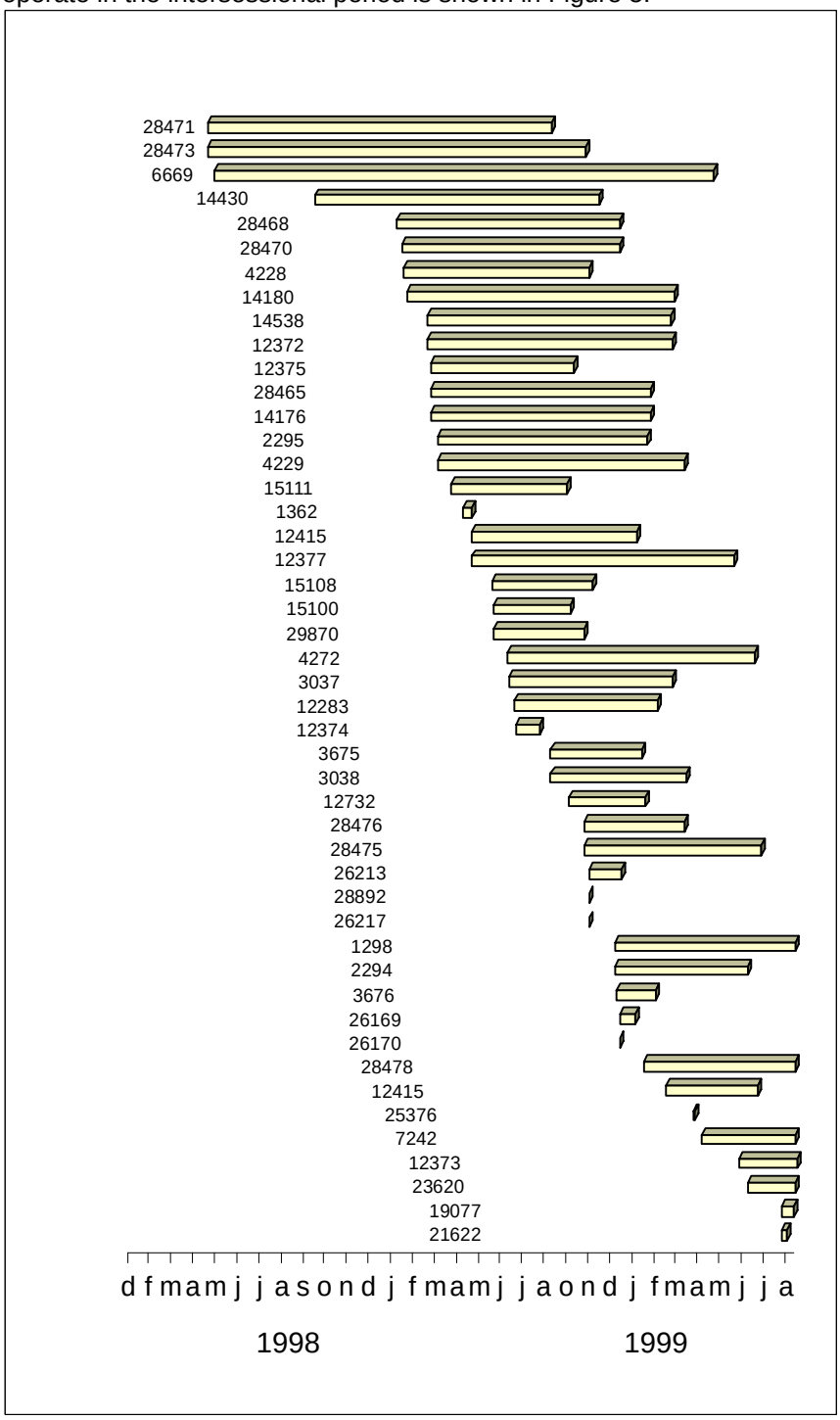


Figure 5. Diagram showing all EGOS buoys that ceased to operate September 1 1999-September 1 2000.. The average lifetime was 210 days. ARGOS Numbers are shown to the left of each bar.

The average lifetime for the drifting buoys that ceased to operate in the intersessional period was 210 days. In 1999 the average was 204 days, in 1998 it was 281 days, and in 1997 the average lifetime was 252 days, in comparison to 336 days in 1996, which was the highest average since EGOS was established. Figure 6 shows the development of annual average lifetimes for EGOS drifting buoys since 1990.

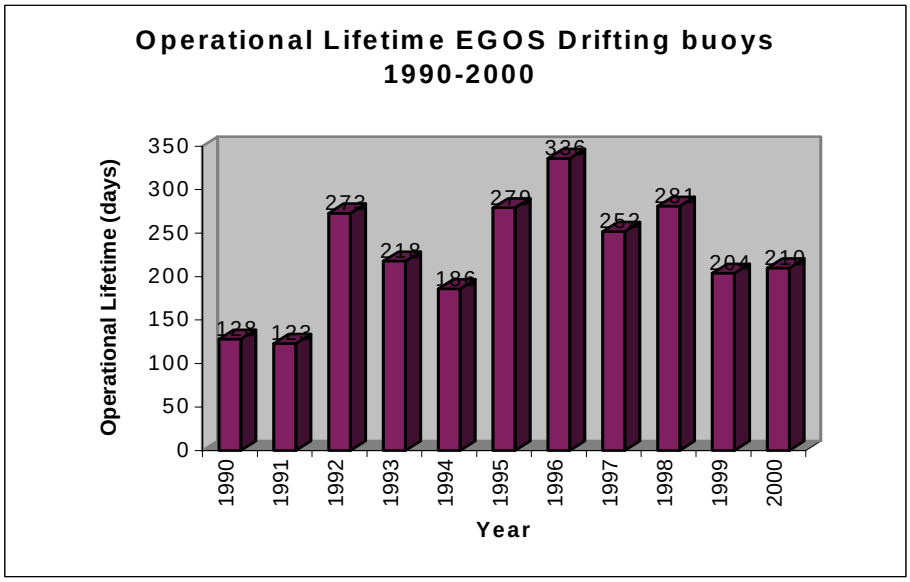


Figure 6. Average operational lifetimes of EGOS drifting buoys, 1990-2000. The value for 2000 is the average lifetime of all buoys that ceased to operate from September 1 1999-September 1 2000.

The decrease in the operational lifetime since 1996 is due to the increasing fraction of short-lived SVP-B Drifters. For 1999 the 7 CMOD drifters contributes to the rather low figure. The CMOD drifters have a nominal lifetime of about 3 months. The average lifetime of the EGOS SVP-B Drifters that ceased to operate was 145 days in 1997 and 158 days for 1998. In 1999 the average lifetime for all SVP-B drifters deployed in EGOS was 130 days. For the intersessional period the average is 120 days.

The percentage of all EGOS SVP-B Drifters that suffered an early failure was 19 % in 1998 and 29 % in 1999. 6 of 17 SVP-B Drifters (35%) failed in the intersessional period. Excluding the early failures, the average lifetime for the SVP-B Drifters was 196 days in 1998, 181days in 1999 and 181 days in the intersessional period. The average lifetime for the TOGA/FGGE style buoys inn 1997 was 303 days, 464 days in 1998, 335 days in 1999 and 279 days in the intersessional period. The 2 CMOD drifters that ceased to operate in the intersessional period both failed. For 1999 the average operational lifetime of the CMOD Drifters was 87 days, which was very close to their nominal lifetime of 90 days. The average lifetime of all EGOS buoys that ceased to operate excluding early failures was 312 days in 1998, and 242 days in 1999. In the intersessional period the average lifetime excluding failures was 252 days. Finally, the average lifetime for all EGOS buoys excluding the CMOD drifters and the early failures was 262 days for 1999, and 252 days for the intersessional period.. A complete list of all EGOS buoys that ceased to operate September 1 1999-September 1 2000 is found in table 2.

Table. 2 EGOS drifting buoys that ceased to operate September 1 1999-September 1 2000.

WMO	ARGOS	Owner	Buoy	DepDate	Stopped	OperDays	Comment line
64529	6669	GE	C/B-GPS	25.04.98	02.05.00	728	
44742	28471	UK	MO	17.04.98	09.09.99	503	
44778	28473	UK	MO	18.04.98	29.10.99	553	
62554	14430	FR	MS-B	19.09.98	18.11.99	415	
44616	28468	UK	MO	18.01.99	17.12.99	325	
44624	28470	UK	MO	18.01.99	16.12.99	318	
65593	4228	NL	C/S	22.01.99	03.11.99	271	Recovered
44621	12372	UK	MO	07.03.99	03.03.00	357	
44728	12375	UK	MO	08.03.99	11.10.99	210	
44766	28465	UK	MO	08.03.99	31.01.00	322	
44546	14538	FR	SVP-B	10.03.99	01.03.00	357	
62503	1362	FR	SVP-B	02.05.99	21.04.00	13	Barometer fail 15.5.99
64518	14180	FR	SVP-B	09.02.99	06.03.00	391	
64516	14176	FR	SVP-B	14.03.99	31.01.00	322	
65594	2295	GE	C/B-GPS	17.03.99	25.01.00	306	
65595	4229	NL	C/S	18.03.99	20.03.00	361	
64595	15111	IC	SVP-B	14.04.99	30.09.99	169	
44777	12377	UK	MO-W	09.05.99	01.06.00	384	
44773	12415	UK	MO-W	10.05.99	11.01.00	242	Recovered
65600	3676	NO	C/B	07.12.99	07.02.00	57	Recovered
65598	1298	GE	C/B-GPS	08.12.99	28.08.00	263	
64547	2294	GE	C/B-GPS	07.12.99	19.06.00	193	Redepl
44513	26213	US	SVP-B	02.11.99	10.01.00	48	
44514	28892	US	SVP-B	02.11.99	09.12.99	1	AP Noisy
44515	26217	US	SVP-B	02.11.99	03.11.99	1	Failed
44516	26169	US	CMOD	16.12.99	07.01.00	22	Failed
44517	26170	US	CMOD	16.12.99	17.12.99	1	Failed
64700	29870	IC	SVP-B	16.06.99	26.10.99	132	
64693	15100	IC	SVP-B	16.06.99	05.10.99	111	
64530	4272	GE	C/B-GPS	04.07.99	29.06.00	360	
64694	15108	IC	SVP-B	13.06.99	08.11.99	147	
44614	3037	GE	C/B-GPS	06.07.99	03.03.00	239	
44625	12283	UK	MO	15.07.99	09.02.00	208	
44629	12374	UK	MO	15.07.99	01.12.99	35	Ap failure
44721	28475	UK	MO-W	26.10.99	11.07.00	259	
62597	28478	UK	MO-W	18.01.00	28.08.00	221	
44722	28476	UK	MO	26.10.99	20.03.00	146	
64546	3675	NO	C/S	05.09.99	17.01.00	132	Redepl Recov
65596	3038	IR	C/S	06.09.99	22.03.00	197	Redepl
62510	12732	FR	SVP-BW	04.10.99	30.05.00	112	AP Rem24.1.00
	25376	UK	SVP-B	02.04.00	03.04.00	1	Failed
44760	12373	UK	MO	07.06.00	30.08.00	83	Unstable PTT
44773	12415	UK	MO-W	20.02.00	05.07.00	135	Redeployed
62515	7242	FR	SVP-B	14.04.00	29.08.00	137	Double Barometer
64521	23620	FR	SVP-BS	19.06.00	28.08.00	70	
44763	19077	UK	SVP-B	08.08.00	27.08.00	19	Failed
44769	21622	UK	SVP-B	08.08.00	17.08.00	9	Failed

7.5 Data reception and dissemination

The data from the buoys in the EGOS North are received by the ARGOS System and by the independent LUTs in Oslo and Søndre Strømfjord which are operated by the Norwegian and Danish Met. Services, respectively. Data are further disseminated from these centres on the GTS on a near real-time basis.

The EGOS south region (south of 50°N) can only be adequately served by the Argos System, and the data are therefore disseminated on the GTS mainly by Météo France in Toulouse (LFPW).

Studies have been carried out at the Icelandic Meteorological Office on the mean number of useful reports from the EGOS North drifting buoys received in Reykjavik per day via LFPW (Toulouse), ENMI (Oslo) and BGSF (Søndre Strømfjord). These investigations include studies on the effect of data reception from all centres, on the data recovery rate and on the data reception via the GTS as a function of the hour of the day, with "cut-off" times of 90 and 210 minutes. Fig. 7 shows an example for the mean hourly reception during April 1999, showing the impact of varying the duration of the cut-off period.

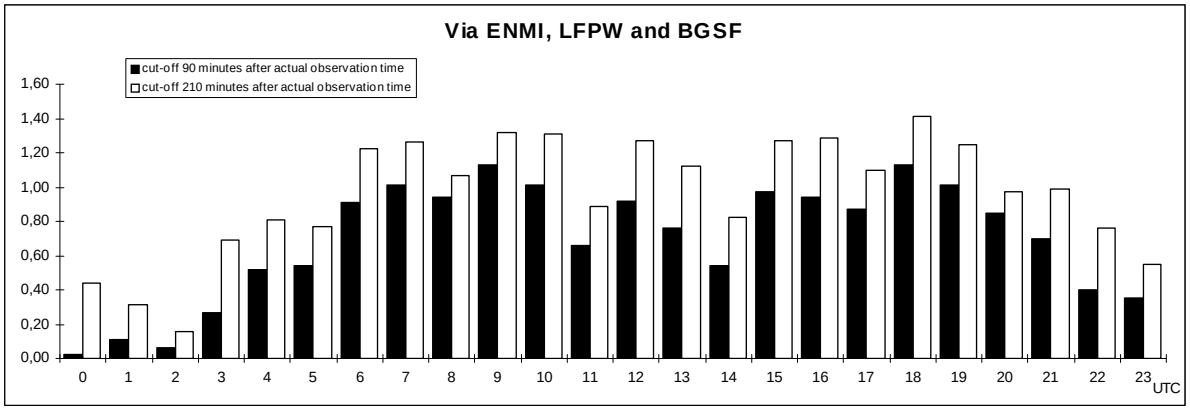


Figure 7. Diurnal Variation in EGOS-North Buoy Reception April 1999, showing the impact of varying the duration of the cut-off period. The figure was provided by the Icelandic Met. Office (H. Hjartarson).

During selected months in 1999 data reception based on all originating centres together varied between 14 – 22 messages per day for each buoy in EGOS North. In EGOS South the data reception was less satisfactory. It is further concluded that the timeliness of the data and the average reception rate are similar to that for the previous years.

7.6 Data Quality and Data Quality Control

The EGOS Technical Co-ordinator is responsible for the quality of buoy data transmitted on the GTS. Following the DBCP guidelines, information on data quality for EGOS buoys is collected through the buoy-qc mailing list , operated by the Icelandic Meteorological Office. Information comes from the Principal Meteorological and Oceanographic Centres (PMOCs) such as the Icelandic Meteorological Office, the UK Meteorological Office ant Météo-France.

In addition to warning messages related to specific buoys, four PMOCs provide monthly statistics of comparisons between buoy data and co-located model output data. These statistics are available on the Internet through a user-friendly interface at http://www.shom.fr/meteo/rechstat.

Monthly statistics provided by Météo-France are shared according to the origin of the reports on GTS. They are issued for EGOS buoys in the EGOS monthly reports.

The Technical Co-ordinator also performs additional quality control procedures and instructs Service Argos and the LUT operators to delete erroneous data from the GTS-

The UK Meteorological Office also publishes quarterly reports on drifting buoys in the North Atlantic. These reports are mainly used to take stock, a posteriori, of the results in matters of quality control.

8. TECHNICAL DEVELOPMENTS

8.1 Air pressure sensors

A comparison made by the UKMO between SOLATRON and PAROSCIENTIFIC barometers had shown that the differences in measurements between the two sensors were insignificant. In 1997 the UK installed SOLARTRON barometers on all of their TOGA (FGGE) style EGOS buoys. Also CMR in Bergen made their electronics unit adaptable to the SOLARTRON barometer in 1997, and an increasing fraction of the ConMar buoys now have SOLARTON barometers. A variety of other Barometer types are also in use, including AIR SB-2A, Vaisala PTB-100 Vaisala PT201A or Air DB−2A. CMOD Drifters, built by Metocean, are equipped with low precision Motorola MX 2100-A barometers. No significant differences have been observed between more expensive sensors and those used on CMOD drifters, during the short life of these buoys. SVP-B drifters built by Marlin, Ukraine and deployed in the EGOS area in the end of 1999, are also equipped with this inexpensive sensor. The results of the evaluation will be presented at EGOS meetings.

8.2 GPS Navigation Receiver in Drifting Buoys

At the summer meeting in Brest-99, it was shown that the GPS technology is now fully implemented and operational. Studies have been continued in more detail, with particular attention to power consumption, and financial aspects. Preliminary results indicate a reduction of the total power consumption by 7-8 %. As of May 1st 2000, the Selective Availability (or distortion) of the GPS signal was removed. It is anticipated that this will, in addition to improved accuracy, also contribute to reduced power consumption.

8.4 Drogue Detection of SVP-B Drifters

At the summer meeting in De Bilt, May 2000 the Technical Co-ordinator reported on his algorithm for detecting the precence of a drogue on SVP-B style Drifters. The method employs the submergence detector on the SVP-Bs. The submergence percentage, i.e. the pecentage of the time the buoys spends submerged is reported in the Argos message, By combining this parameter with the drift trajectory of the buoy, it may be detemined whether or not the drogue is present.

8.5 Air Deployments

The number of air deployments in EGOS has increased during 1999, and has to an increased extent become a major deployment method. In 1995 no air deployments were made, in 1996 5, in 1997 none, in 1998 14, and 27 air deployments were made in 1999. In the intersessional period 23 air deployments have been made.

8.6 Automet -Vessel Carried Automatic Weather Station

A new vessel-carried automatic weather station is being tested by the Norwegian Meteorological Institute. A prototype was demonstrated by Mr. Knut Bjørheim at the EGOS summer 98 meeting in Reykjavik. The station is based upon Inmarsat C communication, which has several benefits compared to the Argos System:

1) Real time communication, gives no time delay
2) Two-way communication
3) Lower communication costs

The station uses GPS for positioning, and has a “silent area” function that automatically switches the station off in over-observed areas, or areas of no interest. The station has been on test at the Norwegian Weather Ship ”Polarfront” at station ”M” in the Norwegian Sea since August 98. At the Summer meeting in De Bilt, the Management Committee decided that EGOS would be a good forum to share technical information on the Ship Mounted AWS, but EGOS is not aiming to be not be an implementation group for this type of stations.

8.7 Common Argos Format

At the EGOS summer meeting in Reykjavik 1998, Mr. Pierre Blouch presented a suggestion for a common ARGOS format (paper available from the author or from the Technical Secretariat). Since then, the format has been adopted by several buoy operators (e.g. Météo-France. GDC, UKMO). Now called DBCP-M1, it is one of the standard formats recommended by the DBCP. Henceforth, all SVP-B Drifters in EGOS will have this format.

8.8 SVP-BS Drifters

Météo-France has tested two set of three salinity drifters over the past two years. These drifters, built by Clearwater and fitted with a FSI conductivity probe, did not work properly. The main problem has been the presence of bio-fouling growing rapidly in the vicinity of the probe. New tests will be carried out in 2000 with more aggressive anti-fouling paint. Results will be presented at the EGOS meetings.

9. EGOS MOORED BUOYS

The UK Met Office has continued to operate a network of 7 moored buoys in the Atlantic west of the British Isles (K1-K5,K7 and RARH). UKMO also has established a moored buoy station at about N 47.3°, W 9° (the 'Brittany' buoy). In July 1998, a new station, the ‘Gascogne’ station in N45.23º, W005º was established in co-operation with Météo-France. After the extension of the EGOS area of interest, the UK moored buoys K16 and K17 also became a part of EGOS as did the ‘Côte d’Azur’ buoy in the Mediterranean Sea, operated by Météo-France. In addition, Météo-France moored a new moored buoy in position 41.61N - 20.4W on August 26th, 2000. The buoy, called POMME, will be recovered in October 2001. Its WMO id is 62002.

The total number of moored buoys in EGOS is thus 13. Their respective positions are shown in figure 3.

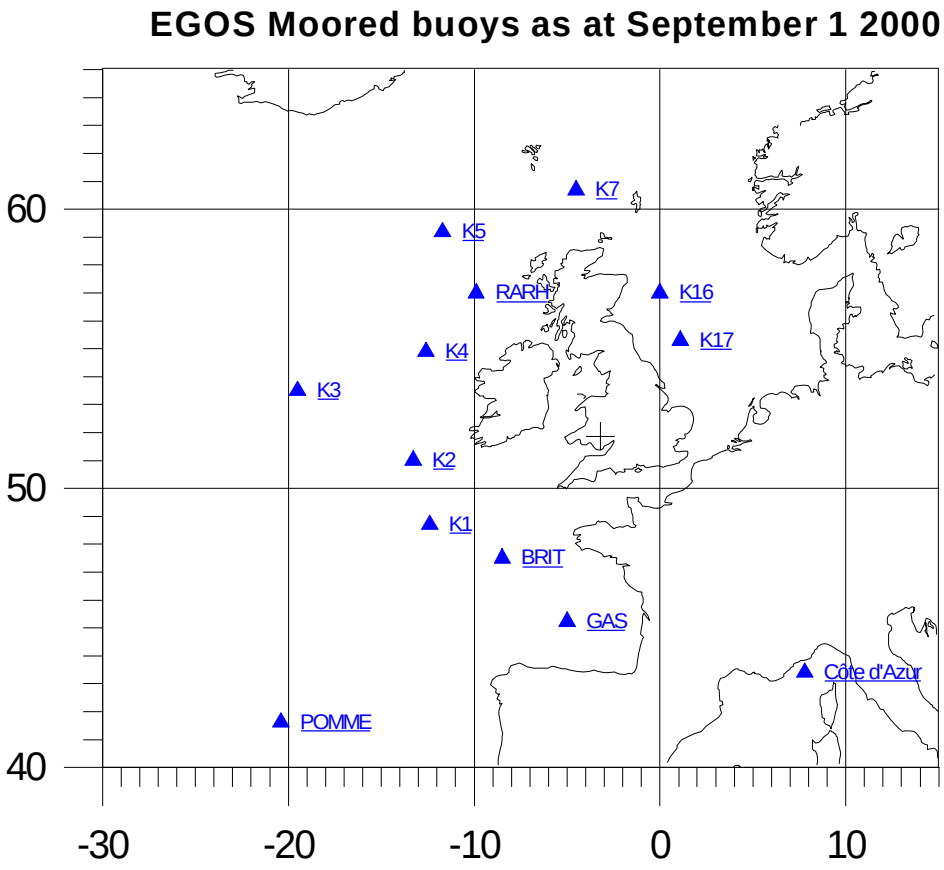


Figure 8- Positions of the EGOS Moored Buoys as at September 1 2000.

10. PROMOTION OF EGOS

The various EGOS programmes are operating satisfactorily and are an important contribution to the operational observing network in the North Atlantic. It is however felt that the programme and its service and potential should be made better known to the user communities.

The presence of EGOS during the CGC and DBCP meetings in 1999 served to promote EGOS. Comprehensive reports were submitted by the Technical Secretariat to both these meetings EGOS Technical Docs. No 183 and 197).

The brochure, which was introduced in 1996, has greatly helped in distributing information about EGOS. An updated version is now available. The work on the amendments of the EGOS Brochure has been co-ordinated by Mr. Wil. C.M van Dijk, KNMI.

Contacts have been established with EuroGOOS for the consideration of future co-operation with EGOS.

Information about EGOS on the DBCP World Wide Web server is also helping to expose EGOS to a wider audience. In 1999 great effort was put on enlarging and updating these home pages at http://www.shom.fr/meteo/egos.

The EGOS reports are now available on www.cmr.no/conmar/egos

11. PARTICIPATION IN INTERNATIONAL MEETINGS

EGOS has been represented at the following international meetings in the intersessional period

- CGC meeting held in Geneva in August 2000. EGOS was formally represented by Mr. Hreinn Hjartarson, Iceland.
- DBCP-XV in Wellington, in October 1999. EGOS was formally represented by Mr. Wynn Jones, UKMO.
- In September 1999 EGOS was represented at the CLIVAR 99 in Vancouver, Canada by Dr. Volker Wagner, DWD.

Reports on EGOS were presented at these meetings by the EGOS representatives (EGOS Technical Docs. No 197 and 213).

ANNEX 1 List of Acronyms

Acronym	Full name
ALIP	Argos Large International Programme
AOML	Atlantic Oceanographic and Meteorological Laboratory (US)
ARGO	Array for Real-time Geostrophic Oceanography
AP	Air Pressure
AT	Air Temperature
BGSF	Local User Terminal, Søndre Strømfjord
BOOS	Baltic Operational Oceanographic System
CGC	Co-ordinating Group of the COSNA
CLS	Collecte Localisation Satellite
CMM (1)	Centre de Meteorologie Marine in Brest
CMM (2)	Commission of Marine Meteorology (formerly)
CMOD	Compact Meteorological and Oceanographic Drifter
CMR	Christian Michelsen Research
COSNA	Composite Observation System for the North Atlantic
COST43	Co-Ordination in Science and Technical Research, Action 43 (formerly)
DBCP	Data Buoy Co-operation Panel
ECMWF	European Center for Medium Range Weather Forecasting
EGOS	European Group on Ocean Stations.
ENMI	Local User Terminal, Oslo
EPSHOM	Etablissement Principal du Service Hydrographique et Oceanographique de la Marine (FR)
EUCOS	Eumetnet Composite Observing System
EUMETNET	European Meteorological Network
EUROGOOS	European Global Ocean Observing System
FASTEX	Fronts and Atlantic Storm Track Experiment
FGGE	First GARP Global Experiment
GARP	Global Atmospheric Research Programme
GBP	Great Britain Pound
GCOS	Global Climate Observing System
GDP	Global Drifter Programme
GODAE	Global Ocean Data Assimilation Experiment
GOOS	Global Ocean Observing System
GTS	Global Telecommunication System

Acronym	Full name
IABP	International Arctic Buoy Programme
IBPIO	International Buoy Programme for the Indian Ocean
IGOSS	Integrated Global Ocean Services System
IMO	Icelandic Meteorological Office.
IOC	Intergovernmental Oceanographic Commission
ISABP	International South Atlantic Buoy Programme
JCOMM	Joint Technical Commission for Oceanography and Marine Meteorology (FR)
JTA	Joint Tariff Agreement (with Argos)
KNMI	Royal Netherlands Meteorological Institute
LFPW	Local User Terminal, Toulouse via Lannion
LUT	Local User Terminal
MEDS	Marine Environmental Data Service (Canada)
METEOSAT	European geostationary meteorological satellite
NAVOCEANO/NAVO	Naval Oceanographic Office (US)
NCEP	National Centre for Environmental Prediction
NDBC	National Data Buoy Center (US)
NOAA	National Oceanic and Atmospheric Administration (USA)
ODAS	Ocean Data Acquisition System
PGC	Principal GTS Co-Ordinator
PTT	Platform Terminal Transmitter
QC	Quality Control
SAI	Service Argos, INC
SST	Sea Surface Temperature
TAO	Tropical Atmosphere Ocean Array
TOGA	Tropical Ocean and the Global Atmosphere
UKMO	United Kingdom Meteorological Office
WMO	World Meteorological Organisation
WWW	World Weather Watch or World Wide Web

ANNEX 2 list of buoy types used by egos

SVP-B	**S**urface **V**elocity **P**rogramme – **B**arometer Drifter. Small Spherical drogue carrying buoy. Barometer type (May vary): Low-precision barometer type AIR SB-2A or Vaisala PTB-100. Does not provide air temperature. Nominal lifetime: 1 year
SVP-BW	As above, but fitted with acoustic wind speed sensor and a fixed vane for wind direction measurements
MO	**M**et**O**cean Buoy- Also Called TOGA or FGGE type. Large, aluminium hull, high precision barometer, type Paroscientific or medium precision type Solartron. Measures all parameters including wind speed and direction where indicated in the ff and dd column. Nominal lifetime: 2 years or more.
C/S	ConMar buoy. Large, Glass Fibre Reinforced hull. High precision barometer, type Paroscientific. Measures all parameters, except wind. Nominal Lifetime: 2 years or more.
C/S-GPS	As above, but with GPS positioning.
C/B	ConMar buoy. As above but with medium precision Solartron barometer
C/B-GPS	As above, but with GPS positioning. PTT repetition interval 200 or 90 seconds.
MS	Marisonde buoy. Medium size, polyethylene hull, medium precision barometer type Vaisala PT201A or Air DB-2A. Nominal lifetime 1 year.
MS-Gt	As above for MS, but fitted with thermistor chain.
MS-Gi	Marisonde Gi (Interaction measurements) measures Air Pressure, Sea Surface Temperature, Wind Direction, wind speed, Air Temperature.
MS-G	As above, but fitted with a vane for wind direction measurements
CMOD	Compact Meteorological and Oceanographic Drifter). Small, cylindrical aluminium hull with gas inflated flotation collar on top Diameter of flotation collar is 36 cm.. 43 cm telescopic mast on top carrying AT sensor and air inlet. Total length 134 cm, low precision barometer. Measures AT, SST and AP and TZ

ANNEX 3 List of EGOS Technical Documents September 99-September 2000

Document Number	Document Title
Tech. Doc. No. 199	Monthly report No. 08/99
Tech. Doc. No. 200	Report on the EGOS Technical Subgroup Meeting in Brest on May 26-27, 1999
Tech. Doc. No. 201	Intersessional report of the European Group on Ocean Stations August 15, 1998 - august 15, 1999
Tech. Doc. No. 202	Monthly report No. 09/99
Tech. Doc. No. 203	Monthly report No. 10/99
Tech. Doc. No. 204	Monthly report No. 11/99
Tech. Doc. No. 205	Monthly report No. 12/99
Tech. Doc. No. 206	ANNUAL REPORT 1999
Tech. Doc. No. 207	Monthly report No. 01/2000
Tech. Doc. No. 208	Monthly report No. 02/2000
Tech. Doc. No. 209	Report on the EGOS Management Committee Meeting in Paris on December 7-8, 1999
Tech. Doc. NO. 210	Monthly Report No. 03/2000
Tech. Doc. NO. 211	Monthly Report No. 04/2000
Tech. Doc. NO. 212	Monthly Report No. 05/2000
Tech. Doc. NO. 213	Intersessional report of the European Group on Ocean Stations July 10, 1999 - July 10, 2000
Tech. Doc. NO. 214	Monthly Report No. 06/2000
Tech. Doc. No. 215	Report on the EGOS Management Committee Meeting in De Bilt on May 30-31 2000
Tech. Doc. No. 216	Monthly report No. 07/2000
Tech. Doc. No. 217	Monthly report No. 08/2000
Tech. Doc. No. 218	Intersessional report of the European Group on Ocean Stations September 1, 1999 - September 1, 2000

INTERNATIONAL ARCTIC BUOY PROGRAMME (IABP)
http://IABP.apl.washington.edu
CHAIRMAN'S AND COORDINATOR'S REPORT
for the Sixteenth Session of the DATA BUOY CO-OPERATION PANEL
Victoria, Canada, 26 to 30 October 2000
prepared 29 September 2000 and updated 11 October by edward.hudson@ec.gc.ca

This report focuses on the challenges facing the International Arctic Buoy Programme and IABP efforts to meet these challenges. The report also outlines activities that have occurred since the report filed August 1999 for the 15th session of the Data Buoy Co-operation Panel.

INTERNATIONAL ARCTIC BUOY PROGRAMME (IABP) TENTH ANNUAL MEETING, FAIRBANKS, ALASKA, JUNE 2000 / NEW PARTICIPANT - Members of the International Arctic Buoy Programme met 26-28 June in Fairbanks, Alaska, for the tenth annual business meeting. The meeting was held concurrently with the biennial meeting of the International Programme for Antarctic Buoys (IPAB). There was one joint afternoon session. Host for the year 2000 meeting was the International Arctic Research Center (IARC), University of Alaska. In addition to hosting the meeting, IARC is the newest member to join the IABP.

IABP EXECUTIVE AND COORDINATOR - The elected IABP executive and appointed coordinator remain:

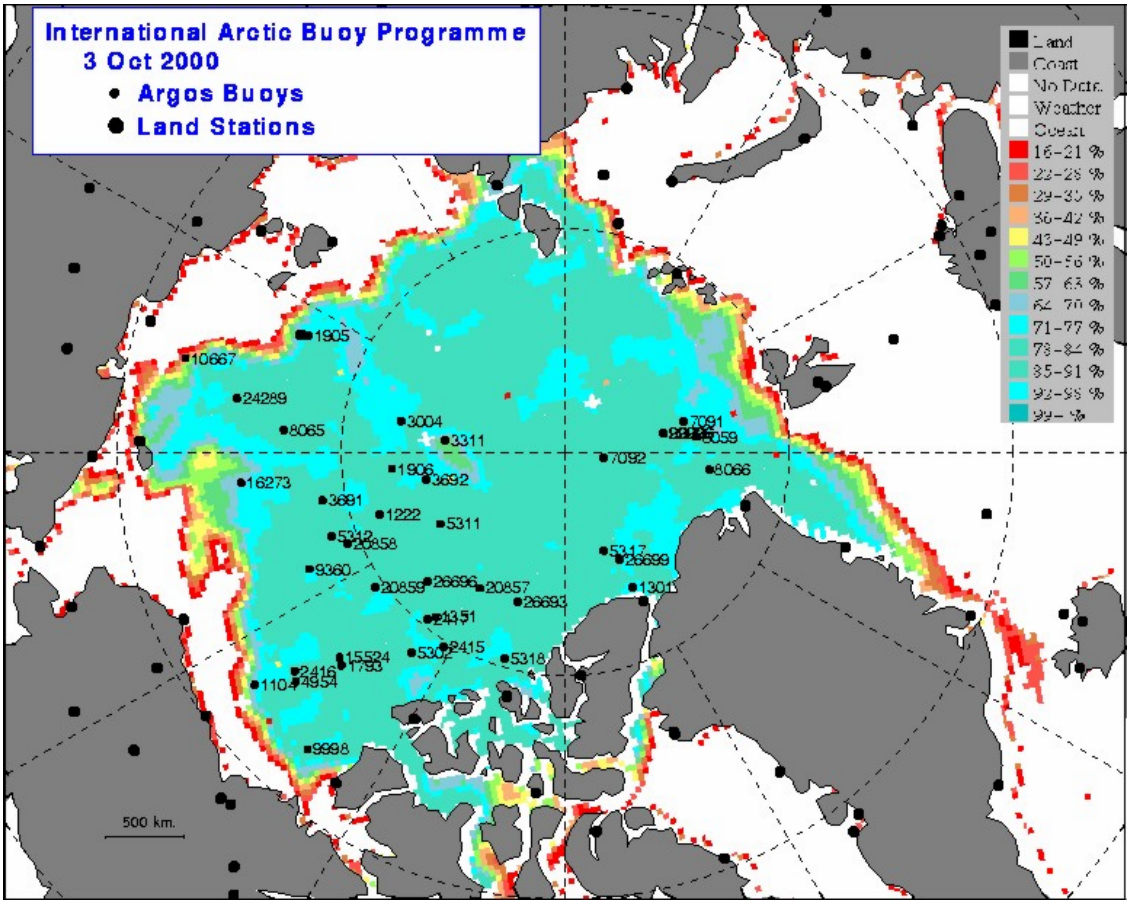
Chairman:	Tim Goos, Environment Canada, Canada	tim.goos@ec.gc.ca
Vice Chairman:	Thor Kvinge, Christian Michelsen Research, Norway	thkvinge@online.no
Member:	Ivan Frolov, Arctic and Antarctic Research Institute, Russia	aaricoop@aari.nw.ru
Member:	Dave Benner, U.S. National Ice Centre, U.S.A.	bennerd@natice.nooa.gov
Coordinator:	Ignatius Rigor, Polar Science Centre, U.S.A	ignatius@apl.washington.edu

MEETING THE OBJECTIVE / PRINCIPLES OF IABP IS CHALLENGING - *The objective of the IABP is to establish and maintain a network of drifting buoys in the Arctic Ocean to provide meteorological and oceanographic data for real-time operational requirements and research purposes including support to the World Climate Research Programme (WCRP) and the World Weather Watch (WWW) Programme. The Programme will build upon cooperation among those agencies and institutions with Arctic interests.*

The Principles of the IABP are:
- Maintain an observational data network over the Arctic Ocean using drifting buoys;
- Distribute basic meteorological data from the network in real time over the Global Telecommunication System (GTS) plus relevant additional real-time data approved for public dissemination;
- Ensure data from the network are archived; and
- Cooperate with, and provide results of the Programme to other related programs**.**

CHALLENGE 1 - MAINTAIN AN ARRAY OF BUOYS ON ICE PROVIDING BASIC METEOROLOGICAL PARAMETERS TO GTS - Maintaining the IABP network is a challenge. Batteries come to the end of their life cycle, buoys fail, and ice on which the buoys reside breaks up, melts or exits the arctic basin. To meet the Objective, the IABP Executive, Coordinator and Participants work to having 25 buoys 'spaced' across the Arctic Ocean reporting the basics of position (as calculated by Service Argos or via onboard GPS), surface air pressure and surface air temperature AND to have this information on the GTS in real time. The map of 03 October 2000, Figure1, shows buoys on ice. Per Table 1 most but not all of these buoys report in real-time onto GTS and most but not all of the buoys reporting to GTS provide both the basics of air temperatures and air pressure.

Figure 1. IABP buoy array 03 October 2000 (from web page http://iabp.apl.washington.edu)
Map below shows number of years ice usually resides in the Basin before exiting



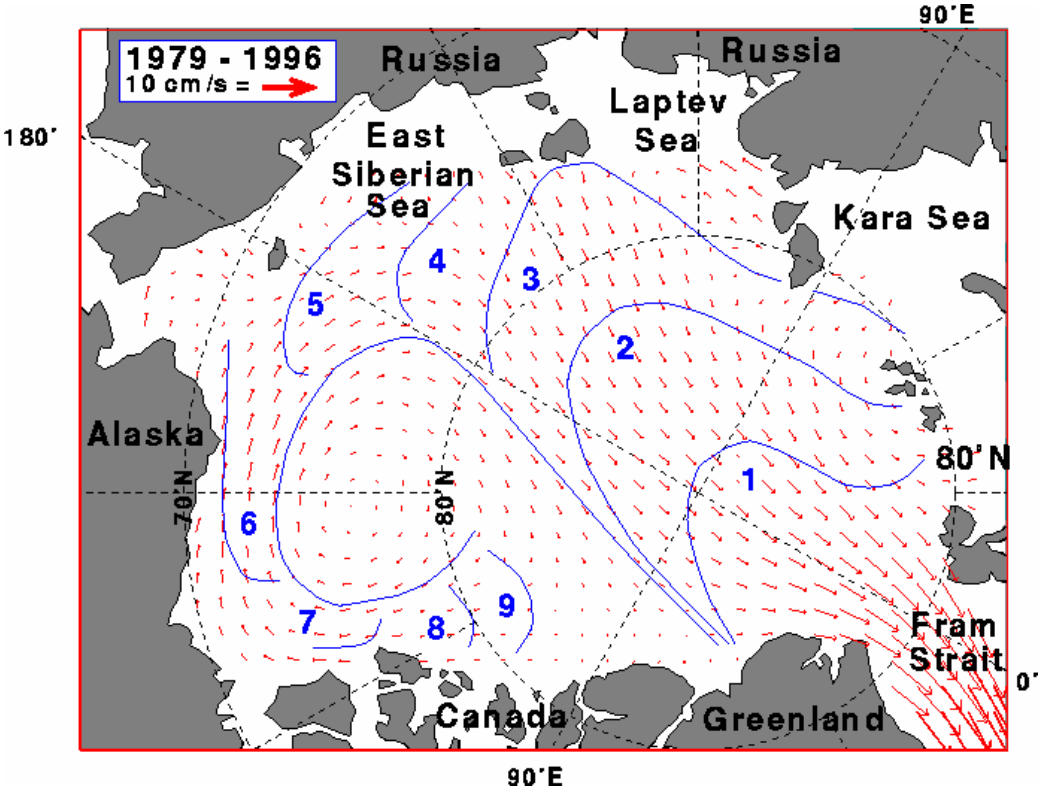


Table 1.

IABP buoy array 03 October 2000 from web page http://iabp.apl.washington.edu

On GTS **and** providing both surface air temperature and surface air pressure
On GTS **and** providing either surface air temperature or surface air pressure
Year 2000 Deployments Enlarged

DATE DEPLOYED	ARGOS ID	WMO ID	EXPR NUMBER	GTS HEADER	POSITION LAT	POSITION LONG	DATA BYTES	P	T	BUOY DESCRIPTION
Oct 2000	1104	48527	627	SSVX02-CWEG	72.675	-143.075	4	Y		CALIB
Aug 1999	1222	48601	484	SSVX01-LFPW	81.258	-161.528	17	Y	Y	ICEX-AIR
Apr 1998	1301	48581	1053	SSVX02-CWEG	83.264	-63.685	16	Y	Y	Metocean TOGA
Aug 1998	1351	48532	484	SSVX01-LFPW	80.633	-128.212	17	Y	Y	ICEX-AIR
Aug 1998	1793	48533	29	SSVX01-LFPW	76.205	-136.393	17	Y	Y	ICEX-AIR
Aug 1998	1905	25525	557	SSVX12-KARS	77.415	155.540	21	Y	Y	ICEX-AIR
Aug 1998	1906	25526	557	SSVX12-KARS	82.233	-174.550	21	Y	Y	ICEX-AIR
Mar 2000	2415	48579	1053	SSVX02-CWEG	79.729	-122.063	32	Y	Y	CES/Zeno Ice Buoy
Apr 1998	2416	47523	1053	SSVX02-CWEG	74.458	-140.963	32	Y		ZENO-3200
Sep 1997	2417	48572	1053	SSVX02-CWEG	80.349	-129.481	16	Y		

CES/Zeno Ice Buoy(SHEBA)
Aug 1998 3004 25535 1053 SSVX12-KARS 82.531 169.289 17 Y Y
ICEX-AIR
Aug 1999 3311 25569 919 SSVX01-LFPW 84.611 174.563 21 Y Y
ICEX-AIR
Aug 1999 3691 25012 314 SSVX01-LFPW 78.951 -168.780 21 Y Y
ICEX-AIR
Aug 2000 3692 48534 314 SSVX07-LFPW 83.682 -168.750 21 Y Y
ICEX-AIR
Apr 1998 4954 48580 1053 SSVX02-CWEG 74.205 -139.564 32 Y
ZENO-3200
Sep 2000 5302 48526 627 SSVX02-CWEG 78.707 -127.341 4 Y
CALIB
Aug 2000 5311 48535 627 SSVX02-CWEG 83.559 -150.130 21 Y Y
ICEX-AIR
Aug 1999 5312 48523 627 SSVX02-CWEG 78.928 -160.200 17 Y Y
ICEX-AIR
Mar 2000 5317 48524 627 SSVX02-CWEG 85.277 -68.555 24 Y Y
EC
Mar 2000 5318 48525 627 SSVX02-CWEG 80.400 -106.300 24 Y Y
EC
Apr 2000 7091 26509 282 SSVX16-KARS 84.545 14.532 12 Y Y
NAVO
Apr 2000 7092 26510 282 SSVX16-KARS 88.256 -8.239 12 Y Y
NAVO
Apr 2000 8059 63661 919 SSVX07-LFPW 84.114 6.651 23 Y Y
AWI
Aug 1999 8065 25570 919 SSVX01-LFPW 77.402 175.463 21 Y Y
ICEX-AIR
Apr 2000 8066 63662 919 SSVX07-LFPW 83.532 -6.868 23 Y Y
AWI
Aug 2000 9360 48531 919 SSVX07-LFPW 77.444 -155.409 16 Y Y
ICEX-AIR
May 1992 10667 1016 72.532 166.087 32 Y
Y IOEB
Aug 2000 15524 48537 29 SSVX07-LFPW 76.364 -137.670 21 Y Y
ICEX-AIR
Aug 2000 16273 48538 484 SSVX07-LFPW 75.457 -174.620 Y Y
ICEX-AIR
Sep 2000 18920 557 72.423 -130.906 4 Y Y
JAMSTEC-JCAD
Apr 2000 20726 695 85.517 10.770 32
PMEL
Aug 2000 20857 48536 1053 SSVX12-KARS 82.825 -122.101 17 Y Y
ICEX-AIR
Aug 1999 20858 48574 1053 SSVX12-KARS 79.458 -157.294 17 Y Y
ICEX-AIR
Aug 1999 20859 48575 1053 SSVX12-KARS 79.582 -144.520 17 Y Y
ICEX-AIR
Apr 2000 22206 695 85.552 10.995 32
PMEL
Aug 2000 24289 25548 1053 SSVX12-KARS 75.149 170.693 16 Y Y
ICEX-AIR

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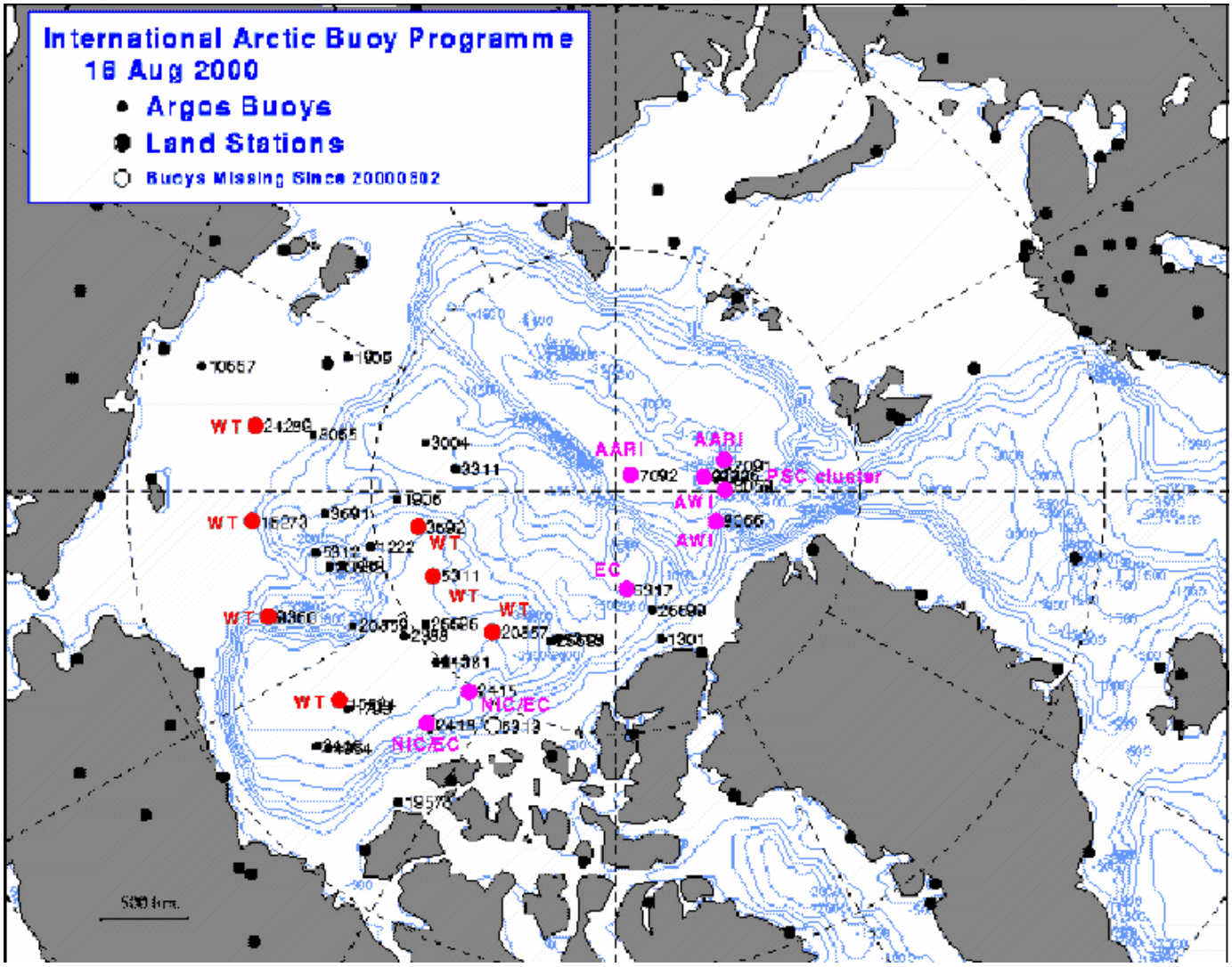
Apr 2000  24300              557                    85.533     10.758      4
Y   Y     JAMSTEC-JCAD
May 1996  26693 48578 1053     SSVX02-CWEG     82.978   -107.589     32     Y
     CES/Zeno Ice Buoy
Sep 1997  26696 48576 1053     SSVX12-KARS     81.571   -136.85132     Y    Y
     CES/Zeno Ice Buoy(SHEBA)
Jul 1996  26699 48573 1053     SSVX02-CWEG     84.613    -63.361      32
```

MEETING CHALLENGE 1 - BUOYS ON ICE 2000 - WHITE TRIDENT - The key re-seeding of the buoy array across the Arctic Basin occurs annually courtesy Commander Naval Meteorology and Oceanographic Command. In the year 2000 August White Trident exercise, seven ICEXAIR buoys were deployed. These buoys were provided by Meteorological Service of Environment Canada, United Kingdom Meteorological Office, Alfred Wegener Institute, Norwegian Meteorological Institute, Norsk Polarinstitutt, US National Ice Center and US Naval Oceanographic Command. See Figure 2.

GETTING BUOYS FOR WHITE TRIDENT IS CHALLENGE 2 - Getting the 7 buoys required for this key re-seeding is an ongoing challenge. The Chairman, the Coordinator, and Participants of the Programme are eager to meet those who would commit to providing such buoys on an ongoing basis. (Contact Ignatius Rigor ignatius@apl.washington.edu)

Figure 2. Buoys on Ice 2000 (to 18 August 2000)

WHITE TRIDENT YEAR 2000 • **OTHER YEAR 2000 DEPLOYMENTS •**



MORE MEETING CHALLENGE 1 - BUOYS ON ICE 2000 - LANDING ON ICE

The Meteorological Service of Canada (MSC) of Environment Canada supported by Polar Continental Shelf Project annually flies (late March / early April) from a high arctic site to deploy buoys via Twin Otter landing on ice. Typically there are one or two flights during which 1 to 4 buoys are deployed. To date, the buoys have been buoys belonging to the US National Ice Center and/or buoys assembled in-house by MSC. MSC plans to continue these annual flights and are receptive to deploying buoys for others. (Contact Ed Hudson - edward.hudson@ec.gc.ca) Figure 3 shows the "range" of the Twin Otter flights noting that the flights of the past few years have been done from Eureka. Figure 4 shows a CES/ZENO deployed for the US National Ice Centre 23 March 2000.

Figure 3. Approximate range of Twin Otter
2 pilots, 2 deployers, 2 buoys @ 90 kg each, 6 drums fuel

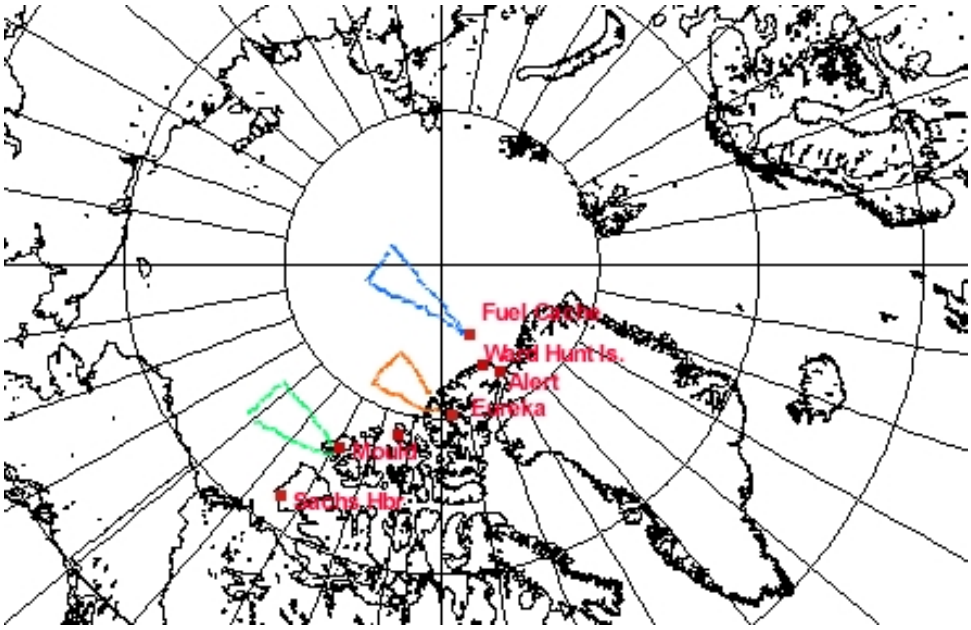
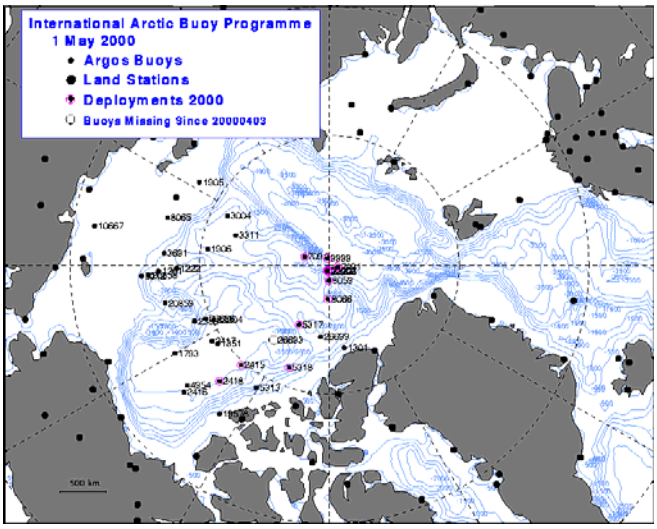


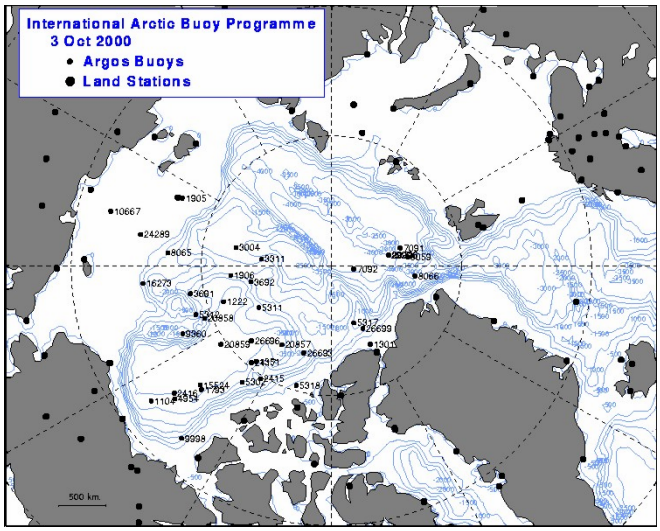
Figure 4. 23 March 2000 Deployment of US CES / Zeno buoy
Photo courtesy Ben Lemon and Mark Abt, Meteorological Service of Canada

STILL MORE MEETING CHALLENGE 1 - BUOYS ON ICE 2000: PARTNERNING WITH SCIENCE AND ADVENTURERS AND A NEW CHALLENGE - CHALLENGE 3 - BALANCING BUOY "DENSITY" AND DEPLOYMENT OPPORTUNITIES - There is aircraft activity in the spring to the north pole to support adventurers and "tourists". The Arctic and Antarctic Research Institute (AARI) , for one, piggy backed on such activity to have 2 buoys deployed near the pole April 2000. Figures 7 and 8 show the AARI buoy deployment. Figure 2 given earlier in this report shows the AARI buoy positions by 16 August. There is also, from time to time, science projects that by their nature result in buoy deployments and/or buoy deployment activities by IABP participants. From fall 1997 through to fall 1998, the Sheba project took place over the Beaufort and points north and there was a full suite of buoys deployed in and around the Sheba site. This year, concurrent with the "tourist" activity to the pole, the North Pole Environmental Observatory activity started up. Their activity was used to deploy 2 Alfred Wegener Institute buoys (Figure 9) April 2000 (labeled AWI on Figure 2) in addition to deploying their own buoys. The net result was a "rich" array of buoys near the north pole, an area from which it takes the ice about a year to make its way out of the basin via Fram Strait. Figure 5 shows the array in place near the pole 01 May 2000. Figure 6 shows how much the ice / buoys-on-ice moved in the 5 month period to 03 October 2000

The challenge for IABP Participants and the IABP coordinator is to utilize deployment opportunities such as science projects and adventures to the pole yet ensure that IABP buoys fill voids in the overall buoy array across the arctic basin rather than adding to already rich arrays.

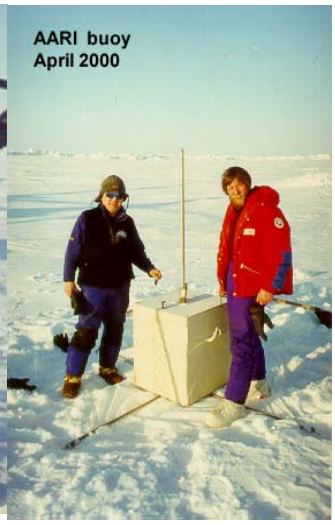
Figures 5 and 6 - Cluster of buoys vicinity North Pole 01 May and east of pole 03 October





Figures 7 and 8 - AARI buoy deployment April 2000

Photos provided by Sergey Priamikov, Arctic and Antarctic Research Institute



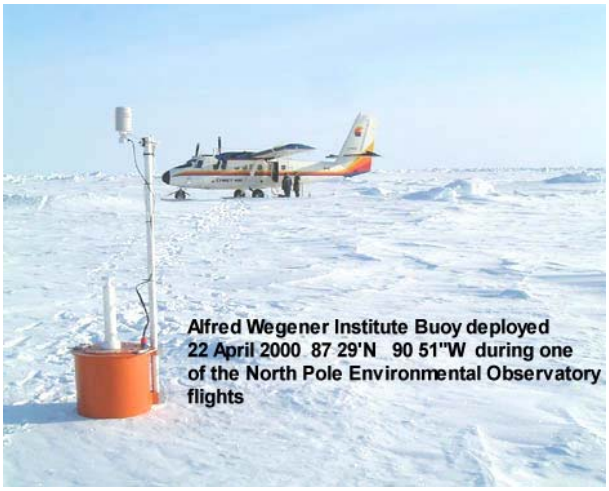


Figure 9. AWI buoy deployed by North Pole Environmental Observatory scientists.

Photo from North Pole Environmental Observatory web site: *http://psc.apl.washington.edu/northpole/index.html*

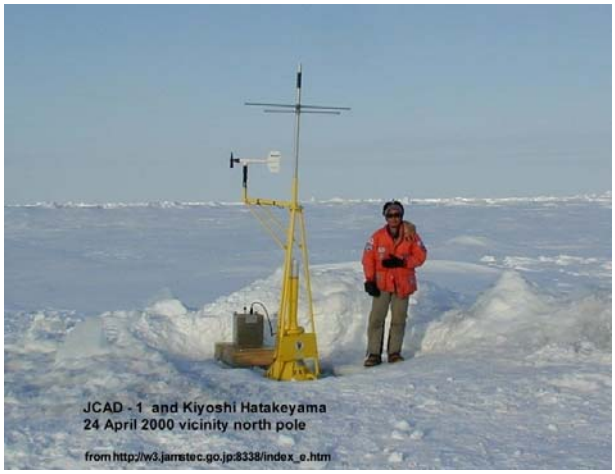


Figure 10. J-CAD 1 deployed at North Pole by Japan Marine Science and Technology Center scientists

Photo from Japan Marine Science and Technology Center Arctic Ocean Research Group web site: *http://w3.jamstec.go.jp:8338/index_e.htm*

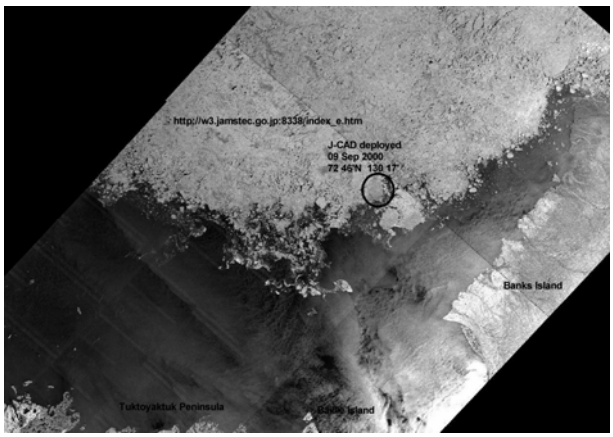


Figure 11. J-CAD-2 goes on ice 9 September 2000
10 September image via Koji Shimada Institute of Ocean Sciences / Japan Marine Science and Technology Center

In addition to J-CAD-1 deployed April 2000 as part of the North Pole Environmental Observatory, J-CAD-2 was deployed on ice the Beaufort at approximately 72 46'N 130 17'W 11 (Figure 11) September 2000 from the Canadian Coast Guard Icebreaker Sir Wilfrid Laurier.

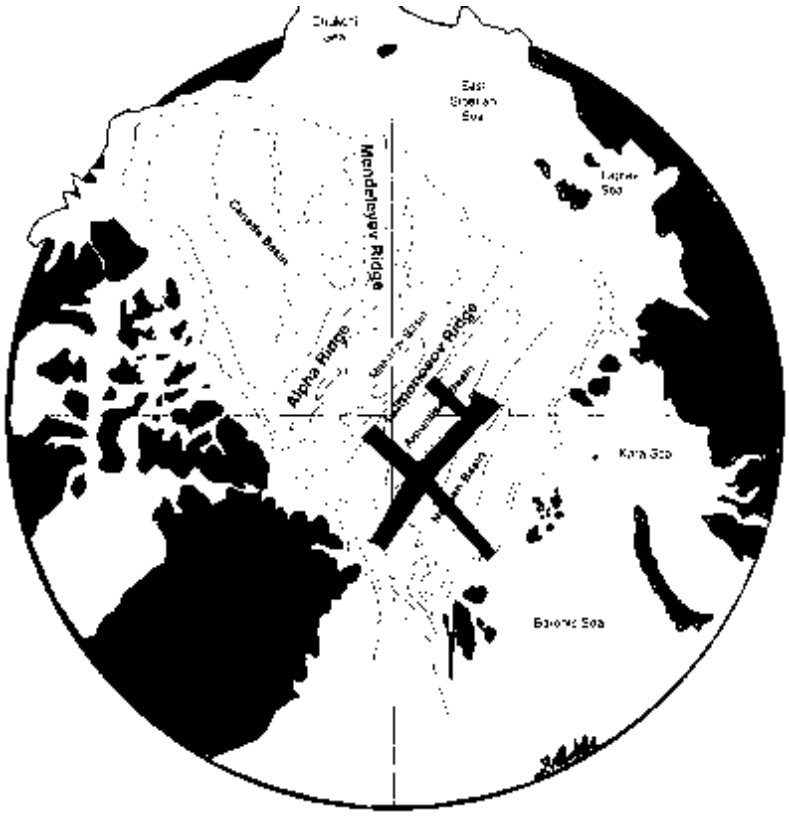
POLARSTERN TO THE ARCTIC 2001

Alfred Wegener Institute for Polar and Marine Research's vessel Polarstern will be Arctic bound 2001. Buoy deployments from the vessel will fill gaps in the Arctic Buoy array on the Eurasian side. Currently there are 3 AWI and one US National Ice Center slated for deployment on this cruise. Additionally, AWI is in negotiations with JAMSTEC to deploy a J-CAD.
(Contact Christian Haas, AWI chaas@awi-bremerhaven.de)

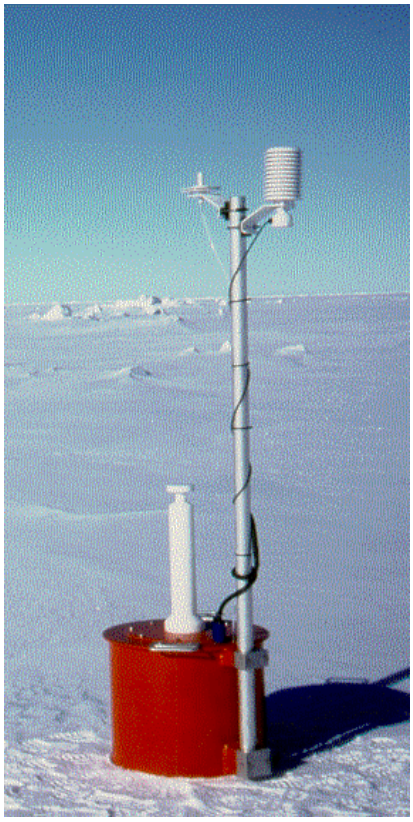
Polarstern 2001 Cruise

■ Area of geoscientific investigations

Ship photo from AWI web site http://www.awi-bremerhaven.de
Figure courtesy Christian Haas
Buoy photo courtesy Lutz Sellman



AWI



Lutz-Kruse buoy

RECENT PUBLICATIONS

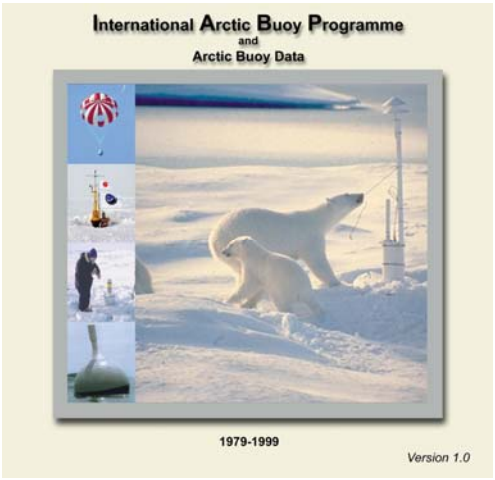
Rigor, I., and M. Ortmeyer, International Arctic Buoy Program (IABP) Data Report, 1 January 1999, 31 December 1999, APL-UW TM 06-00, Applied Physics Laboratory, University of Washington, 2000.

Krishfield, R., S. Honjo, T. Takizawa, and K. Hatakeyama, Ice-Ocean Environmental Program: Archived Data Processing and Graphical Results from April 1992 through November 1998, WHOI-99-12, Woods Hole Oceanographic Institution, August 2000

TO BE RELEASED SOON

CD of buoy data - A CD showing animations of the buoy data is in preparation in a cooperative effort between the Polar Science Center, University of Washington and the International Arctic Research Center, University of Alaska. The last such CD was the CD produced by Martin Kreyscher, Alfred Wegener Institute,1997 which shows ice and buoy motion for the period 1979 to 1994. The intention for this new CD is to make a product that could be used as a teaching aid to study air, sea and ice interaction. (Contact Roger Colony rcolony@iarc.uaf.edu IARC or Ignatius Rigor ignatius@apl.washington.edu PSC.)

IABP CD - Marine Environmental Data Service, Canada, is preparing an IABP CD.
(Contact Estelle Couture couture@meds-sdmm.dfo-mpo.gc.ca MEDS.)



IABP surface air temperature and ice motion fields - IABP SAT and ice motion fields will be on the EWG Arctic Ocean Meteorology and Sea Ice digital atlases.
(Contact Ignatius Rigor ignatius@apl.washington.edu PSC.)

BUOYS IN THE MARGINAL SEAS AND THE IABP

During the IABP June 2000 Meeting, Participants discussed a WCRP ACSYS/CLIC Scientific Steering Group request for an extension of buoy coverage into the seasonal ice zones of the Arctic. Specifically mentioned were the Sea of Okhotsk, the Bering Sea, Hudson Bay and the marginal seas adjacent to the Arctic Basin. At this time, no IABP Participants have a strong interest in expanding their programs to monitor ice motion in the seasonally covered seas. It was noted that the IABP is a self-supporting program based on a collection of Participants who contribute actively to the Arctic Basin program. Meeting the objective and principles of the IABP is in itself a challenge to the IABP and its Participants. The IABP Participants will however cooperate and share resources with related programs.

PARTICIPANTS OF THE IABP - Participants remain a mix of operational agencies, meteorological and oceanographic institutes, research agencies and non-government organizations that are

interested in the Arctic Ocean and who contribute actively to the program. Participant listing of September 2000:

Canada	λ Meteorological Service of Environment Canada (assisted by other agencies including Polar Continental Shelf Project, Canadian Forces, Institute of Ocean Sciences and Canadian Coast Guard) λ Marine Environmental Data Service
France / U.S.A.	λ Service Argos
Germany	λ Alfred Wegener Institute for Polar and Marine Research
Japan	λ Japan Marine Science and Technology Center
Norway	λ Christian Michelsen Research λ Norsk Polarinstitutt λ Norwegian Meteorological Institute
Russia	λ Arctic and Antarctic Research Institute, Russian Federal Service for Hydrometeorology and Environmental Monitoring
U.K.	λ U.K. Meteorological Office
U.S.A / Japan	λ International Arctic Research Centre
U.S.A.	λ Pacific Marine Environmental Laboratory λ Polar Science Center, University of Washington λ Naval Oceanographic Office λ Commander Naval Oceanography Command λ National Ice Center (representing several agencies) λ Woods Hole Oceanographic Institution
International	λ World Climate Research Program (WCRP) of the World Meteorological Organization (WMO) / Intergovernmental Oceanographic Commission (IOC) / International Council of Scientific Unions (ICSU)

PARTNERS AND NEW PARTICIPANTS ALWAYS WELCOME - IABP participants continue to seek partners within their respective countries and internationally who are willing to supply additional buoys or sensors for existing buoys so that the IABP can be sustained. Provision of an ICEX buoy(s) is particularly useful to the program as a minimum of 7 ICEX buoys are required to make the "*White Trident*" exercise happen.

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International Programme for Antarctic Buoys Report

1 Introduction

Seasonal sea ice covers a large part of the Southern Hemisphere and plays an important role in the climate of the Southern Ocean, yet remains one of the least known regions of the earth 's surface. Many processes relating to sea ice remain poorly understood, due in no small part to the lack of data from this inhospitable region. The optimum method of collecting long term in-situ surface data from the ice covered seas around the Antarctic continent is by the use of autonomous stations such as satellite tracked drifting buoys.

The International Programme for Antarctic Buoys (IPAB) was formally launched in 1995 to coordinate drifter deployments in the Antarctic sea ice zone, to optimize buoy distribution over this region and to create a central archive of Antarctic buoy data. IPAB is a self-sustaining project of the WMO/ICSU/IOC World Climate Research Programme (WCRP) and an Action Group of the WMO/IOC Data Buoy Co-operation Panel. The objectives of the program are to establish and maintain a network of drifting buoys in the Antarctic sea-ice zone in order:

(i) to provide a buoy network to support research in the region related to global climate processes and to global change;
(ii) to provide real-time operational meteorological data meeting the quality requirements of the WMO/World Weather Watch (WWW)programme;
(iii) establish a basis for on-going monitoring of atmospheric and oceanic climate in the Antarctic sea-ice zone.

The operational area of the Programme is south of 55 degrees South latitude, and includes that region of the Southern Ocean and Antarctic marginal seas within the maximum seasonal sea-ice extent.

IPAB was initially established for a period of 5-years. The programme was reviewed at the third biennial meeting [Fairbanks, Alaska, June 2000]and participants, with support from the World Meteorological Organisation and WCRP, resolved to continue the programme indefinitely.

2 Participants and Organisation

Unlike the drifting buoy panels operating in other oceans of the world, IPAB does not have strong support from operational meteorological agencies, and the majority of IPAB buoy deployments are made to support specific research programmes, many of which are concerned with the movement of Antarctic sea ice. Membership of IPAB thus includes individual scientists who are supported by funding agencies to deploy buoys in support of Antarctic research programs. Participating organisations and scientists were asked in 2000 to reconfirm their commitment to a continuing IPAB programme. Fourteen Participants had done so as of September 2000 (Appendix A).

IPAB Participants meet every two years and the program is managed by an Executive Committee of 5 plus the Coordinator. The Chairman of IPAB is Dr Enrico Zambianchi (Italy)and from 2001 the Coordinator will be Dr Peter Wadhams (UK). The IPAB web site is currently hosted at: http://www. antcrc. utas. edu. au/antcrc/special/projects. htm

3 Review of IPAB, 1995-1999

More than 100 buoys providing data to the programme were deployed south of 55 °S in the five-year period between 1995 and 1999. Most IPAB data buoys report through System Argos and the programme encourages buoy operators to equip platforms with basic pressure and temperature sensors and to contribute real-time operational meteorological data via the Global Telecommunications System (GTS). Other platforms include more sophisticated meteorological instrumentation while others are position only platforms (often with GPS location)used in the study of sea ice drift and deformation.

Statistics of IPAB buoy activities since 1995 are shown in Figures 1 and 2. Figure 1(a)shows the number of new buoys deployed each year broken down into 3 regions: the Weddell Sea (20 °E to 60 °W); East Antarctica (170 °E to 20 °E); and the Bellingshausen, Amundsen and Ross Seas (60 °W to 170 °E). Figure 1(b)shows the seasonal distribution of these deployments. Almost all deployments are made onto ice floes or into newly forming ice from ships, typically vessels re- supplying Antarctic bases. In the Weddell Sea the deployments are usually made in January and February, while off East Antarctica they are made from late March to early May as the ice edge starts to advance northward from its summer minimum almost at the coast. Most early IPAB deployments were concentrated in the Weddell Sea and off the coast of East Antarctica, but there have been new initiatives in the Ross and Bellingshausen Sea region since1998. The large peak in deployments in East Antarctica in 1995 and 1999 are due to short-term position-only buoy arrays deployed as part of winter sea-ice process studies in August of those years.

Figures 2(a)and 2(b)respectively show the average number of IPAB buoys reporting each year, and the seasonal distribution of active buoys. The number of platforms with meteorological sensors, and reporting via the GTS has remained fairly constant at 12 to 18 per year since 1995, but even at a peak, the number of active drifters falls far short of the optimum requirement. Seasonally the buoy numbers show a peak in late autumn after the new deployments. Buoy numbers drop steadily after the maximum due both to instrument failures, and to northward divergence, which takes many buoys out of the region of interest to IPAB. Although many drifters have sufficient battery power to operate for 2 or more years, most drift northward out of the ice and only very few survive within the Antarctic pack for a second winter.

Synoptic data from buoys reporting in real-time on the GTS are archived by the Marine Environmental Data Service, Canada, acting as the Responsible National Oceanographic Data Centre for drifting buoy data. Up to date information on those IPAB buoys reporting via the GTS is available from MEDS at:

http://www. meds-sdmm. dfo-mpo. gc. ca/meds/Prog_Int/RNODC/RNODC_e. html

The IPAB Co-ordinating Office also maintains a separate research database of data from all buoys, including those that do not report via the GTS and those that measure location only. These data have recently been transferred to the National Snow and Ice Data Center, Boulder, Colorado and will be eventually released to the research community on a CD-ROM.

Data from the IPAB programme are used operationally by meteorological agencies and in support of a wide variety of studies of the Antarctic sea ice zone, including initialisation and validation of numerical climate modelling, and for the validation of satellite remote sensing techniques for determining sea ice motion. The data show the highly dynamic nature of Antarctic sea ice. For example, off East Antarctica the daily average ice-drift speed in the westward flow is 0.23 m s^{-1} (19.8 km day^{-1}), with considerable spatial and temporal variability, and in the eastward flow the average is 0.17 m s^{-1} (15.1 km day^{-1}). Ice drift is on average divergent over much of the Antarctic sea ice zone, and the drift and deformation play a major role in determining the ice thickness distribution.

IPAB data have been used to derive climatologies of sea ice drift in the Weddell Sea:

Kottmeier, C., S. and 12 others, 1997. Wind, temperature and ice motion statistics in the Weddell Sea (A compilation based on data from drifting buoys, vessels, and operational weather analyses). World Climate Research Programme, International Programme for Antarctic Buoys, WMO/TD No 797, 48pp.

and off East Antarctica:

Heil, P and I. Allison (1999) The pattern and variability of Antarctic sea ice drift in the Indian and Western Pacific sectors. *J. Geophys. Res.,*104 (C7), 15789-15802.

Fig. 1(a). New buoys deployed

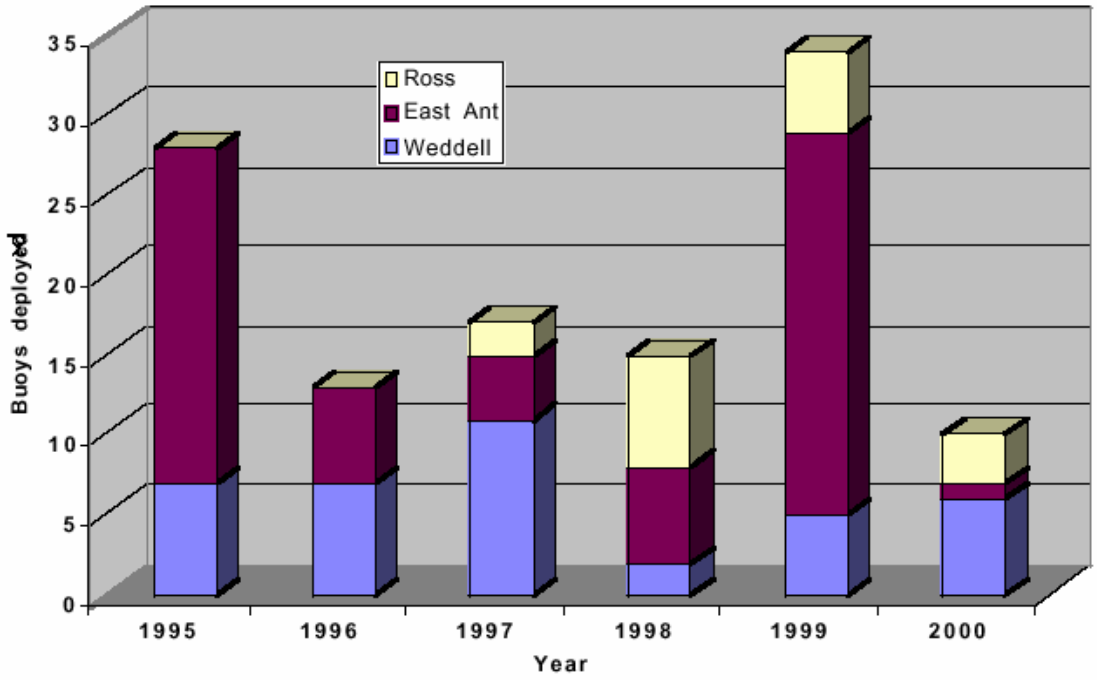


Fig. 1(b). Total new deployments by month 1995-00

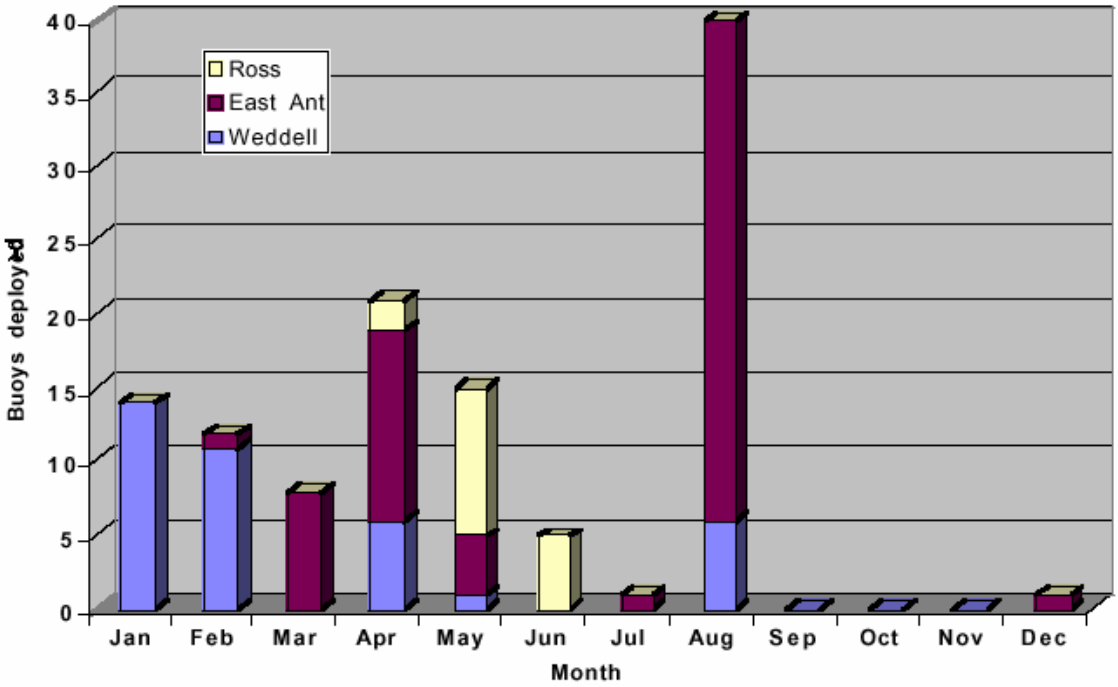


Fig. 2(a). Average number of active buoys per year.

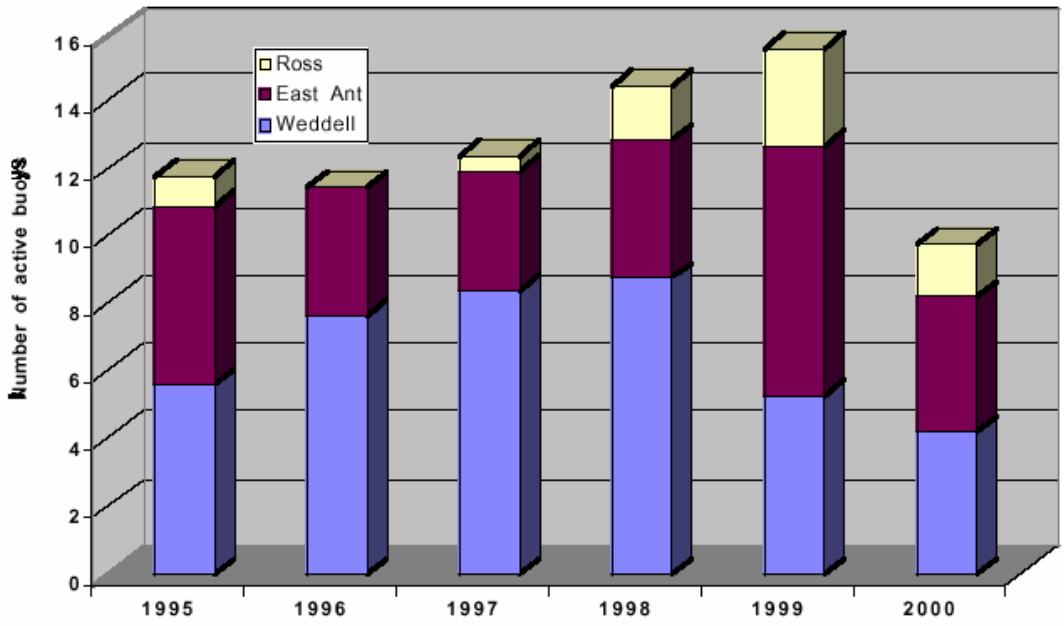
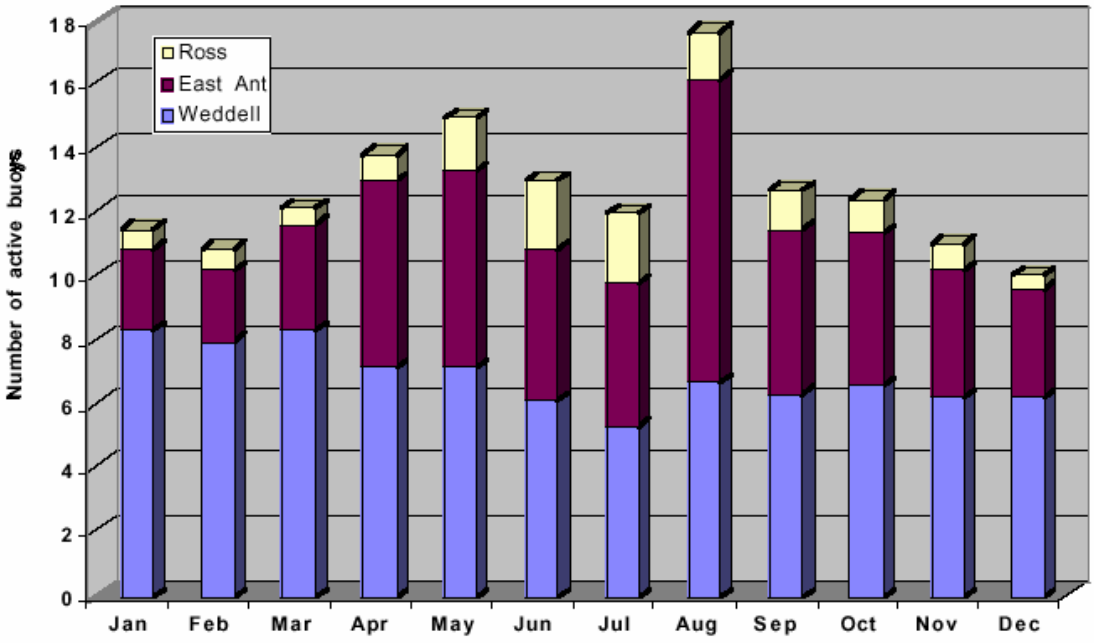


Fig. 2(b). Average monthly distribution of active buoys



4 Current activities and outlook

Deployments during 2000 have been somewhat less than during earlier years, and at October 2000 there were only ten active buoys contributing to IPAB. All of these were reporting via the GTS. Three buoys were operating in the Bellingshasen, Amundsen and Ross Sea region; four had been originally deployed off East Antarctica, but are now spread widely around the continent; and three buoys were operating in the Weddell Sea. These last three are survivors from an array of six innovative buoys deployed by the Scott Polar Research Institute in April 2000 to study highly mobile pancake ice formation, and its role in the ice edge advance. The buoy hull was designed to mimic as closely as practicable the properties of the pancakes. Data was relayed using both System Argos and the higher capacity Orbcomm low-Earth orbit satellite system, and the buoys measured wave spectrum as well as standard meteorological and oceanographic variables.

Although the exact situation is as yet uncertain, it would appear that deployments in 2001 will be much improved over 2000. At least 10 to 12 high latitude deployments are expected within the next 12 months, and potentially more than 20 buoys may be deployed (Appendix A).

Ian Allison
IPAB Co-ordinator
October 2000

APPENDIX A

IPAB Participants
(at September 2000)

Agency/Researcher	Country	Contribution	Date of Confirmation
Alfred Wegener Institute	Germany	• 3 buoys/year	25/07/00
Australian Antarctic Division	Australia	• 4-6 buoys/year • logistical support for ship deployments	14/06/00
Australian Bureau of Meteorology (Tasmania and Antarctica Regional Office)	Australia	• 2 buoys/year	15/06/00
British Antarctic Survey	UK	• 4 buoys in 2001 • logistical support for ship deployments	18/09/00
Finnish Institute for Marine Research	Finland	• 2-4 buoys every alternate year from 20001/02 (potential)	10/08/00 (interim)
Geophysical Institute, University of Alaska - Prof. M. O. Jeffries	USA	• 4 buoys/ year (potential) in 2001 and 2002	29/06/00
Institut fur Meteorologie und Klimaforschung, Universsitat Karlsruhe	Germany	• scientific/technical advice • data transmission, analysis & publication costs. • meeting support	16/06/00
National Ice Center	USA	• scientific/technical advice	28/04/00
National Snow and Ice Data Center	USA	• Data archive and distribution	26/09/00
Programma Nazionale di Ricerche in Antardtide, ENEA	Italy	• logistical support for ship and aircraft deployments	13/07/00
Scott Polar Research Institute	UK	• 6 buoys in April 2000 • 4 buoys (potential) in 2001 • Co-ordinating Office	24/04/00
Service Argos	France	• technical advice • support for meetings	15/09/00
South African Weather Bureau	South Africa	• 3-5 buoys/year • automatic weather station on S. Thule Island • logistical support for ship deployments	23/08/00
United Kingdom Meteorological Office	UK	• Argos costs for 4 PTT/year	01/09/00

INTERNATIONAL BUOY PROGRAMME FOR THE INDIAN OCEAN (IBPIO) - 2000

1. INTRODUCTION

The International Buoy Programme for the Indian Ocean 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. This task includes support to 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 to the research activities of participating institutions.

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

To date, five organisations are formally participating in the International Buoy Programme for the Indian Ocean:

- Bureau of Meteorology (BoM), Australia ;
- Global Drifter Center of NOAA/AOML (GDC), USA ;
- Meteo-France ;
- National Institute of Oceanography (NIO), India ;
- South African Weather Bureau (SAWB).

2. PROGRAMME MEETING

IBPIO had no meeting in 2000. However, participants maintain an ongoing awareness of the respective activities within the programme area. The Fifth Programme Committee meeting will possibly be held in Perth, in October 2001, prior to the DBCP meeting.

3. OPERATIONAL PROGRAMME

3.1 Drifting buoys

More than 100 drifting buoys have been deployed from July 1999 to June 2000. Ninety per cent of them have been lagrangian drifters and 55% (against 40% last year) have been measuring air pressure (AP).

Most of the deployments are carried out by research vessels and ships of opportunity plying the Indian Ocean from many ports such as Perth (Australia), Goa (India), Durban and Cape Town (South Africa) and La Reunion. Some ship voyages to remote islands are useful too, for deployments in the southern latitudes: Heard I. from Australia; Amsterdam I., Kerguelen and Crozet Is. from La Reunion and Marion Is. from South Africa.

By the end of July 2000, the average number of operating buoys carrying out AP measurements was 39 (out of 105). Some of them (two in average) were providing wind data too. The peak of active buoys providing at least AP values in the IBPIO was reached at the beginning of 1998 (55 buoys). The minimum was reached in mid-1999 with 28 active buoys only. The number of buoys measuring SST only - in addition to their position - has been stable since April 1999 (~60 buoys in average).

Some buoys, owned by SAWB, will migrate from the South Atlantic Ocean, westerly driven to the Indian Ocean. This flux, which constitutes a non-negligible contribution from South Africa, is more or less compensated by the escape of other buoys to the south of Australia.

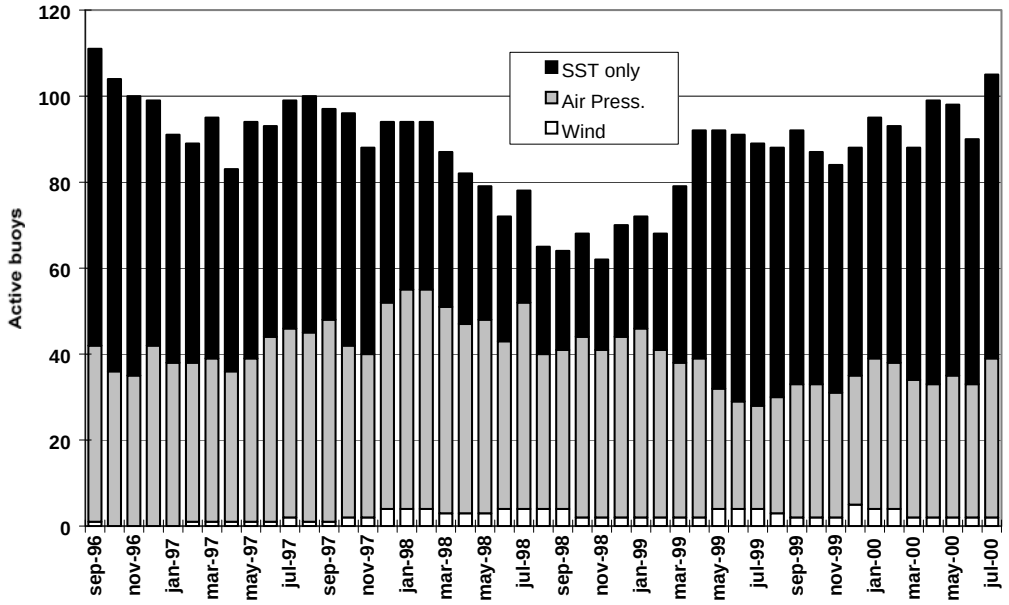


Figure 1. Number of drifting buoys operating in IBPIO according to the parameters they measure

Owner	SST only	Air Pressure	Wind
Australian Bureau of Meteorology	-	4	-
Global Drifter Center	62	22	-
Météo-France	-	2	1
National Institute of Oceanography	1	4	-
Navoceano	2	1	-
South African Weather Bureau	1	4	1
Total	**66**	**37**	**2**

Table 1. **Operating drifting buoys by the end of July 2000**

All drifting buoys are using the Argos system to report their data. More and more are fitted with the DBCP-M1 format which significantly increases the availability and the timeliness of the data.

3.2 Moored buoys

The National Institute of Ocean Technology (NIOT), India, operates a network of 12 moored buoys in Indian waters. Eight of them were operational on August 31st, 2000. Data transmission is carried out thanks to Inmarsat. Surface meteorological parameters have been sent on the GTS in "FM 18 BUOY" code through the Indian Meteorological Department since mid-2000. Bulletin headers are SSVX01 DEMS. The IBPIO participants are interested in the extension of the TAO/TRITON array in the Indian Ocean planned by the Japanese Agency of Marine Science and Technology (JAMSTEC).

4. PLANS

Efforts are mainly aimed at filling data gaps in the tropical regions, mainly during the cyclone seasons. In the southern tropical area, air deployments of SVP-B drifters, done at least once a year by Navoceano in November, should continue in the next few years. These buoys are provided by

NOAA/GDC, and 10 barometers are funded by Meteo-France each year. Meteo-France plans to deploy 3 additional SVP-B drifters by ship before the end of 2000. Further north, NIO plans to deploy 7 to 10 SVP-B drifters plus one or two buoys fitted with wind and air temperature sensors, before mid-2001.

In the Southern part of the Indian Ocean, SVP-B drifters mainly provided by BoM should be regularly deployed by RV Marion Dufresne during her rotations between La Reunion and Crozet, Kerguelen and Amsterdam islands. As for 2000, some opportunities will be found from Cape Town and Fremantle too.

BoM plans to deploy approximately 10 drifting buoys in the next 12 months, and is also funding 10 barometers for GDC drifters.

IBPIO participants are still encouraged to increase their contributions of buoys, or to fund barometers to equip SVP drifters provided by GDC. For the fifth consecutive year, Meteo-France is funding 10 barometers for the Indian Ocean in 2000. BoM also took this initiative in 2000 and plans to continue in 2001.

As for the previous years, the deployment of many SVP drifters provided by GDC should continue. These drifters measure SST only in addition to the surface current deduced from their move, although it is understood the GDC has recently received funding for the addition of barometers to some of its drifters.

5. INFORMATION ON THE IBPIO

IBPIO information is available on the World Wide Web at http://www.shom.fr/meteo/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 status, buoy trajectories, data availability charts, deployment log.

A promotional leaflet on the IBPIO is now available. Copies can be obtained from the Chairman or the Programme Co-ordinator.

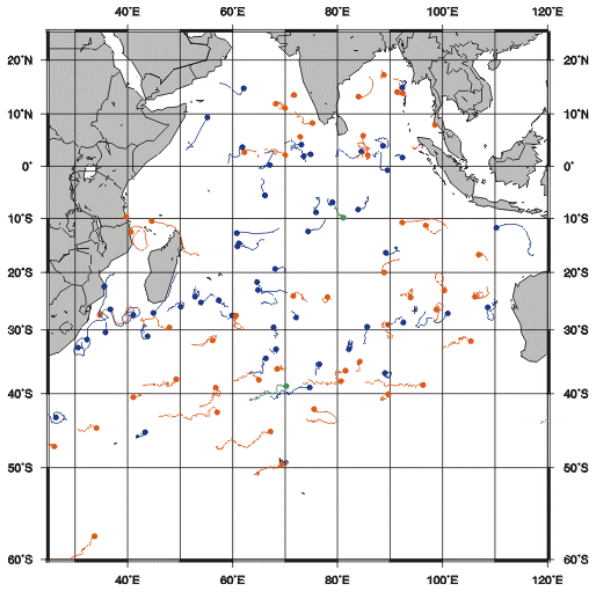


Figure 2. Buoys drifting in the Indian Ocean - September 2000

INTERNATIONAL SOUTH ATLANTIC BUOY PROGRAMME

1. INTRODUCTION

The International South Atlantic Buoy Programme (ISABP) was established in1993 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 (CGOS), the World Climate Research Programme (WCRP), the Global Ocean Observing System (GOOS), as well as to the research activities of participating institutions.

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

2. ANNUAL MEETING

The seventh International South Atlantic Buoy Programme meeting was held in Salvador, Brazil from 31st July 2000 to the 4th August 2000. The meeting was hosted by “Instituto Nacional de Meteorologia”. The meeting lasted for four days. The first day was devoted to a workshop, were 8 technical and scientific papers were presented, covering a wide spectrum of applications. While the workshop and meeting was successful and productive, participants also enjoyed the hospitality of Brazil and its people. Participants were also taken on a tour of the Global Atmospheric Watch station (GAW) at Arambepe just outside Salvador.

The participants elected Alaor Moacyr Dall’ Antonia Jr, Brazil, as chairman and Javier Valladares, Argentina, as vice-chairman. Louis Vermaak, South Africa, was re-appointed as Programme Co–ordinator. During the meeting another joint meeting with IBPIO was discussed. Due to travelling costs etc is was decided that the ISABP should have its own meeting in Argentina next year.

3. OPERATIONAL PROGRAMME

3.1 Data coverage in the ISABP area.

The inter-session period has been another good year. Data coverage in the ISABP area of interest is fairly good in some places but is is becoming under threat. In the area south of 20S there is still a good array of SVP and SVPB drifters. A large gap exists east of Argentina and need attention. A gap are also visible south of 50S but is remains a challenge to any institutions to deploy drifters that far south due to the danger of pack ice.

In the area between 20S and 10N large gaps exist in the area. The Pirata array exist along the equator. Due to the economy most western African countries do not want to participate in the program.

In the area 10N to 20N, there are a good array of SVP and WOTAN drifters. ISABP would like to thank GDP for deployments in this area with special consideration to the hurricane season.

3.2 Buoy deployments.

In the Tropical Atlantic region north of 20S, GDP deployed 76 SVP and 2 SVPB drifters by ship. In the South Atlantic region south of 20S, GDP deployed 14 SVPB drifters by ship.

In the Hurricane array, 17 GDP hurricane array WOTAN drifters were air deployed by US Naval Oceanographic Office, while 1 GDP and 2 Meteo-France WOTAN drifters were deployed from a voluntary observation ship.

In the South Atlantic Argentina deployed two drifters with one failing after one month and the other after four months.

In the Tropical Atlantic region south of 10 S the Brazilian National Buoy Programme (PNBOIA) deployed by ship 11 SVPB and 8 SVP and started to test a Atlas buoy at the Guanabara Bay.

The South African Weather Bureau deployed 27 drifters with 14 SVPB belonging to the SAWB and the rest to other institutions. All these deployments were done from the supply ship SA Agulhas on its routine voyages to Gough and Marion Island as well as to Antarctica.

3.3 Data recovery and dissemination

The data is recovered through the Argos system and sent on the GTS through the processing centres of Toulouse and Landover. SAWB is operating a Argos LUT in Cape Town and the data is reported to CLS/Argos.

The SAWB is also operating LUT's on Gough and Marion Islands but due to bandwidth limitations on the communication lines at present TIP data can not be send to Argos for processing. The UKMO are busy with final tests on the LUT on the Falklands and it should be operational soon.

4. INFORMATION ON THE ISABP

ISABP information is available on the World Wide Web at http://dbcp.nos.noaa.gov/dbcp/isabp/. The pages, regularly updated, give a description of the programme, its objectives and management, listing of participants and meeting reports.

5 CONCERNS AND RECOMMENDATIONS

The lack of an LUT in South America to cover the western Southern Atlantic Ocean. Answer is still waiting from Argos on the issue. It is recommended that the DBCP carries this message to the JTA.

The participants in the ISABP, especially in Argentina feels strongly that we should approach Chile and Peru to participate in the ISABP as all the weather reaching Argentina comes from the Pacific Ocean and data in that region could assist operational weather forecasters in the region.

All participants continue to be concerned by the very high Argos processing costs, which limit their participation in the program.

ISABP Progamme Committee.

The Global Drifter Programme (GDP)

October 2000 - Victoria, British Columbia, Canada

Since last year=s meeting in Wellington, New Zealand the Global Drifter Center (GDC) has been fully integrated into NOAA's Global Ocean Observing System (GOOS) Center in Miami, Florida and has continued to meet the goals of deploying approximately 400 drifters per year, maintaining the existing network and gradually increasing the overall global coverage in all three ocean basins. One of the goals of the GDC, with guidance from the Climate Observing System Council, is to have a global network consisting of 940 drifters by the end of 2001.

Over the next 12 months the GDC plans to deploy 419 drifters, 205 into the tropical Pacific, 87 into the tropical Atlantic, 50 into the tropical Indian and 77 into the souther oceans, or about 35 drifters per month. The GDC plans to work closely with our DBCP colleagues to deploy these drifters in the most efficient, effective and mutually beneficial manner as possible.

During the past 12 months the GDC has worked with the following organizations: U.K. Met Office, Australia BOM, Meteo France, IRD Noumea, New Zealand Met Service, South African Weather Bureau, University of Cape Town, Brazilian Navy, Instituto Nacional de Investigacion y Desarrollo Pesquero - Argentina, Korea, Instituto Canario de Ciencias Marinas - Canary Islands, CICESE - Mexico, U.S. Naval Oceanographic Office, Scripps Institution of Oceanography, University of Washington, Harbor Branch Oceanographic Institution, NOAA OMAO and several different Voluntary Observing Ships and their parent companies.

The GDC still supports the upgrading of SVPs to SVPBs by any country who desires to do so and will work closely with those countries in coordinating the shipping and deployment of those upgraded drifters.

The GDC and its related Data Assembly Center (DAC) continues to develop new and improve existing products that are available on the following web site:

"www.aoml.noaa.gov/phod/dac"

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

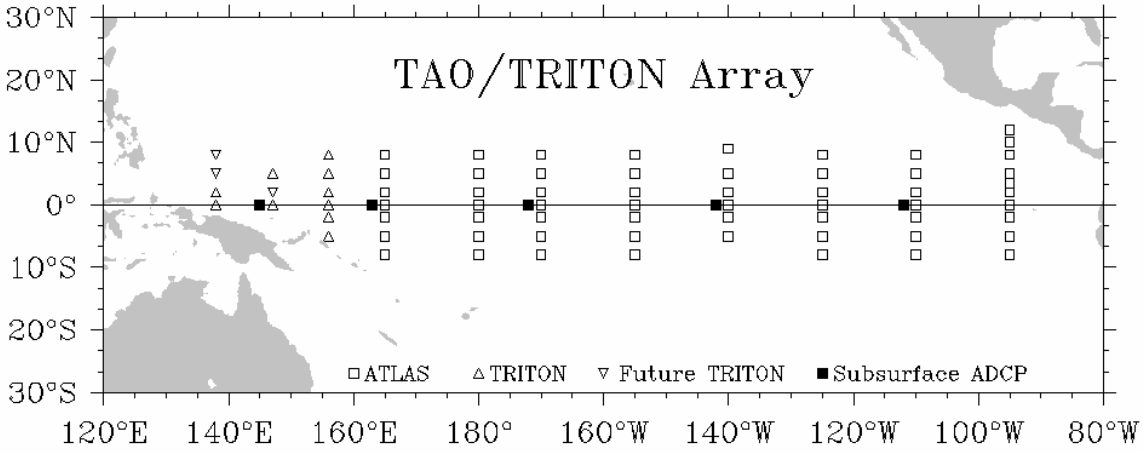
The GDC still encourages the use of Standard data formats for all new deployments which reduce the problems of having to write new de-coders for a minimal number of drifters. As drifters evolve (depart from the original area of interest) from other nation=s or organization=s programs and are then added to the GDC tracking responsibilities, it is most important that we know the individual specifications for those drifters and, as such, encourage the flow of this information in a timely manner.

Plans are to continue to work closely with our national and international colleagues to increase communication thereby improving the efficiency and effectiveness of all drifter deployments as well as their tracking and insertion onto the Global Telecommunications System.

TAO Implementation Panel (TIP)

The TAO/TRITON (Tropical Atmosphere Ocean/Triangle Trans-Ocean Buoy Network) moored buoy array represents the largest ocean observing system ever deployed specifically for research and forecasting of El Nino and La Nina. In January 2000 the array was renamed ATAO/TRITON≅ reflecting the transition of sites west of 165EE longitude from ATLAS moorings, designed and built by PMEL (Pacific Marine Environmental Laboratory), to TRITON moorings, designed and built by JAMSTEC (Japan Marine Science and Technology Center). The present composition of the array is 58 ATLAS moorings, 10 TRITON moorings, and 5 subsurface ADCP (Acoustic Doppler Profiler) moorings. An additional 3 TRITON moorings will be deployed in the coming year.

Over the past few years, scientists and engineers at the PMEL have redesigned TAO moorings to take advantage of technological advances and to increase sampling capabilities. The



results of these efforts can be seen in the adaptability of the moorings to accommodate new field experiments. For example, the array was expanded for NOAA's EPIC (Eastern Pacific Investigation of Climate Processes) Program (http://www.pmel.noaa.gov/tao/epic/) with 3 additional moorings along 95EW in the eastern Pacific. Moreover, all moorings along this line were enhanced with additional sensors to provide real-time telemetry of long- and short-wave radiation, rainfall, barometric pressure, salinity, and ocean currents.

A two-month long, land-based intercomparison of TAO, TRITON and WHOI-IMET surface instrumentation was conducted this summer. Initial examination indicates that data from the three systems compare well. A detailed description of the intercomparison and analysis of the data will be published as a technical report.

TAO/TRITON data return remains good, with an overall value for real-time data availability of about 85%. 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 (Pilot Research Moored Array in the Tropical Atlantic) is completing its pilot phase and is about to enter a 5-year (2001-2006) consolidation phase during which the pilot array will be continued in a 10-mooring configuration and evaluated for its utility in support of research and operational forecasting.

The TAO Web Pages (http://www.pmel.noaa.gov/tao/) have been updated to offer improved distribution of both information about the TAO Project and TAO/TRITON data itself. In

particular, a new data distribution page provides a wider range of data types, more varied temporal sampling and options on formats. In addition to the actual replacement of moorings, the transition to TAO/TRITON required the assembly of data processed by both PMEL and JAMSTEC into a unified data set available on the world wide web from both PMEL and JAMSTEC. Data from all sites continue to be disseminated on the GTS.

Plans are underway to reorganize TIP in terms of its membership and terms of reference. This is in part in response to the fact that TAO is now fully implemented and in an operational phase. TIP will become the Tropical moored buoy Implementation Panel and will function as a technical advisory committee for existing or future mooring programs in any of the tropical oceans. The scientific design and scope of future moored arrays will be addressed by the sponsors of TIP, the COOP (CLIVAR Ocean Observation Panel) and OOPC (Ocean Observations Panel for Climate). The next TIP meeting will be held 16-17 November 2000 in Perth, Australia.

Annex III

REPORTS FROM DATA MANAGEMENT CENTRES

The following pages contain the reports by the:

- Responsible National Oceanographic Data Centre (RNODC) for drifting buoys of the International Oceanographic Data and Information Exchange (IODE) system of IOC, which is implemented by the Canadian Marine Environmental Data System (MEDS);

- Specialized Oceanographic Centre (SOC) for drifting buoys of the Integrated Global Ocean Services System (IGOSS) of IOC and WMO, which is implemented by the Subdivision Prévision marine (SCEMO/PREVI/MAR) de Météo-France.

Annex III

RESPONSIBLE OCEANOGRAPHIC DATA CENTRE (RNODC) FOR DRIFTING BUOYS

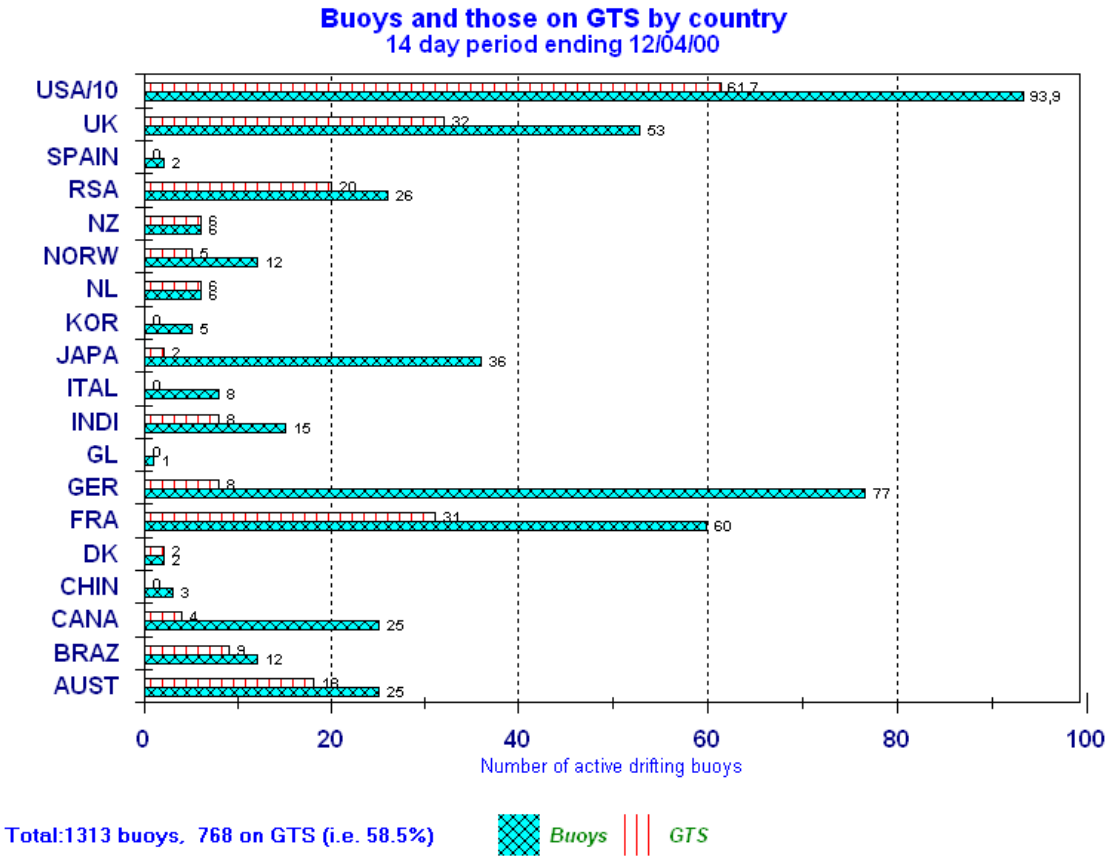
see separate file

Annex III

SOC FOR DRIFTING BUOY REPORT 1999 - 2000

see separate file

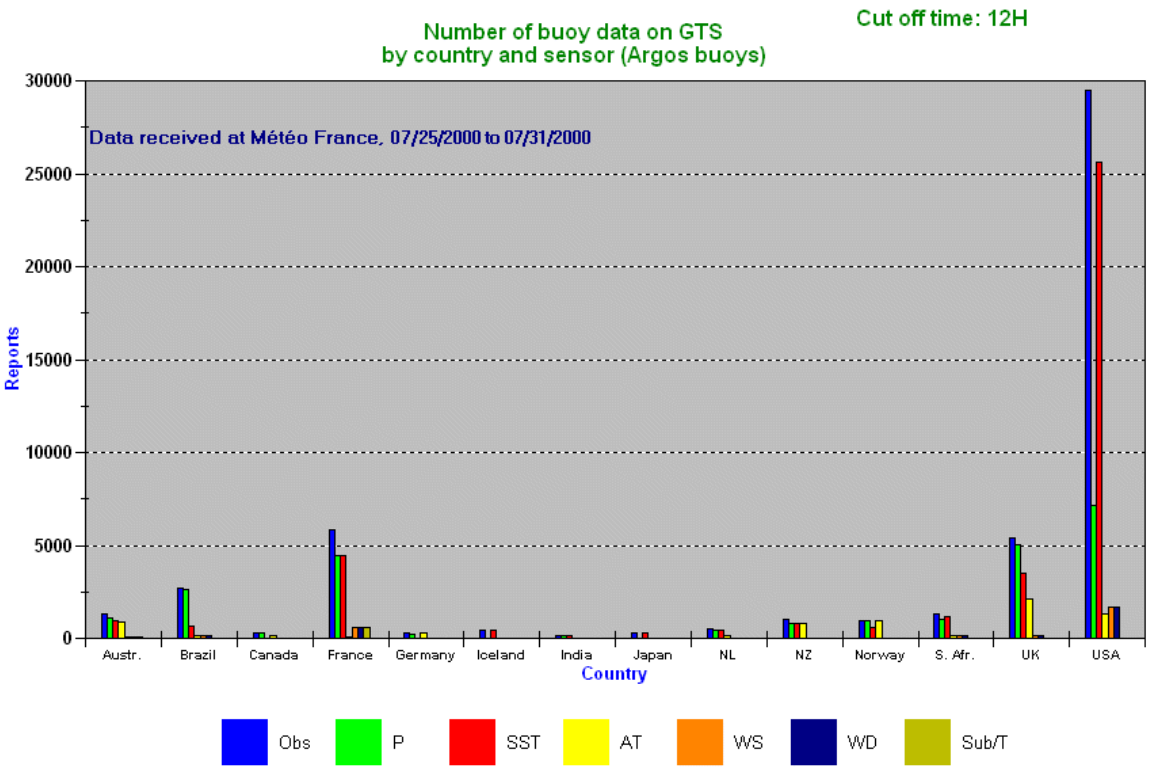
Distribution of GTS and non-GTS platforms by country



Annex V

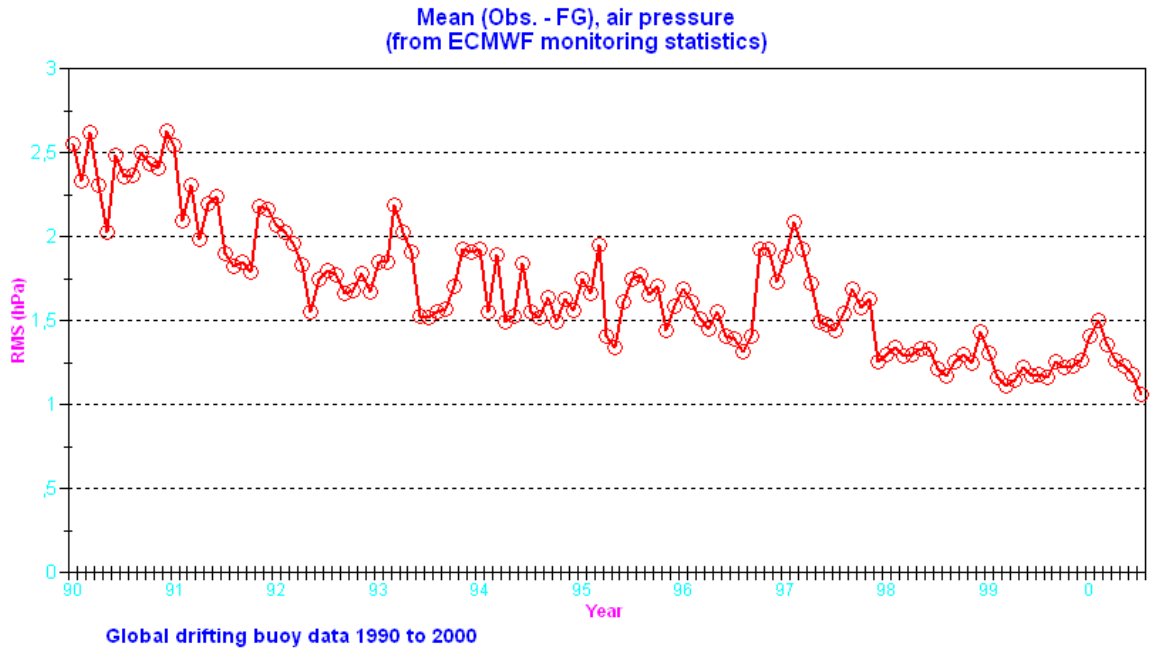
Number of BUOY reports received at Toulouse during November 2000

Distribution of GTS buoy reports by country and variable
(cut off time 12 hours)

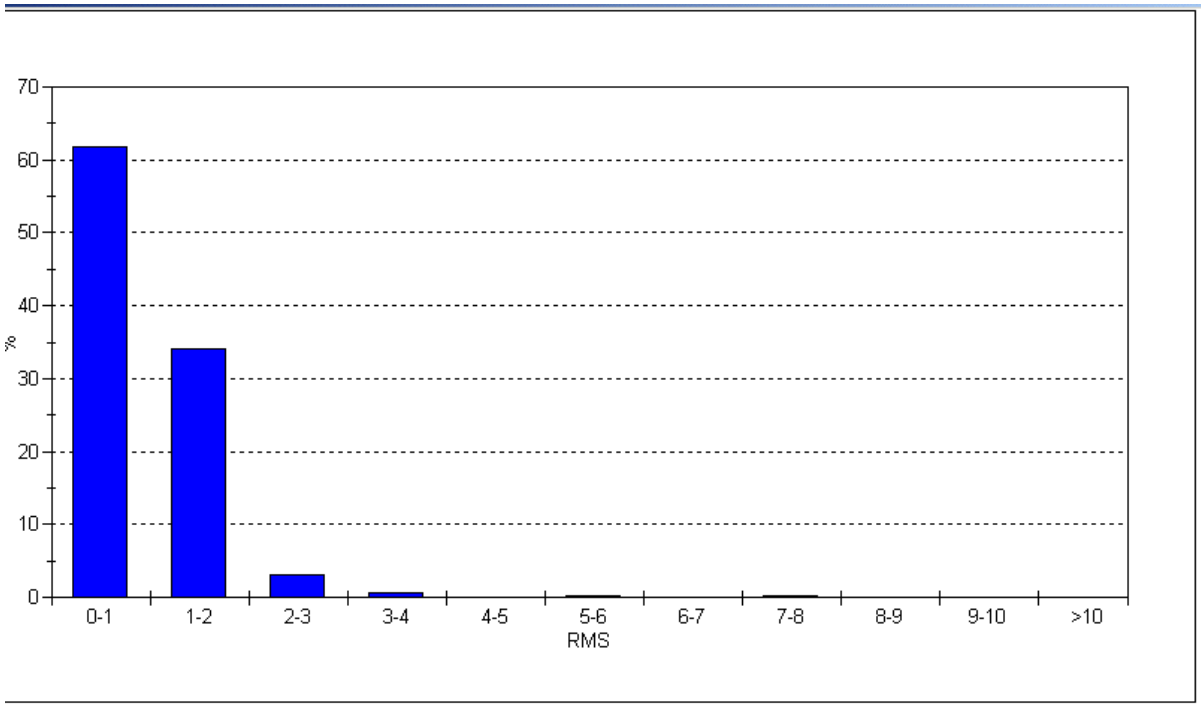


Annex VI

Evolution of mean RMS (Obs-FG) per month for DB air pressure data (from ECMWF statistics)



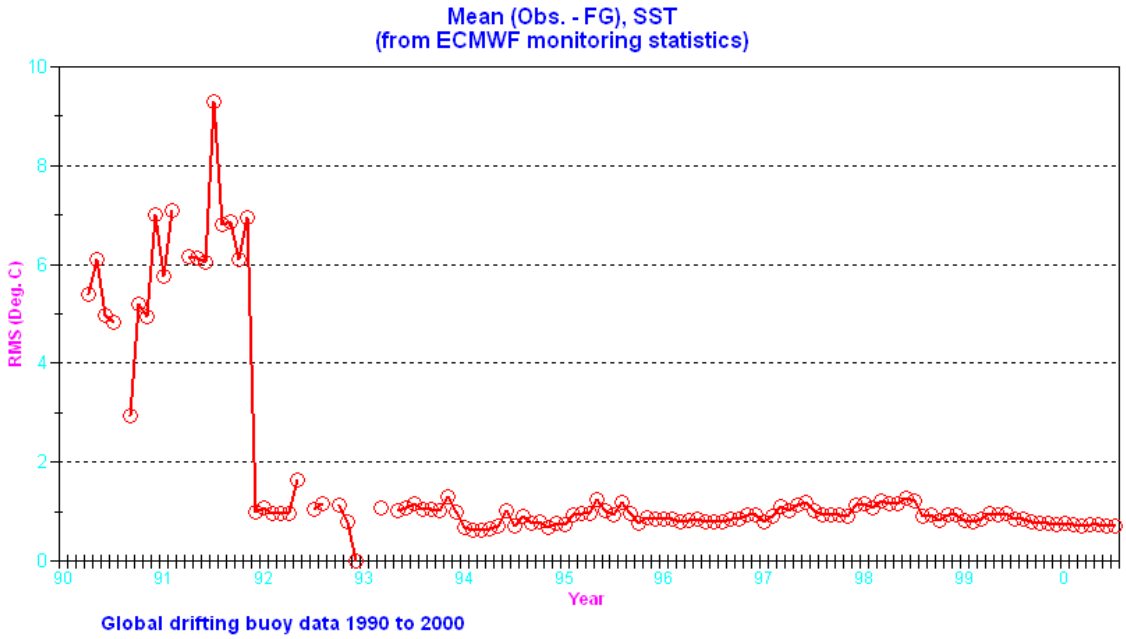
Distribution of RMS (Obs-FG) for DB air pressure data
(from ECMWF statistics)



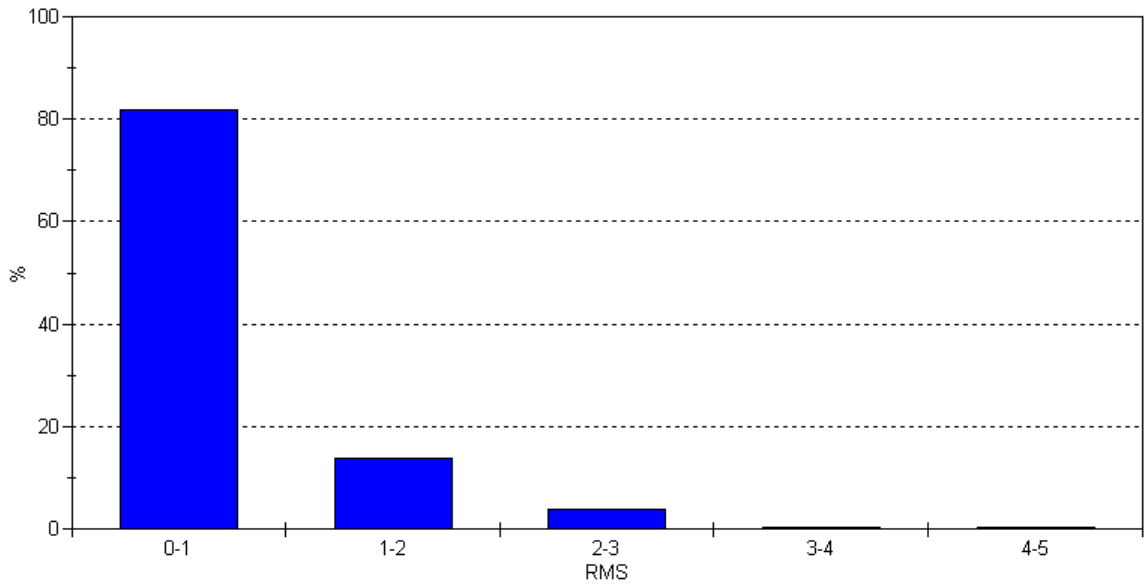
RMS Histogram (Obs - FG) - Global Drifting GTS buoy data - 05/00 to 10/00 - Air Pressure (hPa) - from ECMWF statistics

Buoys: 365 ; Observations: 428419 ; Mean RMS: 1.00 hPa

Evolution of mean RMS (Obs-FG) per month for DB SST data (from ECMWF statistics)



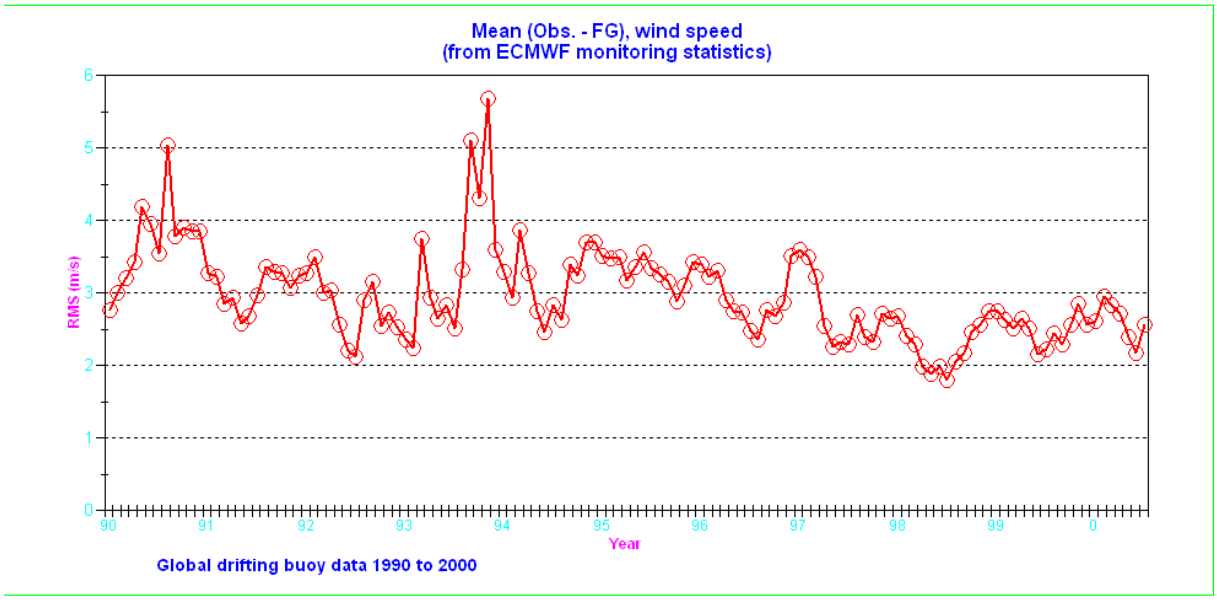
Distribution of RMS (Obs-FG) for DB SST data
(from NCO statistics)



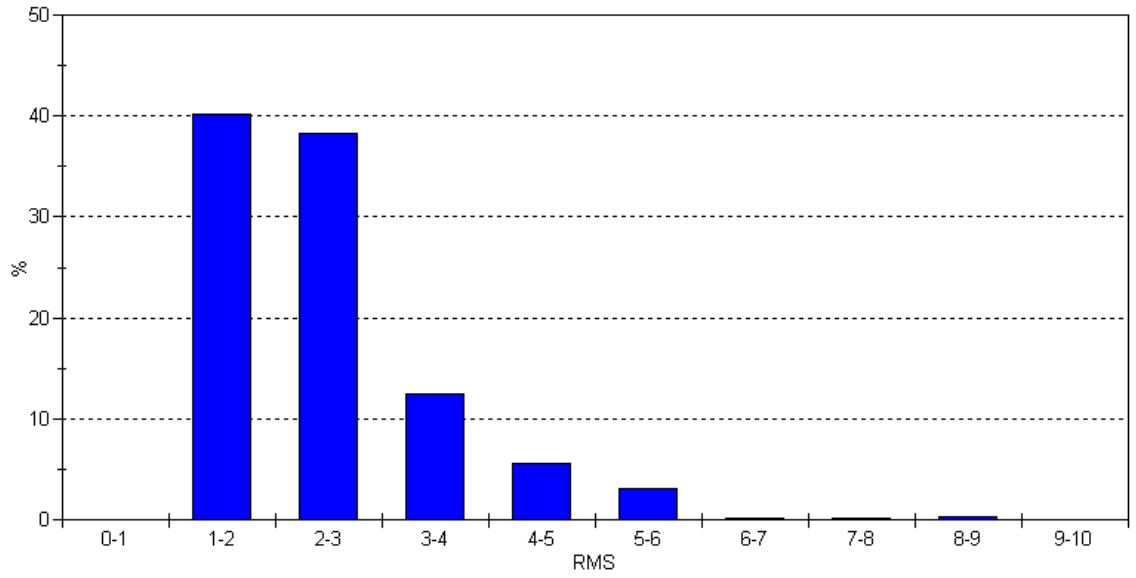
RMS Histogram (Obs - FG) - Global Drifting GTS buoy data - 02/00 to 07/00 - SST (Deg) - from NCO statistics

Buoys: 1033; Observations: 1105195; Mean RMS: .68 Deg

Evolution of mean RMS (Obs-FG) per month for DB wind speed data (from ECMWF statistics)



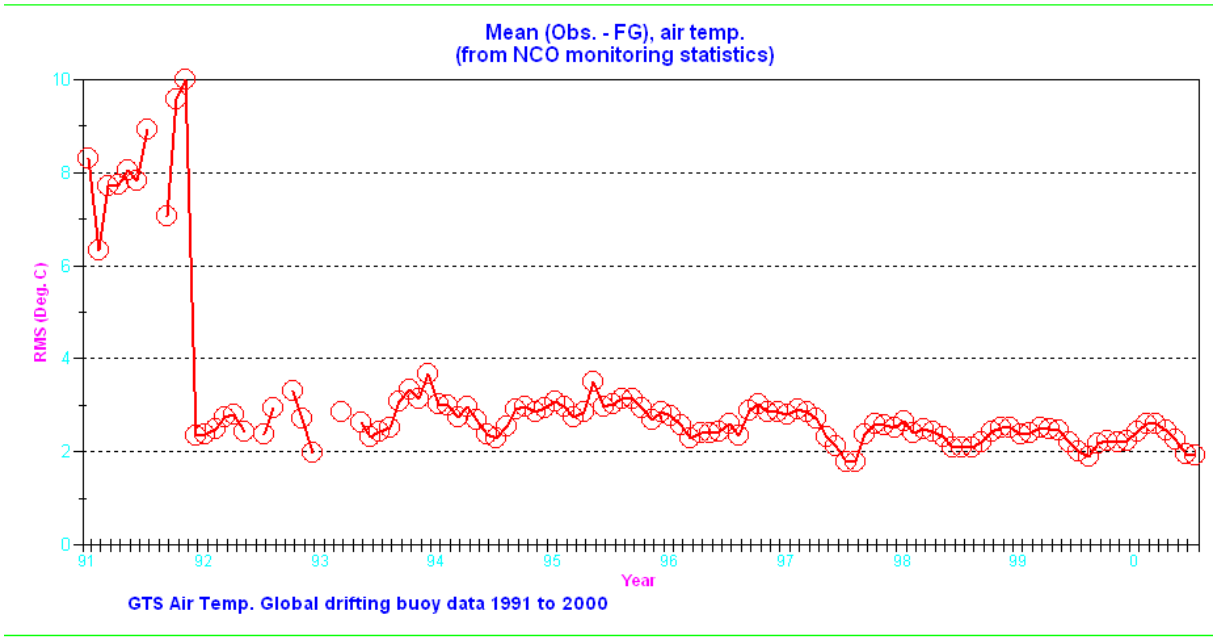
Distribution of RMS (Obs-FG) for DB wind speed data (from ECMWF) statistics)



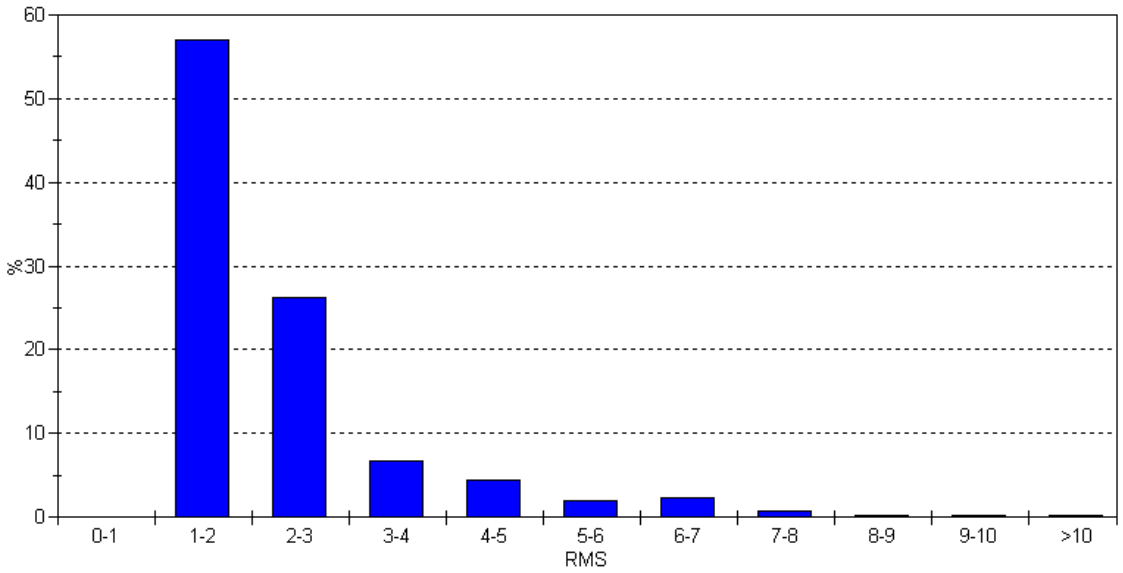
RMS Histogram (Obs - FG) - Global Drifting GTS buoy data - 02/00 to 07/00 - Wind Speed (m/s) - from ECMWF statistics

Buoys: 80 ; Observations: 57670 ; Mean RMS: 2.38 m/s

Evoluation of mean RMS (Obs-FG) per month for DB air temperature data (from NCO statistics)



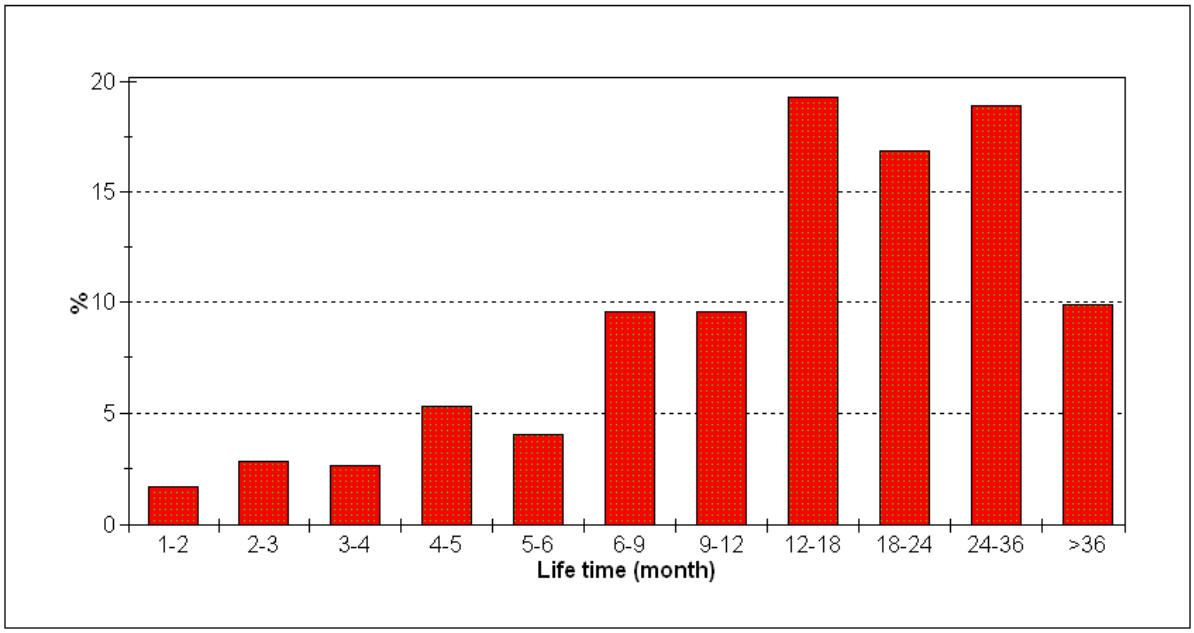
Distribution of RMS (Obs-FG) for DB air temperature data (from NCO statistics)



RMS Histogram (Obs - FG) - Global Drifting GTS buoy data - 02/00 to 07/00 - Air Temperature (Deg.) - from NCO statistics

Buoys: 142 ; Observations: 214784 ; Mean RMS: 2.31 Deg.

Life time distribution, Global drifting buoy Air Pressure data-12/00 (based on ECMWF statistics)



Life time distribution, Global drifting buoy Air Pressure data - 12/00 (based on ECMWFstats.)

Annex VIII

Report of the SVP Working Group

1. This has been a busy year for the SVP drifter community. Météo-France reported that data from approximately 800 SVP drifters and their variants have been loaded into their data base. Météo-France is building a meta-database to track the performance of the SVP drifter variants. A variety of parameters influence the lifetime of the drifters. These include Argos message length, transmission repeat period, battery capacities, type of barometer, and different manufacturers. Analysis of each variable is a time-consuming process, which is complicated by errors in the records, re-assignment of Argos or WMO numbers to other buoys, and unreported buoys.

2. Météo-France noted that there have been several improvements in the SVP program during the intersessional period. These include:

   (i) Early drifter failures have decreased;
   (ii) Air deployments are working again;
   (iii) Argos message length decreases have resulted in an increase in buoy lifetimes;
   (iv) Gross errors (e.g. 120-day lifetime issue, or lower limit set at 1000 hPa) have been eliminated;
   (v) Data inserted onto the GTS and available for operational purposes have increased significantly as a result of the elimination of the 1/3 duty cycle and optimization of data transmission due to the DBCP-M1 format.

3. Météo-France reported that recent tests were conducted using two different types of barometers. Results suggest that the barometers are more reliable than the components of the measurement system, i.e. the air intake and pipe. A few SVP-B buoys significantly exceeded their life expectancy, so clearly good systems can be built. However, a large number of barometers fail prematurely. Marlin did extensive barometer analyses over the past year. As a result of their work, they have built three drifters for the Naval Oceanographic Office to determine which barometer port materials give the best results. These drifters will be deployed in the Indian Ocean in November 2000.

4. Marlin continued their in-depth investigation of the performance of their low-cost transmitter this year. Specifically, they noted differences in receipt of data transmissions between NOAA-J and NOAA-K. They have been working to maximize data transmissions in particular during low-angle satellite passes.

5. Scripps Institute of Oceanography (SIO)has been working with Pacific Gyre, Technocean and Clearwater to make improvements on a digital SVP-BW. Deployments have been conducted in the Sea of Japan, the Labrador Sea and in the Pacific with good results. The data are available on an SIO website. Results indicate that winds can be reliably measured up to 30 meters per second. Reports from the studies cited above will be presented during the technical workshop and then published as proceedings of the workshop.

6. The New Zealand Meteorological Service reported very good results from ship deployments of Technocean SVP drifters in the Tasman Sea this year.

7. The Naval Oceanographic Office (NAVOCEANO) deployed 40 SVP-B and BW drifters for other action groups of the DBCP during the intersessional period. NAVOCEANO deployed an additional 40 SVP-B's globally, and 8 SVP-BW drifters in the Inter-Tropical Convergence Zone for tropical storm forecasting, with mixed results. MetOcean advised NAVOCEANO during the early summer that they had identified a problem with the copper crimping used to attach the drogue to the hub that caused the drogue to drop off perhaps even before deployment. They recommended a procedure to check the crimps before the buoys are deployed.

8. As a result of comments presented by New Zealand Met Service at last year's DBCP, NAVOCEANO began a preliminary investigation of longevity of pressure sensors. Nearly all of the drifters the office deploys are equipped with barometers. Although an extensive review was not carried out, NAVOCEANO can confirm that just looking at GTS data for barometer performance can be misleading because bad values disappear. Over the past year, NAVOCEANO noted that there were no requests for re-calibration of pressure their sensors, so either the barometers worked properly or not. NAVOCEANO is setting up a database to track sensor performance. These data are not available at present.

9. Météo-France analyzed the data from SVP-BW drifters deployed during the year. They noted that there are some significant problems with the data. These include the following: The weather classification algorithm doesn't work. Too many data sets appear with class 5 and 3, so this quality index is not used to filter the GTS data. If it were used, then 50% or more of the good data would be quality-controlled out. Météo-France is working on a new index and hopes to have it ready soon. Sometimes the wind speed data appear to be unreliable, with a large scatter for a while then the data are good again. This may be due to some external problem, where the data could be quality-controlled with a properly working index. Finally, if the drogue falls off an SVP-BW, it may be that the float wind vane no longer orients into the wind, and that the hydrophone floats near the surface causing the data to be bad.

10. Several recommendations are offered in light of the analysis above. Manufacturers should attach the drogues with care. Météo-France made QC tools available to check operators' data on GTS, and they should take advantage these tools. The drogue submergence parameter should be reported over the GTS, as it is important to check that the drogue is still attached for accurate wind measurements. Electrical connections between the hydrophone and buoy should be checked.

11. All members of the working group contributed to the better understanding of the SVP drifter series during the intersessional period. Some new insights have been gained, and some worthwhile recommendations have been proposed.

Annex IX

ARGOS REGIONAL RECEIVING STATON NETWORK

Financial Statement by IOC
for the year 1 June 1999 to 31 May 2000
(all amounts in US $ unless otherwise specified)

BALANCE (from previous year)			**$ 21 929**
FUNDS TRANSFERRED FROM WMO (relevant to the period)			
$ 118 000	(28.04.1999)		**$ 118 000**
FF 80 000	(16.12.1999)		**FF 80 000**
	TOTAL RECEIPTS		**$ 139 929**
			FF 80 000
	EXPENDITURES		
Technical Co-ordinator's employment:			
	- Salary:	69 572	
	- Allowances:	25 762	
	- Relocation (yearly provision):	4 456	**$ 99 790**
Technical Co-ordinator's missions:			
	- Bremerhaven (1-4 June 1999)	0[3]	
	- Oban (12-15 June 1999)	2 982	
	- Saint Petersburg (18-23 July 1999)		
	- Saint Raphael (18-21 October 1999)	1 155	
	- Wellington/Melbourne (23 October – 6 November 1999)	3 868	
	- Geneva (28-30 November 1999)	1.312	
	- Paris (5-9 December 1999)	965	
	- Washington (9-19 February 2000)	1 988[4]	
	- Southampton (6-9 March 2000)	1 435	
	- San Diego (24March - 2 April 2000)	2 051	
	- Geneva/Tokyo (9-15April 2000)	3 770	
	- Regularization (previous year 's missions)[5]	640	**$ 20 166**
Contract with CLS/Service Argos:			**FF 80 000**
	TOTAL EXPENDITURES		**$ 119 956**
			FF 80 000
BALANCE (at 1 June 2000)			**$ 19 973**

3 The cost of the mission to Bremerhaven was taken into account under the mission to Brest (26-28 May 1999), already accounted for in the previous financial statement

4 The mission was partly paid for by WMO/CBS

5 Some mission-related expenses were taken into account too late within the administrative system to appear in last year's financial statement.

World Meteorological Organization

Data Buoy Co-operation Panel
Final Statement of Account as at 31 December 1999

	US$	US$
Balance from 1997		33,645
Contributions Paid for Current Biennium		300,072
Total Funds Available		333,717
Obligations Incurred		
Technical Co-ordinator	249,211	
Experts	3,845	
Consultants	5,490	
Travel	16,559	
Reports	12,194	
Administrative costs	8,620	
		295,919
Balance of Fund		US $ 37,798
Represented by		
Cash at Bank		46,395
Unliquidated obligations		8,597
		US $ 37,798

CONTRIBUTIONS	Received 1998	Received 1999
Australia	25,000	13,500
Canada	10,000	10,000
France	11,400	11,210
Germany	-	5,000
Greece	2,200	2,200
Iceland	1,500	1,500
Ireland	1,377	1,460
Japan	5,000	-
Netherlands	1,575	1,575
New Zealand	500	500
Norway	-	1,575
South Africa	3,000	6,000
UK	17,000	16,000
USA	68,000	83,000
TOTAL	146,552	153,520

World Meteorological Organization

Data Buoy Co-operation Panel
Interim Statement of Account as at 3 October 2000

	US$		US$
Balance from 1999			37,798
Contributions Paid for Current Biennium			112,456
Total Funds Available			150,254
Obligations Incurred			
Consultants	100,000		
Travel	24,752		
Bank charges	18		
			124,770
Balance of Fund		US $	25,484
Represented by.			
Cash at Bank			40,833
Unliquidated obligations			15,349
		US $	25,484

CONTRIBUTIONS	Received 2000
Canada	10,000
France	9,863
Germany	5,000
Greece	2,200
Iceland	1,500
Ireland	1,243
Netherlands	1,575
Norway	2,075
USA	79,000
TOTAL	112,456

NATIONAL FOCAL POINTS FOR THE DBCP

(as of July 2000)

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