INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (OF UNESCO)

WORLD METEOROLOGICAL ORGANIZATION

DATA BUOY COOPERATION PANEL

ANNUAL REPORT FOR 1999

DBCP Technical Document No. 16

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NOTE

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FOREWORD

I am pleased to present this thirteenth Annual Report for the Data Buoy Co-operation Panel, covering the Panel's activities during 1999.

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, to the extent that one group is now meeting in virtually every month of the year. In a world of constantly changing priorities, and ever increasing pressures in most administrations, it is most heartening to see the continuing contributions by members in these fora towards advancing the DBCP workplan. Without their efforts, the DBCP would not be able to progress the cause of buoys in the manner that it has over the years, with a consequent impact on the international community.

I note that the Panel's introduction of a Technical Workshop component into it's annual meeting, has proved to be very successful. They have grown each year, since their introduction in 1995 to become an integral part of the Panel's operation. This year's sessions were again very informative and well attended by people from the private sector, as well as by various governmental representatives. The DBCP publishes the presentations as a document in the DBCP 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 organiser of this year's annual meeting, Ms Julie Fletcher from NZ, and also the organiser for the Technical Workshop, Mr Ron McLaren from Canada.

Graeme Brough
Chairman, DBCP

SUMMARY

Introduction

The Drifting Buoy Co-operation 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 Co-operation Panel (DBCP) and to slightly modify its terms of reference, so that the panel might also provide any international co-ordination 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

Fourteen countries, seven action groups and two data management centres submitted reports on their data buoy activities

2. Real-time Data Flow

The data available in real-time on the GTS represented a bit less than 70% of the overall data transmitted from more than 1250 (as a mean) data buoys. Some 68% of the global data sets were delivered to users within 3 hours and 86% within 4 hours. Some 80% of the "regional" data sets were available within 30 minutes.

3. Data Quality

The statistics gathered through the year showed that the quality of air pressure data (including SVPB), and sea surface temperature, from drifting boys was excellent. Such a result is most probably attributable to the implementation of the DBCP quality control guidelines for GTS data and to an increased confidence in the quality of the buoy data on the part of the numerical weather prediction community.

4. Data Archival

The Marine Environmental Data Service (MEDS) in Canada has acted as the RNODC for drifting buoys on behalf of IOC and WMO since 1986. The number of messages MEDS archived per month increased from approximately 129,700 in 1997, to approximately 144,300 during the first half of 1999.

5. Technical Developments

During the intersessional period, a working group was established to analyze the performance of the Surface Velocity Programme (SVP) drifters equipped with barometers and/or wind measuring devices. Much progress has been made over the year, but some questions still remain and the work will continue over the next intersessional period.

6. Communications System Status

The Argos system has continued to provide a reliable service for recovery and processing of data buoy in real or quasi real-time. Various system enhancements were undertaken during the year and future developments are planned for the next few years. Alternative communications systems utilising Low Earth Orbiting (LEO) satellites were also reviewed at the DBCP session.

7. Administrative Matters

The Panel 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)..

The Panel's technical co-ordinator, 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. He is in addition discharging the tasks of technical co-ordinator for the the Ship-of-Opportunity Programme (SOOP) since January 1999

Fourteen countries contributed on a voluntary basis to the financial support of the Panel and/or SOOP in 1999: Australia, Canada, France, Germany, Greece, Iceland, Ireland, Japan, Netherlands, New Zealand, Norway, South Africa, United Kingdom and USA.

For the Panel's next financial year (1 June 2000 to 31 May 2001), a total budget of US$156,995- is planned to be allocated as follows:

	US$
Technical co-ordinator (salary, travel, logistic support)	130,000
Travel of Chairman, Vice-chairmen & JTA chairman	10,000
Experts	3,500
JTA chairman (contract)	6,000
Publications	5,000
WMO Costs	500
Contingencies	1,995
TOTAL	**156,995**

RESUME

Introduction

Le Groupe de coopération pour la mise en oeuvre des programmes de bouées dérivantes a été créé en 1985 en vertu de la résolution 10 (EC-XXXVII) de l'OMM et de la résolution EC-XIX.7 de la COI. En 1993, les organes directeurs de la COI et de l'OMM ont décidé de le rebaptiser Groupe de coopération pour les programmes de bouées de mesure (DBCP) et d'en modifier légèrement le mandat, afin qu'il puisse également assurer la coordination internationale requise pour les programmes de bouées ancrées qui servent d'appui aux grands programmes de l'OMM et de la COI (résolution XVII-6 de la COI et résolution 9 (EC-XLV) de l'OMM).

1. Programmes actuels et programmes prévus

Quatorze pays, sept groupes d'action et deux centres de gestion des données ont présenté des rapports sur leurs activités concernant les bouées de mesure.

2. Acheminement des données en temps réel

Les données disponibles en temps réel sur le SMT représentaient un peu moins de 70 % de l'ensemble des données transmises par plus de 1.250 bouées de mesure (en moyenne). Environ 68 % de l'ensemble des séries de mesure ont été transmis aux utilisateurs dans un délai de trois heures et 86 % dans les quatre heures. Quelque 80 % des séries de données "régionales" ont été disponibles dans les trente minutes.

3. Qualité des données

Les statistiques recueillies tout au long de l'année montrent que la qualité des données relatives à la pression atmosphérique (y compris celles fournies par les SVPB) et celles concernant la température de surface de la mer, recueillies par les bouées dérivantes, étaient excellentes. Un tel résultat tient très probablement à la mise en oeuvre des directives de contrôle de qualité du DBCP pour les données du SMT et à la confiance accrue que les milieux chargés de la prévision météorologique numérique accordent à la qualité des données recueillies par les bouées de mesure.

4. Archivage des données

Le Marine Environmental Data Service (MEDS) (Service des données sur le milieu marin) du Canada exerce les fonctions de Centre national de données océanographiques responsable, CNDOR, en ce qui concerne les bouées dérivantes pour le compte de la COI et de l'OMM depuis 1986. Le nombre de messages MEDS archivés par mois est passé d'environ 129.700 en 1997 à environ 144.300 au premier semestre de 1999.

5. Progrès techniques

Pendant la période d'intersession, un groupe de travail a été créé pour analyser les résultats des bouées dérivantes SVP (Programme sur la vitesse superficielle), équipées de baromètres et/ou d'anémomètres et autres appareils de mesure du vent. Beaucoup de progrès

ont été faits au cours de l'année, mais certaines questions demeurent et le travail se poursuivra pendant la prochaine période d'intersession.

6. Etat du système de communication

Le système Argos a continué d'assurer un service fiable de récupération et de traitement des données fournies en temps réel ou quasi réel. Diverses améliorations ont été apportées durant l'année écoulée et de futurs aménagements sont prévus dans les prochaines années. Au cours de sa session, le DBCP a également examiné d'autres systèmes de communication utilisant des satellites en orbite terrestre basse (LEO).

7. Questions administratives

Le Groupe de coopération compte sept groupes d'action : le Groupe européen pour les stations océaniques (EGOS), le Programme international de bouées de l'Arctique (IABP), le Programme international de bouées de l'Antarctique (IPAB), le Programme international de bouées de l'Atlantique-Sud (ISABP), le Programme international de bouées pour l'océan Indien (PIBOI), le Programme mondial sur les dériveurs (GDP) et le Groupe de mise en oeuvre du TAO (TIP).

Le coordonnateur technique du Groupe de coopération, M. Etienne Charpentier, a continué de travailler pour le compte de l'UNESCO/COI, en tant qu'expert dont les activités sont financées par un fonds d'affectation spéciale, au CLS/Service Argos à Toulouse, France. Il assume en outre les fonctions de coordonnateur technique du Programme de navires occasionnels (SOOP) depuis janvier 1999.

Les quatorze pays ayant fourni une contribution financière volontaire au Groupe de coopération et/ou au SOOP en 1999 sont les suivants : Afrique du Sud, Allemagne, Australie, Canada, Etats-Unis, France, Grèce, Irlande, Islande, Japon, Norvège, Nouvelle-Zélande, Pays-Bas et Royaume-Uni.

Pour le prochain exercice financier du Groupe de coopération (du 1er juin 2000 au 31 mai 2001), il est prévu un budget total de 156.995 dollars des Etats-Unis, répartis comme suit :

	Dollars des Etats-Unis
Coordonnateur technique (rémunération, frais de voyage et soutien logistique)	130.000
Frais de voyage du Président, des Vice-Présidents et du Président du JTA	10.000
Experts	3.500
Président du JTA (contrat)	6.000
Publications	5.000
Frais OMM	500
Faux frais	1.995
TOTAL	**156.995**

RESUMEN

Introducción

El Panel de Cooperación sobre Boyas a la Deriva fue establecido en 1985 en virtud de la Resolución 10 de la OMM (EC-XXXVII) y de la Resolución EC-XIX.7 de la COI. En 1993, los órganos rectores de la COI y de la OMM decidieron cambiar el nombre del Panel, que pasó a ser el Panel de Cooperación sobre Boyas de Acopio de Datos (DBCP), y modificar ligeramente su mandato de modo que también pudiera facilitar la coordinación internacional que exigieran los programas de boyas fondeadas en apoyo de los principales programas de la OMM y de la COI (Resolución XVII-6 de la COI y Resolución 9 de la OMM (EC-XLV)).

1. Programas actuales y previstos

Catorce países, siete grupos de acción y dos centros de gestión de datos presentaron informes sobre sus actividades de acopio de datos de boyas.

2. Flujo de datos en tiempo real

Los datos de boyas transmitidos en tiempo real por el Sistema Mundial de Telecomunicación (SMT) correspondieron a un poco menos del 70% del total de datos transmitidos mediante más de 1.250 (en promedio) boyas de acopio de datos. Alrededor del 68% de las series de datos mundiales se transmitieron a los usuarios dentro de las tres horas y 86% dentro de las cuatro horas. Alrededor del 80% de las series de datos "regionales" se podían consultar en 30 minutos.

3. Calidad de los datos

Las estadísticas recopiladas durante el año mostraron que la calidad de los datos sobre la presión atmosférica (entre ellos los del barómetro a la deriva del Programa sobre la Velocidad Superficial (SVP)) y la temperatura de la superficie del mar procedentes de las boyas a la deriva era excelente. Lo más probable es que este resultado se deba a la aplicación de las directrices de control de calidad del DBCP para los datos del Sistema Mundial de Telecomunicación y a la mayor confianza en la calidad de los datos procedentes de las boyas por parte de quienes se ocupan de la previsión climática y meteorológica mediante sistemas numéricos.

4. Datos de archivo

Desde 1986, el Servicio de Datos sobre el Medio Marino (MEDS) de Canadá actúa, en nombre de la COI y de la OMM, como Centro Nacional Responsable de Datos Oceanográficos (RNODC) respecto de las boyas a la deriva. El número de mensajes archivados mensualmente por el MEDS aumentó de aproximadamente 129.700 en 1997 a unos 144.300 en los seis primeros meses de 1999.

5. Evolución técnica

Durante el periodo entre dos reuniones se creó un grupo de trabajo para analizar el funcionamiento de las boyas a la deriva del Programa sobre la Velocidad Superficial, equipadas con barómetros y/o anemómetros. Durante el año se ha avanzado mucho, pero

algunas cuestiones han quedado sin respuesta y la labor continuará durante el próximo periodo entre las reuniones.

6. Situación en que se encuentra el sistema de comunicaciones

El sistema Argos ha seguido proporcionando un servicio fiable de recuperación y proceso de datos en tiempo real o casi real. Durante el año se pusieron en práctica algunas mejoras en el sistema, y para los próximos años se prevén otros adelantos. En la reunión del DBCP también se examinaron los sistemas de comunicación alternativos que utilizan satélites en órbita baja (LEO).

7. Cuestiones administrativas

El Panel cuenta con siete grupos de acción: el Grupo Europeo sobre Estaciones Oceánicas (EGOS); el Programa Internacional de Boyas en el Artico (IABP); el Programa Internacional de Boyas en el Antártico (PIBA); el Programa Internacional de Boyas en el Atlántico Sur (ISABP); el Programa Internacional de Boyas para el Océano Indico (IBPIO); el Programa Mundial de Derivadores (GDP) y el Equipo de Ejecución del TAO (TIP).

El Sr. Etienne Charpentier, coordinador técnico del Panel, sigue trabajando para UNESCO/COI como experto remunerado con cargo a un fondo fiduciario y está destacado en el CLS del Servicio Argos de Tolosa, Francia. Además, desde enero de 1999 actúa como coordinador técnico en el Programa de Buques que Colaboran Ocasionalmente (SOOP).

En 1999 catorce países facilitaron voluntariamente apoyo financiero al Panel y al SOOP: Alemania, Australia, Canadá, Estados Unidos de América, Francia, Grecia, Irlanda, Islandia, Japón, Noruega, Nueva Zelandia, Países Bajos, Reino Unido y Sudáfrica.

Para el próximo ejercicio financiero (del 1° de junio de 2000 al 31 de mayo de 2001) el presupuesto total del Panel asciende a 156.995 dólares estadounidenses, desglosados del modo siguiente:

	dólares estadounidenses
Coordinador técnico (sueldo, viajes y apoyo logístico)	130.000
Viajes del Presidente, los Vicepresidentes y el Presidente del Acuerdo sobre Tarifas Colectivas (JTA)	10.000
Consultores/expertos	3.500
Presidente del JTA (contrato)	6.000
Publicaciones	5.000
Gastos de la OMM	500
Imprevistos	1.995
TOTAL	**156.995**

РЕЗЮМЕ

Введение

В 1985 г. в соответствии с резолюцией 10 (EC-XXXVII) ВМО и резолюцией EC-XIX.7 МОК была создана Группа сотрудничества по дрейфующим буям. В 1993 г. руководящие органы МОК и ВМО решили переименовать ее в Группу сотрудничества по буям для сбора данных (ДБКП), а также незначительно изменить круг ее обязанностей, с тем чтобы Группа могла обеспечивать также любую международную координацию, необходимую для программ по заякоренным буям, поддерживающих основные программы ВМО и МОК (резолюция XVII-6 МОК и резолюция 9 (EC-XLV) ВМО.

1. Текущие и планируемые программы

Четырнадцать стран, семь групп действий и два центра управления данными представили отчеты о своей деятельности в отношении буев для сбора данных.

2. Поток данных в реальном масштабе времени

Данные в реальном масштабе времени в рамках ГСТ составляли несколько менее 70% от общего объема данных, передаваемых с более чем 1 250 (в среднем) буев для сбора данных. Около 68% глобальных наборов данных предоставлялось пользователям в течение трех часов, а 86% - в течение четырех часов. Доступ к примерно 80% "региональных" наборов данных обеспечивался в пределах 30 минут.

3. Качество данных

Собранная в течение этого года статистика свидетельствовала о высоком качестве поступающих с дрейфующих буев данных об атмосферном давлении (включая данные барометра СВП) и температуре поверхности моря. Такой результат вероятнее всего достигается благодаря реализации руководящих принципов контроля качества ДБКП в отношении данных ГСТ, а также повышением доверия к качеству данных с буев со стороны сообщества специалистов по цифровому метеорологическому прогнозированию.

4. Архивация данных

С 1986 г. Служба данных о морской среде (МЕДС) в Канаде выступает от имени МОК и ВМО в качестве ОНЦОД по дрейфующим буям. Приблизительное количество сообщений, ежемесячно помещаемых МЕДС в архив, увеличилось с 129 710 в 1997 г. до приблизительно 144 300 в течение первой половины 1999 г.

5. Техническое развитие

В межсессионный период была учреждена рабочая группа для анализа функционирования дрейфующих платформ в рамках Программы измерения скорости на поверхности (СВП), оснащенных барометрами и/или ветровыми датчиками. За этот год был достигнут большой прогресс, однако все еще остаются нерешенными некоторые вопросы, и работа будет продолжаться в следующий межсессионный период.

6. Состояние системы связи

Система Аргос продолжала предоставлять надежное обслуживание, обеспечивая сбор и обработку данных с дрейфующих буев в реальном и близком к реальному масштабе времени. Различные улучшения системы были осуществлены в течение года, и на ближайшие несколько лет планируется ее дальнейшее развитие. На сессии ДБКП рассматривались также альтернативные системы связи, использующие спутники с низкой околоземной орбитой (НОО).

7. Административные вопросы

В настоящее время в Группе имеется семь групп действий: Европейская группа по океаническим станциям (ЕГОС); Группа по Международной программе по арктическим буям (ИАПБ); Группа по Международной програме по антарктическим буям (ИПАБ); Группа по Международной программе по буям для Южной Атлантики (ИСАБП); Группа по Международной программе по буям для Индийского океана (ИБПИО); Группа по Глобальной программе по дрейфующим платформам (ГДП) и Группа по осуществлению ТАО (ТИП).

Технический координатор группы г-н Этьен Шарпантье по-прежнему состоял в штате ЮНЕСКО/МОК в качестве эксперта, финансируемого из целевого фонда, работая в КЛС/Службе Аргос в Тулузе, Франция. Кроме того, с января 1999 г. на него возложены задачи технического координатора Программы попутных судов (СООП).

В 1999 г. на добровольной основе вносили свой вклад в финансовую поддержку Группы следующие четырнадцать стран: Австралия, Германия, Греция, Ирландия, Исландия, Канада, Нидерланды, Новая Зеландия, Норвегия, Соединенное Королевство, США, Франция, Южная Африка и Япония.

В следующем финансовом году Группы (1 июня 2000 г. - 31 мая 2000 г.) планируется распределить ее общий бюджет в сумме 156 995 долл. США следующим образом:

	долл. США
Технический координатор (заработная плата, путевые расходы, материальное обеспечение)	130 000
Путевые расходы председателя, заместителей председателя и председателя КТС	10 000
Эксперты	3 500
Председатель КТС (контракт)	6 000
Публикации	5 000
Расходы ВМО	500
Непредвиденные расходы	1 995
ИТОГО	**156 995**

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 1999, data from a total of 1256 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 22 countries. (A detailed breakdown by countries is given for the month of October 1999 in Annex IV).

Some 69.2% (869) of the 1256 buoys transmitted their data over the GTS in real- or quasi real-time. At the same time, in 1998, the total number of buoys was 1230 and 44.1% of them (543) were transmitting data over the GTS. (The number and location of BUOY reports received in Toulouse during October 1999 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). Figures 1 and 2 show how the GPCs receive the global data sets from 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 operations 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 68% of the global data sets are delivered to users within 3 hours and 86% within 4 hours. Some 80% of the regional data sets are available within 30 minutes.

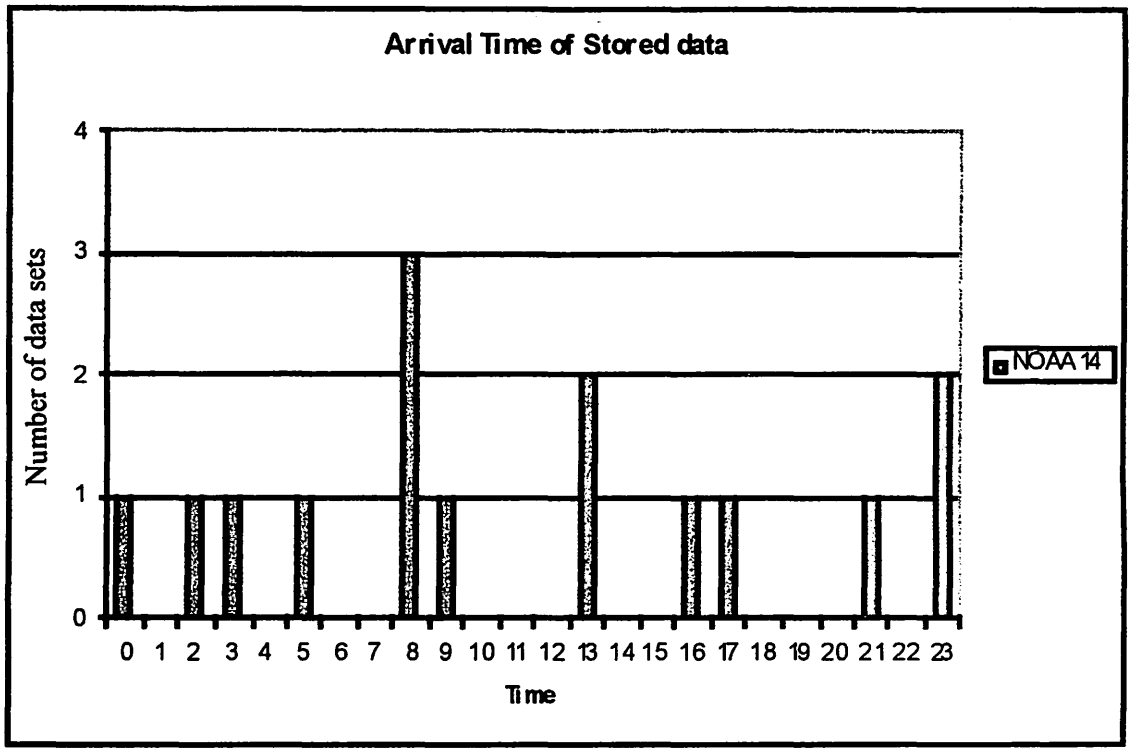
Arrival Time of Stored data
Number of data sets
0
1
2
3
4
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time
NOAA 14

Fig. 1

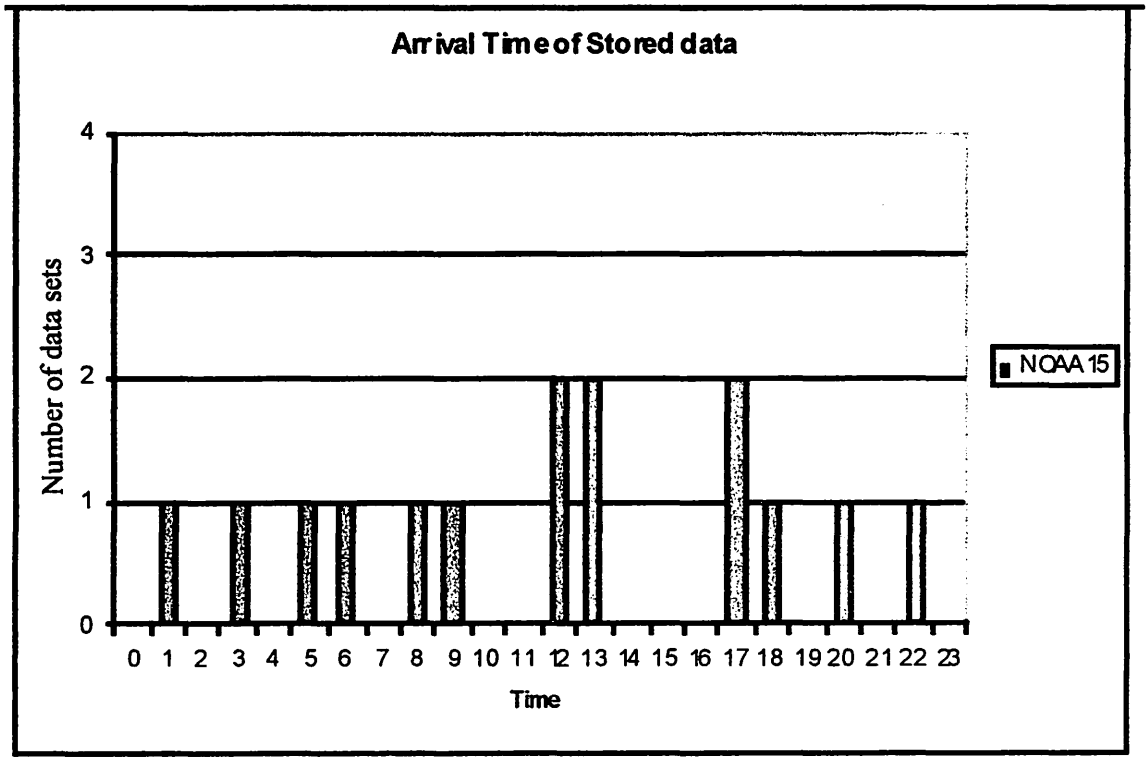
Arrival Time of Stored data
Number of data sets
0
1
2
3
4
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time
NOAA 15

Fig. 2

Regional stations	Country	Operator	Satellites
Cape Town	South Africa	CLS/SAWB	NJ, ND, NH
Melbourne	Australia	BOM	NK, NJ, ND, NH
Darwin	Australia	BOM	NK, NJ, ND
Perth	Australia	BOM	NK, NJ, ND, NH
Casey	Australia (Antarctica)	BOM	NK, NJ, ND
Halifax	Canada	Environment Canada	NJ, ND
Edmonton	Canada	Environment Canada	NK, NJ, ND, NH
Lannion	France	Météo France	NK, NJ, ND
Toulouse	France	CLS	NK, NJ, ND, NH
Reunion Island	France	Météo France	NK, NJ, ND
Tokyo	Japan	Jamstec	NK, NJ, ND, NH
Wellington	New Zealand	Met Office	NK, NJ, ND
Gilmore	USA	NOAA	NK, NJ, ND,NH
Wallops	USA	NOAA	NK, NJ, ND,NH
Hawaï	USA	University of Hawaï	NK, NJ, ND
Monterey	USA	US Navy	NJ, NK
Largo	USA	SAI	NJ, ND, NH
Lima	Peru	CLS perù	NK, NJ, ND,NH

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 1.2 hPa (see Annex VI). 51% of the RMS values are now lower than 1hPa and another 42% between 1 and 2 hPa. For SST, 72% of the data are within 1 Celsius, and 90% within 2 Celsius (see Annex VI). Mean RMS using the NOAA/NCEP model is in the order of 1 Celsius.

Such a result is most probably attributable to the implementation of the DBCP quality control guidelines for GTS data, which worked very efficiency during the period, as well as to an increased confidence in the quality of the buoy data on the part of the meteorological centres. Overall activity under the QC guidelines was a little lower than for the previous years and fewer buoys had their status changed (62 this year, versus 132 in 1998, 171 in 1997 and 210 in 1996). It can be assumed that monitoring centres and the numerical weather prediction community rely increasingly on buoy data and are more and more confident in the quality of the data: improvements in NWP and assimilation techniques have indeed demonstrated that this quality is very good.

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 co-ordinator 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 Sub-group

During the intersessional period, problems identified with SVPB drifters and their variants led to the establishment of a sub-group to examine technical issues. The technical co-ordinator set up a forum associated with the DBCP web page. Users and manufacturers were encouraged to participate in the forum. Representatives from both sectors registered on the forum, and have been providing information exchange.

The report of the Evaluation Sub-group is given as Annex VIII. Although considerable progress has been made, much work remains to be done in the future. The panel therefore agreed that the sub-group should continue as an important ongoing component of the DBCP. Participants were thanked for their input and all panel members were encouraged to provide input.

6. COMMUNICATION SYSTEM STATUS

Argos system

6.1.1 SPACE SEGMENT

Two satellites are operational: NOAA-12 (D) and NOAA-14 (J) since 14 May 1991 and 30 December 1994, respectively. Satellite NOAA-15 (K)was launched successfully in May 1998 and should replace NOAA 12 (D) as the primary morning satellite. NOAA 12 (D) should be the secondary AM satellite and back up NOAA-15 (K) when needed. Its global data is transmitted according to the third satellite transmission characteristics. NOAA 11 and 10 are on stand by status, both with normal Argos equipment operating indirect transmission mode. NOAA-9 was decommissioned in February 1998. 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, regional stations are operational in Melbourne, Casey, Darwin, Perth, Tokyo and Wellington (the data are processed in Melbourne; some of them are sent to the French GPC for quality control and forwarding over the GTS); and in Hawaii (the data are relayed to the US GPC for processing). Annex IX shows the network and the regional coverage areas for near-real time data collection.

The Argos Global Processing Centres in Toulouse and Largo were operational over 99.9% of the time and the GTS sub-system remains fully operational.

Satellite status	Before May 98		After December 1st 98
Under Test		15 NOAA K	
Operational	14 - NOAA J 12 - NOAA D	14 - NOAA J 12 - NOAA D	15 NOAA K 14 - NOAA J
Back up Third	11 - NOAA H 10 - NOAA G	11 - NOAA H 10 - NOAA G	12 - NOAA D 11 - NOAA H 10 - NOAA G
Decommissioned	9 - NOAA F	9 - NOAA F	9 - NOAA F

Table 2

6.1.3 ARGOS ENHANCEMENT

An Automatic Distribution Service is used to send processed data to users. A scheme of the Service is presented in figure 3.

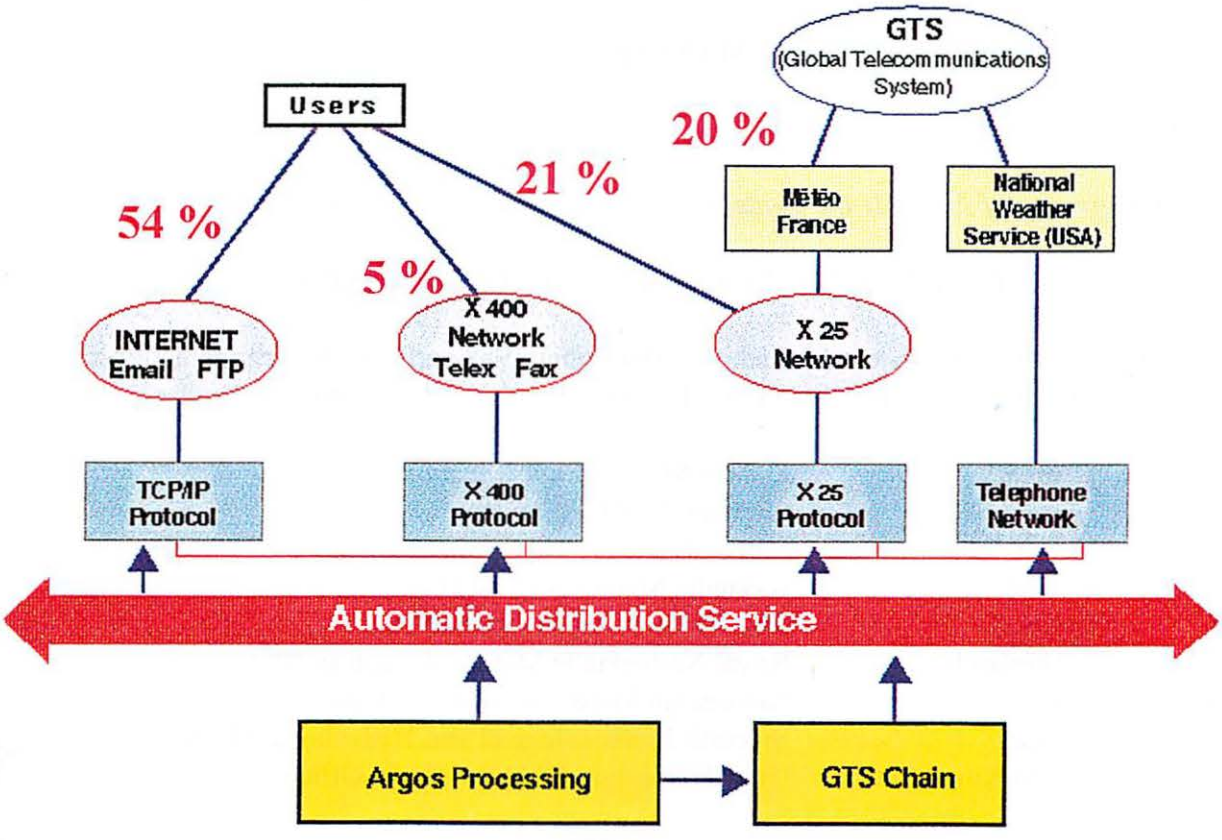

Fig. 3

The Internet is now the main communication link used by all Argos centers to receive data sets from receiving stations, to communicate with each other and to distribute processed data to users. However, to maintain maximum availability and reliability, CLS and SAI are still operating their overseas leased line for transmissions between France and USA. A leased line between NOAA/NESDIS and SAI is also used to transmit data sets. The X25 protocol has been abandoned between NOAA/NESDIS - SAI and between NOAA/NESDIS - CLS. The FTP protocol is now used.

Software for converting and processing the new telemetry formats used by the Argos2 instrument on board NOAA-K has been validated and integrated in the operational processing systems. New software for acquiring data sets from NOAA in DCS level 1 B format has been also validated. New software for acquiring data sets from NOAA using FTP rather than X25 has been also validated and integrated. Databanks are now sent to users on CD-ROM.

Argos is further developing the Argos 2001 project to upgrade the entire Argos processing system by 2001. This project is vital for the long-term continuity of the Argos system and to better serve the user community. The project is scheduled in three phases:

- **1998/1999:** Development and implementation of a new user interface allowing users to access their data, view and update their technical files via a Web server. The System Use Agreements database will also be implemented during this phase. Data will be stored and managed by a database management system designed to be responsive to users' needs. The first phase is now at the development and testing stage. The deployment of the first phase is scheduled for November 1999 and users will have Web access at the end of 1999.
- **2000/2001:** Improvement and development of value-added services.
- **2002/2003:** Redesign and merging of Argos and GTS processing systems. The plan for the second and third phases is already in place, but changes could prove necessary in response to new requirements.

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 Envioronmental 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 Co-operation 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 1994 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) during the past year. This first annual report introduces TAO to the DBCP (see Annex II), focusing on what TAO is, how it is structured, and other issues which are relevant to the DBCP.

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:

- Eleventh session (Pretoria, South Africa, October 1995): Argentina, Australia, Brazil, France, Iceland, Netherlands, New Zealand, South Africa, Ukraine, United Kingdom, USA

- 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

7.2.2 NATIONAL FOCAL POINTS

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

7.3 Technical co-ordinator

The panel's technical co-ordinator 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 co-ordinator 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 1999, while IOC has arranged contracts for the employment of the technical co-ordinator 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 1998 to 31 May 1999;

(b) Interim WMO Statement of Account as at 31 December 1999.

For the financial year 2000-2001, 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)	130,000
Travel of Chairman, Vice-chairmen & JTA chairman	10,000
Experts	3,500
JTA chairman (contract)	6,000
December Publications	5,000
WMO Costs	500
Contingencies	1,995
TOTAL	**156,995**

B. Income

Contributions	148,750
Extra funding for the JTA chair contract	6,000
Carry-over 1998-1999	2,245
TOTAL	**156,995**

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.

ANNEX I

NATIONAL REPORTS ON DATA BUOY ACTIVITIES

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

DATA BUOY CO-OPERATION PANEL

Country: Australia

Year: 1999

CURRENT BUOY PROGRAMME

A. AUSTRALIAN BUREAU OF METEOROLOGY

Number and type of buoys:

(a) deployed during the previous year:
3 TOGA, 3 TOGA/WSD, 4 SVPB

(b) operational at 31st August 1998:
10 TOGA, 3 TOGA/WSD, 4 SVPB

(c) reporting on GTS at 31st August 1999:
all buoys as above

Purpose of programmes:
to collect operational meteorological data

Main deployment areas:
15 to 60 South
75 to 120 East

B. AUSTRALIAN ANTARCTIC DIVISION

Number and type of buoys:

(a) deployed during the previous year:
15 ice drifters, 3 sea ice and 4 TOGA style ice buoys

(b) operational at 31st August 1998:
15 ice drifters, 3 sea ice and 3 TOGA style ice buoys

(c) reporting on GTS at 31st August 1999:
3 Toga style ice buoys

Purpose of programmes:
to collect meteorological data for research purposes

Main deployment areas:
Ice drifters at 65S 145E; ice TOGA >65S, 60 to 140E

C. CSIRO MARINE

Number and type of buoys:

(a) deployed during the previous year:
nil
(b) operational at 31st August 1998:
nil
(c) reporting on GTS at 31st August 1999:
nil

PLANNED PROGRAMMES

A. AUSTRALIAN BUREAU OF METEOROLOGY

Over the next 12 months, the Australian Bureau of Meteorology plans to deploy the following number of buoys as a continuation of our operational meteorology requirements :

4 TOGA , 1 TOGA/WSD, 3 SVP-B
They will be deployed in the usual areas to the north west and south west of Australia between 15 and 60 South and 75 to 120 East.

The Bureau of Meteorology also expects to deploy its remaining WOTAN buoy to the north-west of Australia.

A moored TOGA/WSD buoy will be maintained for tropical cyclone watch in the Gulf of Carpentaria.

In addition, the Bureau is funding ten barometers to be fitted to SVP buoys provided by the AOML for deployment in the Indian Ocean in support of the IBPIO.

B. AUSTRALIAN ANTARCTIC DIVISION

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

Met. Research TOGA style ice buoys qty 2 to 3

C. CSIRO MARINE

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

Oceanographic Palace floats 10

AUSTRALIAN BUREAU OF METEOROLOGY

TECHNICAL ISSUES

An Orbcomm/Argos buoy (TOGA style) was extensively tested on land after receipt of software to enable remote control of the reporting frequency. It was felt necessary, on the available evidence, that the power consumption should be minimized because of the power consumed by the satellite controller. The preferred reporting interval was to be 6 hourly synchronized to the UTC hour giving a probable lifetime for the Argos/Orbcomm combination of about 8 months (and about 14 months for an Orbcomm only system). As anticipated, considerable difficulty was encountered in getting any messages through the satellites, despite their abundance. Part of the problem was the lack of an accessible (and secure) location that also had an excellent view of the sky. As a result of the buoy seeming to lock up and become inoperative on Argos, the buoy was returned to Metocean for conversion back to Argos only operation.

BUOY LIFETIMES

During the last 12 months, the Bureau has experienced two early failures. The TOGA style buoy 2765 was last heard two hours before deployment. 2937 experienced the pressure reading remaining fixed at 1029.0 hPa after 30 days at sea. It is noteworthy that the Vaisala PTB201A had previously experienced checksum errors due to the buoy inadvertently switch on and off during a previous transport operation.

The expected life of SVP-B drifters supplied to the Bureau by Metocean is about 12 months. Of the three buoys, 8098 failed at six months due to battery failure. 8098 was also notable for the pressure data ceasing after 37 days at sea. Metocean have been advised to provide better security for the appropriate connector.

SVPB BUOYS

All of our recent SVPB buoys are using the Vaisala PTB100A pressure sensor. However, after obtaining experimental evidence of the Gortex membrane not readily shedding water in the confines of the standard pressure port, we often note instances of "membrane blocking" when the SVPB buoys are in sea conditions that cause submergence of about 50% or more. Buoy 8097 at 15S with little submergence has had no pressure problems. Buoy 8098 at 45S 120E showed some pressure anomalies during the first 37 days before total loss of pressure data presumably due to connector unreliability. This can be contrasted with buoy 8099 at 55 to 60S which is showing rms errors from the model of 4 to 5 hPa. The submergence factor is typically 50% or more. We are of the opinion

that at the very least, the air breathing holes in contact with the Gortex should be considerably elongated to improve the water shedding ability of the Gortex.

SVPBW BUOYS

One Wotan buoy was deployed. The wind performance exhibited errors of 1.4 knots and 23 degrees rms. Unfortunately, the batteries failed after about three months instead of an expected nine months. While this style of buoy can give usable data, for general wind use, we feel that better performance, reliability and lifetimes will still be obtained from the TOGA wind buoys.

DBCP 15

WELLINGTON - NZ

Country: BRAZIL

Year: 98/99

CURRENT PROGRAMMES

A) Agency or programme: DHN/PNBOIA

Number and type of buoys: (a) deployed during year: 8 (99) and 2 (98)
(b) Operational at 31 august: 6
(c) Reporting on GTS at 31 August: 6

Purpose of the Programme a) Operational: 10

Main deployment areas: METAREA V

PLANNED PROGRAMMES:

B) Agency or programme: DHN/INPE/USP/PNBOIA

Number and type of buoys planned for deployment in the next 12 month

Purpose of the Programme (a): 15 (5 moored - 10 drifters)
(b) Operational (2 moored and 10 drifters)
(c) Met/ocean research: 3 moored

Main deployment areas: METAREA V

SPECIAL COMMENTS

(d) Others: 4 of the 10 drifters were vandalised

Country: Canada

YEAR: 1998/99 (Sept. 1/98 - Aug. 31/99)

CURRENT PROGRAMS:

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

Number and type of buoys:

a) Deployed during year:	• 4 Standard WSD Metocean drifters • 1 Developmental three metre Discus buoy for sensor testing.
b) Operational (31/08/99):	• 3 moored six meter NOMAD buoys • 13 moored three meter Discus buoys • 1 Developmental three metre Discus buoy • 4 standard WSD drifters
c) Reporting on GTS (31/08/99):	• 16 moored buoys • 4 standard WSD drifters
Main deployment area:	• North Eastern Pacific Ocean

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

Number and type of buoys: **Arctic Basin IABP drifting buoys**

a) Deployed during year:	• 2 Environment Canada assembled buoys • expect 2 CALIBS via air drop Aug 1999 • expect 1 ICEX as contributed to US Naval Oceanography via air drop Aug 1999
b) Operational (31/08/99):	• 2 Environment Canada buoys
c) Reporting on GTS (31/08/99):	• 2 Environment Canada buoys • 3 US National Ice Centre buoys
Main deployment area:	• Arctic Basin west of the Canadian Arctic Islands - 2 to 5 drifters

Number and type of buoys: **moored buoys in lakes - open water season only**

a) Deployed during year:	• 4 moored buoys: 2 Great Slave Lake, 2 Lake Winnipeg
b) Operational (31/08/99):	• all 4 moored buoys
c) Reporting on GTS (31/08/99):	• all 4 moored buoys
Main deployment area:	• Great Slave Lake: one hexoid buoy and one 3 meter • Lake Winnipeg: one moored buoy (MetOcean drifter) deployed North Basin of Lake Winnipeg on June 11and to be retrieved in October. One Axys Watchman package mounted in new plastic hull buoy on South Basin of Lake Winnipeg at end of May and to be retrieved late October.

C AGENCY OR PROGRAM: CANADA - **Canadian Ice Services**

Number and type of buoys:

a) **Deployed during year:**	• 1 CALIB with pressure sensor off Coburg island for tracking southward motion of old ice. • 4 Ice Beacons with GPS in Gulf of St-Lawrence for ice pressure experiment. • 2 CALIBs along the Labrador coast for sea ice drift model verification. • 3 CALIBs for the Arctic Land Fast Ice project: off Pangnirtung, off Pond Inlet and off Arctic bay.
b) **Operational (31/08/99):**	• None
c) **Reporting on GTS (31/08/99):**	• None
Main deployment area:	• Arctic waters - along Baffin Island. • Gulf St.-Lawrence. • Labrador Coast

D AGENCY OR PROGRAM: CANADA - **Atlantic region**

Number and type of buoys:

a) **Deployed during year:**	• One 6 meter NOMAD •
b) **Operational (31/08/99):**	• Eight 6 meter NOMAD buoys • One DATAWELL
c) **Reporting on GTS (31/08/99):**	• 8 NOMADS
Main deployment area:	• North West Atlantic

E AGENCY OR PROGRAM: CANADA - **Ontario region**

Number and type of buoys:

a) **Deployed during year:**	• 5 three meter buoys • 2 twelve meter buoys • 3 lightweight WATCHKEEPER buoys
b) **Operational (31/08/99):**	• 10 buoys
c) **Reporting on GTS (31/08/99):**	• all
Main deployment area:	• Great Lakes • Large Lakes and bodies of water other than the Great Lakes

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

Number and type of buoys:

a) **Deployed during year:**	• 1 moored 3-meter discus buoy
b) **Operational (31/08/99):**	• 1 buoy
c) **Reporting on GTS (31/08/99):**	• 1

Main deployment area:	• Gulf of St. Lawrence

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

Purposes of the 1999 program:

Extensive programs continued on the ice fields of the Labrador Shelf and Gulf of St. Lawrence using beacons measuring drift, pressure, stress and convergence/divergence. Data was provided to the Canadian Ice Centre for forecasting and to the Canadian Coast Guard to support icebreaking. A directional wave buoy and a moored weather station were used to study the shoaling of waves near Cape Hatteras. GPS beacons were used to empirically indicate and validate models of transport and dispersal pathways for salmon aquaculture sites in the Bay of Fundy and mussel farms in Prince Edward Island. ALACE floats continued to be used to measure deep flow in the Labrador Sea. Several types of drifter were used in the Gulf of St. Lawrence to improve the accuracy of trajectory modeling in CANSARP – the Canadian Search and Rescue search planning program.

Number and type of buoys:

a) Deployed during year:	• Several GPS beacons • One directional wave buoy and one moored weather station • Several types of drifter
b) Operational (31/08/98):	• n/a
c) Reporting on GTS (31/08/98):	• n/a
Main deployment area:	• Labrador Shelf and Gulf of St. Lawrence • Bay of Fundy • Cape Hatteras

PLANNED PROGRAMS:

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

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

a) Operational:	• 0 moored buoys • 6 standard wind speed and direction drifters.
b) Developmental:	• Nil
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 PROGRAM: CANADA - **Prairie and Northern Region**

Purpose of **Arctic Basin IABP drifting buoys** program

- To actively participate in the International Arctic Buoy Programme (IABP). Our focus is ensuring that there are buoys on ice to provide real-time meteorological data from the southeastern Arctic Ocean / the Beaufort section of the Arctic Basin and that the data is available on GTS.

a) Operational:	From 3 to 5 buoys depending on 'holes' in the buoy array across the southeastern Arctic Ocean / the Beaufort and deployment opportunities. The deployments will be comprised of: • air-drops of CALIB buoys and • landing on ice with a Twin Otter operating from Eureka or Tuktoyaktuk to deploy in-house assembled buoys or buoys on behalf of the U.S. National Ice Centre • provide 1 ICEX for deployment by US Naval Oceanography Command.
b) Developmental:	• Will continue to experiment with the assembly of buoys in house including making combination battery / solar panel power supplies
Met/Ocean research:	• Endeavouring to have oceanographic temperature/salinity profiles done at sites where buoys are deployed via Twin Otter landing on ice. Such measurements were done at the two EC buoy deployment sites March 1999
a) Main deployment area:	• Arctic Basin ice east of 141W and south of about 83N

Moored buoys in lakes:

Purpose of program

- To support operational marine forecasting program for Great Slave Lake and Lake Winnipeg

a) Operational:	• 4 buoys
b) Developmental:	• nil
c) Met/Ocean research:	• nil
Main deployment area:	• Great Slave Lake (3 meter buoy and hexoid buoy) Lake Winnipeg (moored MetOcean drifter and Tideland Plastic Hull buoy)

C AGENCY OR PROGRAM: CANADA - **Canadian Ice Services**

a) **Operational:**	• **2** Metocean Lithium Battery with air Pressure sensor CALIB to be deployed in Western and Eastern Arctic to support Environment Canada data acquisition program. • **1** Ice Beacons 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" • **3** standards CALIB for the Arctic Landfast Ice project • **2** standards CALIB for model verification off Labrador coast.
Main deployment	Eastern & Western Arctic. Gulf and Newfoundland/Labrador

area:	waters.

D AGENCY OR PROGRAM: 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 PROGRAM: CANADA - **Ontario region**

a) Operational:	• 3 Light weight WATCHKEEPER Buoys
b) Developmental:	• Light Weight Coastal Buoy
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:	• Develop a light weight meteorological buoy that can work in coastal conditions and can be handled by smaller ships. • 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 buoys Lake Ontario • 3 meter buoys Lake Superior, Georgian Bay, Lake Erie • Lightweight Buoys, Lake Simcoe, North Channel Georgian Bay, Lake Nipigon, Lake of the Woods. • Light weight buoys deployed in Lake Simcoe, Lake Nipissing, North Channel East Basin, North Channel Western Basin, Lake of the Woods and Lake Nipigon.

F AGENCY OR PROGRAM: 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 PROGRAM: CANADA - **Fisheries and Oceans (BIO)**

Purpose of program

- To provide data to the Canadian Ice Centre for forecasting and to the Canadian Coast Guard to support icebreaking.
- 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 and

	convergence/divergence. 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:**	• Continued deployment of solar powered buoys. • Improvements to wind mast design to simplify exchange of anemometers at sea. • 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 95% complete. • Ultrasonic anemometer continues on test at an operational buoy station and on the developmental buoy. • Optical sensors for biological monitoring installed on 2 buoys.

B Arctic Basin IABP drifting buoys: CANADA - **Prairie and Northern Region**

a) **Buoy design:**	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:**	• air-deployed CALIBs: surface atmospheric air pressure sensor • surface-deployed buoys (in house and those deployed on behalf of US National Ice Centre): air pressure and air temperature sensors
c) **Others** :	1) Buoy data is used operationally to provide air pressure and air temperature data to assist in real time analysis and forecasting across the Canadian sector of the Arctic Ocean by the Arctic Weather Centre, Canadian Meteorological Centre and other international forecast offices such as the UK Met Office. The data is also used operationally by Canadian Ice Service to provide general ice motion data. 2) The data contributes to the overall Arctic Basin data set which is used to provide data on ice motion, surface pressure pattern, and air temperatures across the Arctic Ocean for both the operational and research communities.

Moored buoys in lake: CANADA - **Prairie and Northern Region**

a) **Buoy design:**	nil
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 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

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

a) **Beacon design**	• Using mostly Lithium batteries for northern beacon deployments. • Using Standard (alkaline) batteries for southern beacon deployments.
b) **Instrumentation:**	• Pressure and temperature sensors on 1 CALIB in Northwestern 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 2 Nomads • New design for Solar panel mounts 2 hulls
b) **Instrumentation**:	• Watchman 100 Payloads installed in2 Nomads

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

a) **Buoy design:**	• Presently deploying a small lightweight buoy that can be used in the coastal waters or smaller lake environment that can be serviced using smaller vessels than are presently used with the 12 and 3 meter buoys. • All 10 buoys have the upgraded WATCHMAN Payload on board • 7 Buoys are using the larger 40W solar panels and the new battery configuration. • The Lightweight Buoys are in development stage ... three were deployed in the 1999 Marine Season and an additional three for the 2000 season.
b) **Instrumentation**:	• All buoys in the Buoy Program are being upgraded with the new Buoy Payload (WATCHMAN 100). • All buoys have Global Positioning System installed.

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

a) **Buoy design:**	• 3D
b) **Instrumentation**:	• Buoy upgrade to Watchman 100 completed Spring 99

PUBLICATIONS:

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

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

B CANADA - **Prairie and Northern Region**

Arctic Basin IABP Drifting buoys

- Data from buoys deployed on the ice of the Arctic Basin as part of the International Arctic Buoy Programme is included in the annual International Arctic Buoy Programme Data Reports published by the Applied Physics Laboratory, University of Washington, Data is also available from the IABP web site **http://iabp.apl.washington.edu.**

Moored buoys in Lakes

- None

C CANADA - **Canadian Ice Services**

- Third internal CIS beacon report delivered on September 11th, 1998.

D CANADA - **Atlantic Region**

- none

E CANADA - **Ontario Region**

- none

F CANADA - **Quebec Region**

- 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**

Arctic Basin IABP drifting buoys

a) **Quality of buoy data:**	• Good and reliable. Data is routinely evaluated and data deemed unreliable is not put on GTS.
b) **Communication:**	• Prairie and Northern Region, Environment Canada, continue

	to operate a Local Users Terminal at their Edmonton facility. Canadian and some U.S. National Ice Centre buoy data is accessed, processed and input to GTS directly from Edmonton.
c) Buoy Lifetimes:	• 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 breakup of ice throughout the year factor into buoy lifetimes!
d) Other.	• Ice in the southern Beaufort is vulnerable to melt and breakup and also to moving quickly out of the region. Hence our use of air-deployable CALIBs which provide position and air pressure but not temperature data. For surface deployments we target ice which we believe to be within, but on the outer edge, of the Beaufort gyre.

Moored buoys in lakes

a) Quality of buoy data:	• Great Slave lake: Good and reliable. • Lake Winnipeg: Good and reliable.
b) Communication:	• Great Slave lake: n/a • Lake Winnipeg: GOES in South Basin buoy and ARGOS in North Basin Buoy. Good. Over 95% of all possible moored buoy data delivered to users
c) Buoy Lifetimes:	• Great Slave lake: n/a • Lake Winnipeg: Moored buoys - up to 3 years between battery changes. New solar buoys should increase service interval for battery replacement up to 5 years.
d) Other.	• n/a

C CANADA - **Canadian Ice Services**

a) **Quality of buoy data:**	• Good and reliable.
b) **Communication:**	• Good and reliable.
c) **Buoy Lifetimes:**	• 3-4 months for Standard, up to 1 year for Lithium batteries.
d) **Other:**	• 1 CALIB deployed last winter along the Labrador Coast died upon deployment ...no data available. • 3 of the 4 CALIB deployed by MLI for the ice pressure experiment reported for a very short period. Only one was retrieved.

D CANADA - **Atlantic Region**

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

E CANADA - **Ontario Region**

a) **Quality of buoy data:**	• Good
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

CONTACT POINTS

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

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B CANADA - **Prairie and Northern Region**

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C CANADA - **Canadian Ice Services**

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E CANADA - **Ontario Region**

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F CANADA - **Quebec Region**

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

Department of Fisheries and Oceans
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H CANADA - **Environment Canada National Marine Program**

National Marine Focal Point
373 Sussex dr. 3rd floor, Block E
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K1A 0H3
attn. : Normand Michaud

Phone : 613-947-3754 Fax: 613-996-4218 Email : Normand.Michaud@ec.gc.ca

Country: **FRANCE**

Year: **1 September 1998 - 31 August 1999**

PROGRAMMES

A. MÉTÉO-FRANCE

Number and type of buoys :

(a) 32 drifting buoys (most of them drogued) + three moored buoys were deployed in last 12 months. Drifting buoys are :
- 2 Marisonde B (FGGE type) ;
- 3 Marisonde G (wind FGGE type) ;
- 29 SVP barometer drifters (including 2 with wind measurement capabilities and 3 with salinity) ;

(b) 28 buoys[1] were operational at 31 August ;

(c) 28 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...) ;

(c) 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 :

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 will be enhanced. Meteo-France will continue to buy new moored buoys to operate its three ocean weather stations (two in West Indies and one in the Mediterranean Sea) and to implement a new one in the Mediterranean Sea. The co-operation with the UK Meteorological Office to maintain the Brittany and Gascogne moored buoys will continue.

B. LODYC (DYFAMED, CARIOCA, IMCORP programmes)

Number and type of buoys :

(a) 4 CARIOCA buoys (moored and drifting) and one prototype of Carbon buoy were deployed in last 12 months ;

(b) 3 CARIOCA buoys and one Carbon buoy were operational at 31 August ;

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

Purposes of programmes :

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

(b) Research : to understand, quantify and monitor the CO2 fluxes exchanged at the air-sea interface ;
(c) Technical : to develop a buoy able to measure CO_2 concentrations at the ocean-atmosphere interface (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 :
Equatorial Pacific and Atlantic (ESCOBA programme) ;
Western Mediterranean Sea (DYFAMED programme) ;
Southern Ocean (Indian sector) (PROOF programme).

Plans for the next 12 months :
Four new drifters will be deployed in the Southern Ocean.

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

Number and type of buoys :
(a) CETMEF operates a network of 10 omnidirectional wave moored buoys and three directional (DATAWELL). In addition, CETMEF implemented wave measurement systems on two Aid-to-Navigation moored buoys ;
(b) 15 buoys were operational at 31 August ;
(c) None 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. STNMTE will complete it with two omnidirectional and one directional buoys in the next 12 months.

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

Number and type of buoys :
(a) One Atlas buoy was moored in last 12 months, three others were replaced ;
(b) Three buoys were operational at 31 August ;
(c) Three 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 :

Two new stations will be implemented in November 1999 ;
Buoys will be replaced on 5 other stations.
More information on *http://www.ifremer.fr/orstom/pirata/pirataus.html*

E. **IFREMER** (MAREL programme)

Number and type of buoys :

(a) Two buoy were moored in last 12 months ;
(b) Three buoys were operational at 31 August ;
(c) None was reporting on GTS at 31 August.

Purposes of programme :

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

Deployment area :

French coasts

Plans for the next 12 months :

One new station will be implemented in next 12 months.

F. **IFREMER** (PROVOR programme)

Number and type of buoys :

(a) Two prototypes were deployed in last 12 months ;
(b) None was operational at 31 August ;
(c) None was reporting on GTS at 31 August.

Purposes of programme :

To get oceanic data (temperature and salinity in depth) that could be introduced in real time into prediction models of the climate evolution, or for defence applications. The data will be assembled in the Coriolis Data Centre, French contribution to the ARGO programme (*http://www.ifremer.fr/coriolis/*).

Deployment area :

North Atlantic

Plans for the next 12 months :

Six profiling floats will be deployed by the end of September 1999.

TECHNICAL DEVELOPMENTS

(b) Instrumentation

(i) Meteo-France continues to participate in the evaluation of SVP pressure drifters developed by the Global Drifter Center (USA). Twenty-three SVP-B drifters were deployed in the last 12 months. 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. Two SVP-BW drifters, owned by Meteo-France, were deployed during the 12 past months. In addition, Meteo-France participates in the Atlantic Hurricane Array with NOAA/AOML and Navoceano.

(iii) Meteo-France also evaluates SVP-B drifters fitted with conductivity sensors. Three buoys were tested during the 12 past months, off France. Two of them were recovered. They will be send back to their manufacturer for expertise.

(iv) The project of CO_2 concentration measurements from drifting buoys, managed by LODYC is continuing. Four buoys, called CARIOCA (CARbon Interface OCéan Atmosphère) and one Carbon buoy were deployed in last 12 months. It is planned to deploy 4 new drifters in the Southern Ocean.

(v) The technological developments in physico-chemical sensors offer now the possibility to operate autonomous instrumented station networks able to collect environmental data with higher frequency than by manual techniques. The MAREL concept, developed by IFREMER and implemented on moored buoys and other platforms, is able to measure various parameters such as salinity, pH, turbidity, dissolved oxygen, chlorophyll and nitrate concentrations, in addition to more common meteorological and oceanographic ones. Data are available on the Internet at *http://www.ifremer.fr/marel/*.

(vi) IFREMER developed a free drifting profiler, called MARVOR, which uses most of the electronic or mechanical parts which were designed for the multicycle subsurface MARVOR float. PROVOR is designed to drift at depth for 5 years and come up to the surface every ten days. After the float stabilises at a desired depth, it drifts with the surrounding water, until the date of the profile. Then, it descents to the start depth, stays for a few hours and begins the profile. At the surface, it transmits the CTD information get when it was going up. Then it dives back to the cruise depth.

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

Bakker D.C.E., Etcheto J., Boutin J. and L. Merlivat, 1999. Variability of surface -water f CO2 during seasonal upwelling in the equatorial Atlantic Ocean as observed by a drifting buoy, *J. Geophys.Res.*. in revision.

Bates N.R., L. Merlivat and L. Beaumont, 1999. Intercomparison of shipboard and moored CARIOCA buoy seawater measurements in the Sargasso Sea. *Journal of Marine Chemistry*, submitted.

Blouch P., 1999. Timeliness and Availability of Buoy Data on the GTS, 1999. *DPCP Technical Workshop, Wellington,* Oct. 1999..

Hood E.M., R. Wanninkhof and L. Merlivat, 1999. The effects of wind-induced mixing on short timescale surface variability of f CO2 and fluorescence : results from the GASEX-98 CARIOCA buoy data. *J.Geophys.Res.*, in revision.

Hood E.M. and L. Merlivat., 1999. Annual to interannual variations of fCO2 in the northwestern Mediterranean Sea: high frequency time series data from CARIOCA buoys (1995-1997). *J.Mar.Res.*, submitted.

Loaëc G., N. Cortes, M. Menzel and J. Moliera, 1998. PROVOR : a hydrographic profiler based on MARVOR technology. *IEEE-Oceans'98*, Sep. 1998.

Loaec G., T. Carval, S. Le Reste and G. Maudire, 1999. Provor and Coriolis Data Center, a step towards operational oceanography. *DPCP Technical Workshop, Wellington,* Oct. 1999..

Marchand P., 1999, CORIOLIS-Atlantic, an in-situ network for operational oceanography. *EUROGOOS Second international Conference*, March 1999.

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).

Rolland J., J.-P. Jullien and P. Blouch, 1999. Meteo-France's moored buoys in deep sea off French West Indies. *DPCP Technical Workshop, Wellington,* Oct. 1999..

Servain J., A.J. Busalacchi, A. Moura, M. McPhaden, G. Reverdin, M.L. Vianna and S. Zebiak, 1998. A Pilot Research Moored Array in the Tropical Atlantic (PIRATA). *The Bulletin of American Meteorological Society*, 79, 2019-2031.

Vianna M.L., J. Servain and A.J. Busalacchi, 1999. PIRATA: Recent results and future perspectives. Submitted to *CLIVAR-Exchange*.

Vianna M.L., J. Servain and A.J. Busalacchi, 1999. The PIRATA Program: Monitoring the tropical Atlantic with ATLAS moorings and islands stations Submitted to *Sea & Technology*.

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. French monthly statistics and those provided by other centres are available on Internet through anonymous ftp in the */meteo/qc-stats/* directory of host *ftp.shom.fr*. They are also available on the World Wide Web thanks to an application software which allows to get those of a particular buoy or a list of buoys. The http address is *http://www.shom.fr/meteo/rechstat/*.

(d) Other

For the fourth consecutive year, Meteo-France funded 10 barometers to be added to SVP drifters. These will be deployed in the Indian Ocean in November 1999. The action will be renewed in 2000 if possible.

Country: **Iceland.**

Year: 1999

Current programmes

A. Agency or programme: Icelandic Meteorological Office
Number and types of buoys: (a) deployed during year: 0
(b) operational at 31 August: 0
(c) reporting on GTS at 31 August: 0
Purpose of programme: Participating in EGOS drifting buoy programme by providing 1 PTT a year to EGOS buoys. Deployment service, quality control and email server.
Main deployment areas: North Atlantic.

B. Agency or programme: Marine Research Institute/Scripps Inst.
Number and types of buoys: (a) deployed during year: 0
(b) operational at 31 August: 1
(c) reporting on GTS at 31 August:
Purpose of programme: A 3 year co-operation programme by MRI and SIO as part of the Global Drifter Programme for circulation study. Deployment of 5 drifters for Meteo France.

C. Agency or programme: Marine Research Institute/Larvae drift
Number and types of buoys: (a) deployed during year: 20
(b) operational at 31 August: 18
(c) reporting on GTS at 31 August: 18
Purpose of programme: To study the drift of fish larvae in coastal waters around Iceland.

Planned programmes
A. Agency or programme: Icelandic MetOffice
Purpose of programme: Participation in EGOS as above.

B. Agency or programme: Marine Research Institute
Still not decided.

Publications
1)Hedinn Valdimarsson and Svend-Aage Malmberg, 1999. Near surface circulation in Icelandic waters derived from satellite tracked drifters. (Rit Fiskideildar in press).
2) Svend-Aage Malmberg and Hedinn Valdimarsson, 1999. Satellite tracked surface drifters and "Great Salinity Anomalies" in the Subpolar Gyre and the Norwegian Sea. ICES CM 1999/L:15.

Country: **India**
Year: **1998 - 1999**

CURRENT PROGRAMMES

A. **Agency or programme:** National data buoy programme (NDBP)
National Institute of Ocean Technology
Department of Ocean Development

Number and type of buoys:	(a)	deployed during year	Maintenance & redeployment of existing buoys.
	(b)	operational at 31 August	Six
	(c)	reporting on GTS at 31 August	-
Purpose of programme:	(a)	Operational	✓
	(b)	met/ocean research	✓
	(c)	developmental	-
Main deployment areas:	Bay of Bengal and Arabian sea		

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

PLANNED PROGRAMMES

A. **Agency or programme:** NDBP

Number and type of buoys planned for deployment in next 12 months:			Six
Purpose of programme:	(a)	operational:	✓
	(b)	met/ocean research:	✓
	(c)	developmental:	✓
Main deployment areas	Bay of Bengal and Arabian Sea		

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

TECHNICAL DEVELOPMENTS

(a) Buoy design:	Improvements to existing buoy system
(b) Instrumentation:	-
(c) Others:	Beacon light

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

1. **Technical Report NDBP-98-1** A preliminary analysis of meteorological and oceanographic observations during the passage of a tropical cyclone in Bay of Bengal.

2. **Technical Report NDBP-98-2** First result from a new observational system over the Indian Seas.

SPECIAL COMMENTS (if any)

(a) Quality of buoy data:	Good
(b) Communications:	Good
(c) Buoy lifetimes:	Could not be commented as more damages due to act of vandalism.
(d) Others:	-

NATIONAL DATA BUOY PROGRAMME

(Moored Data Buoys)

National Institute of Ocean Technology

(Department of Ocean Development, Govt. of India)

Programme Overview

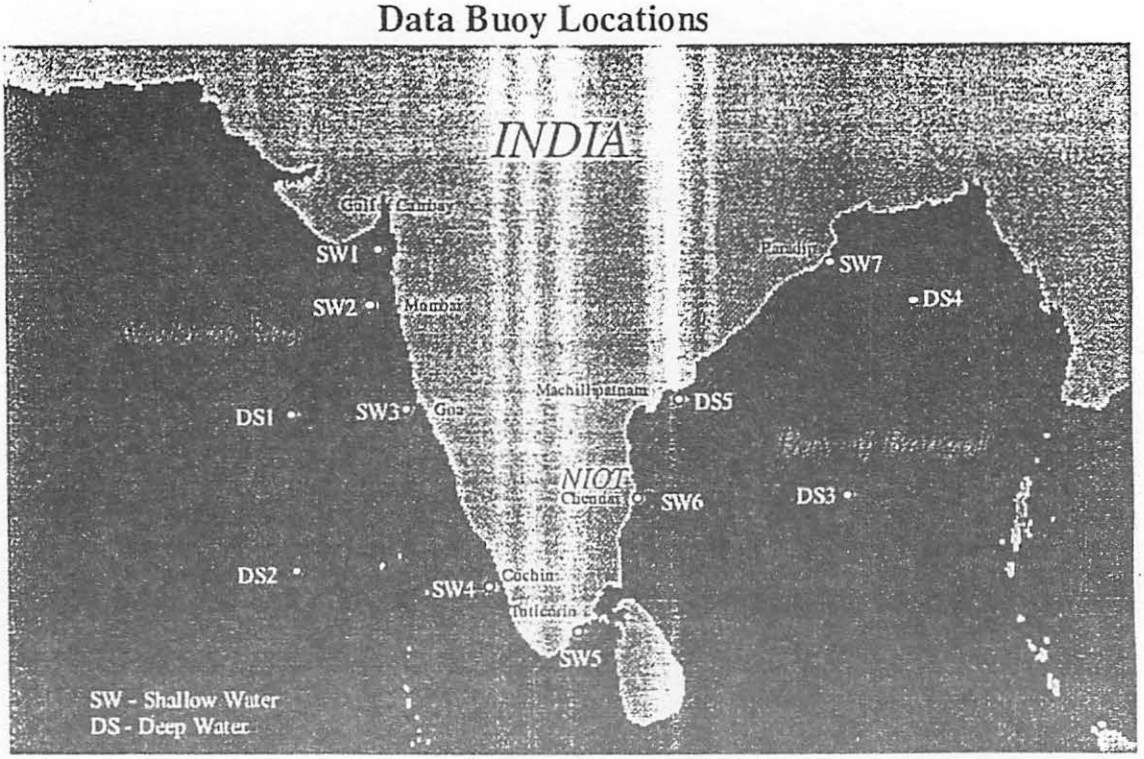
The collection of time series observation of oceanographic and meteorological parameters over Indian Seas are necessary to improve oceanographic services and predictive capability of short term and long term climatic changes as well to increase the understanding on ocean dynamics. Keeping this in view Department of Ocean Development has established a National Data Buoy Programme (NDBP) during 9th Year Plan, at National Institute of Ocean Technology (NIOT) Chennai, with the following objectives:

- To collect met-ocean parameters in Indian Seas
- To monitor the marine environment
- To generate and supply data products
- To improve the weather and ocean state prediction
- To validate satellite data
- To participate in the GOOS (Global ocean observing system) of IOC (Inter governmental Oceanographic Commission) of UNESCO.
- Indigenisation of buoy technology.

DOD has entered into an agreement in December 96 with OCEANOR, the Oceanographic company of Norway to supply, install and maintain data buoys.

The NDBP manned by highly qualified and experienced professionals along with OCEANOR representatives accomplished the deployment of 12 data buoys between Aug '97 to Feb '98 at a sea depth of 20 m to 4500 m and spread all over the Exclusive Economic Zone of India as shown below:

Data Buoy Locations

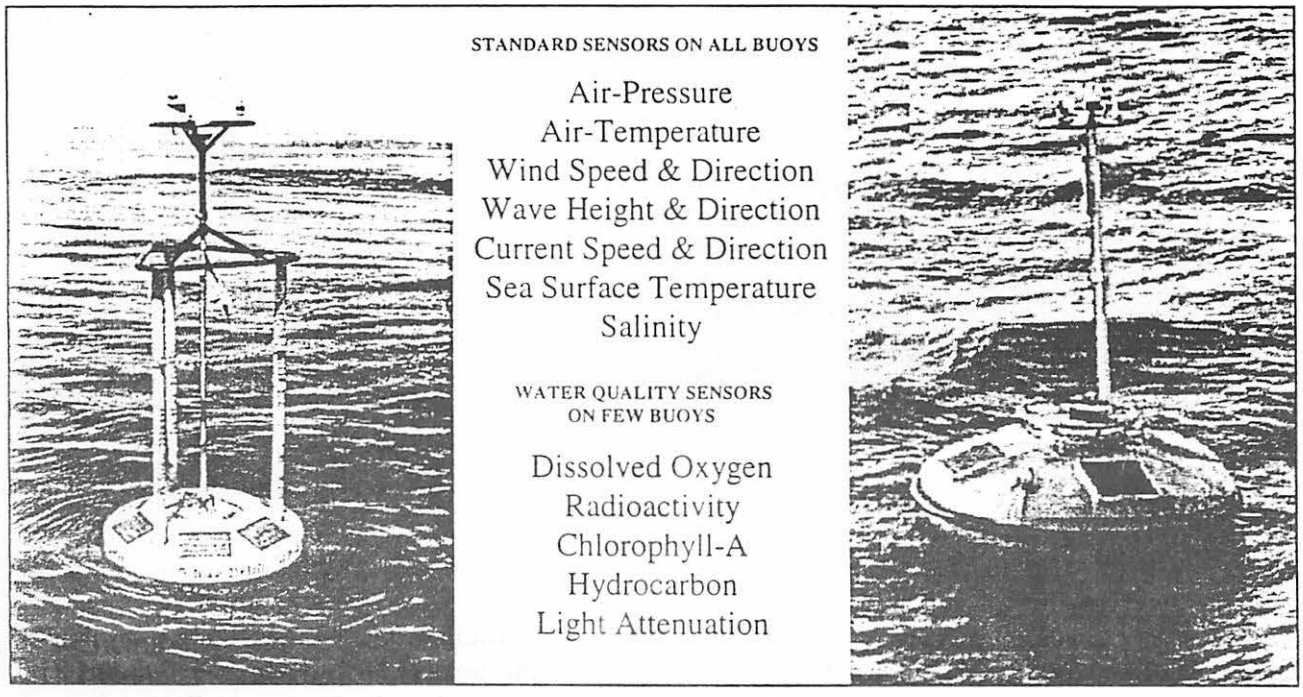


Buoys Safety

The deep-water buoys happened to be the target of vandalism due to which only 8 data buoys are currently in operation. Action in hand to rebuild the remaining 4 buoys and install in Indian Seas shortly. All over the Globe remotely moored data buoys suffer to such act of vandalism. As such tamper proof buoys are to be developed for moored data buoys to be deployed in remote location.

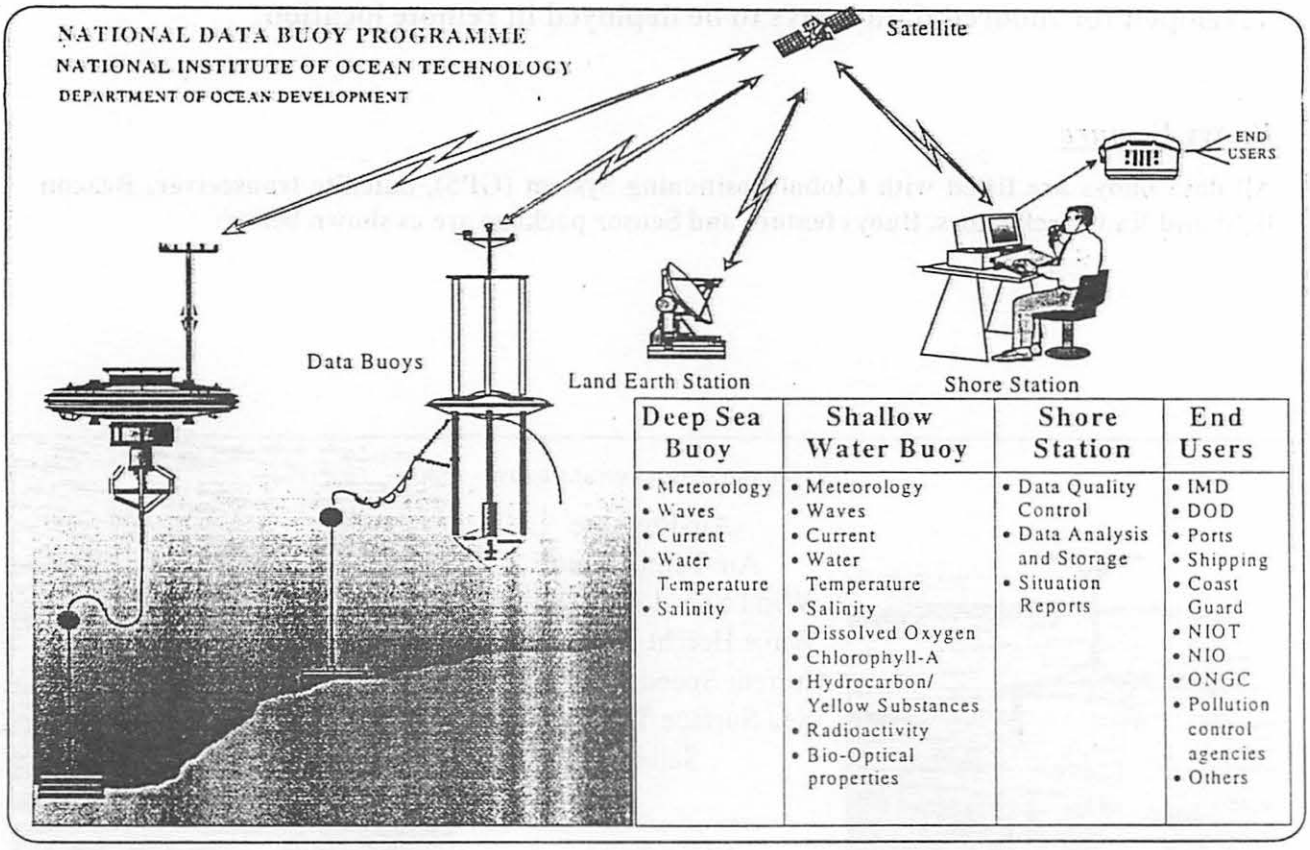
Buoys Feature

All data buoys are fitted with Global Positioning System (GPS), Satellite transceiver, Beacon light and Radar reflectors. Buoys feature and Sensor package are as shown below:



Data Communication

The data collected from the buoys are transmitted through INMARSAT-C having two way communications to the shore station located at NIOT.



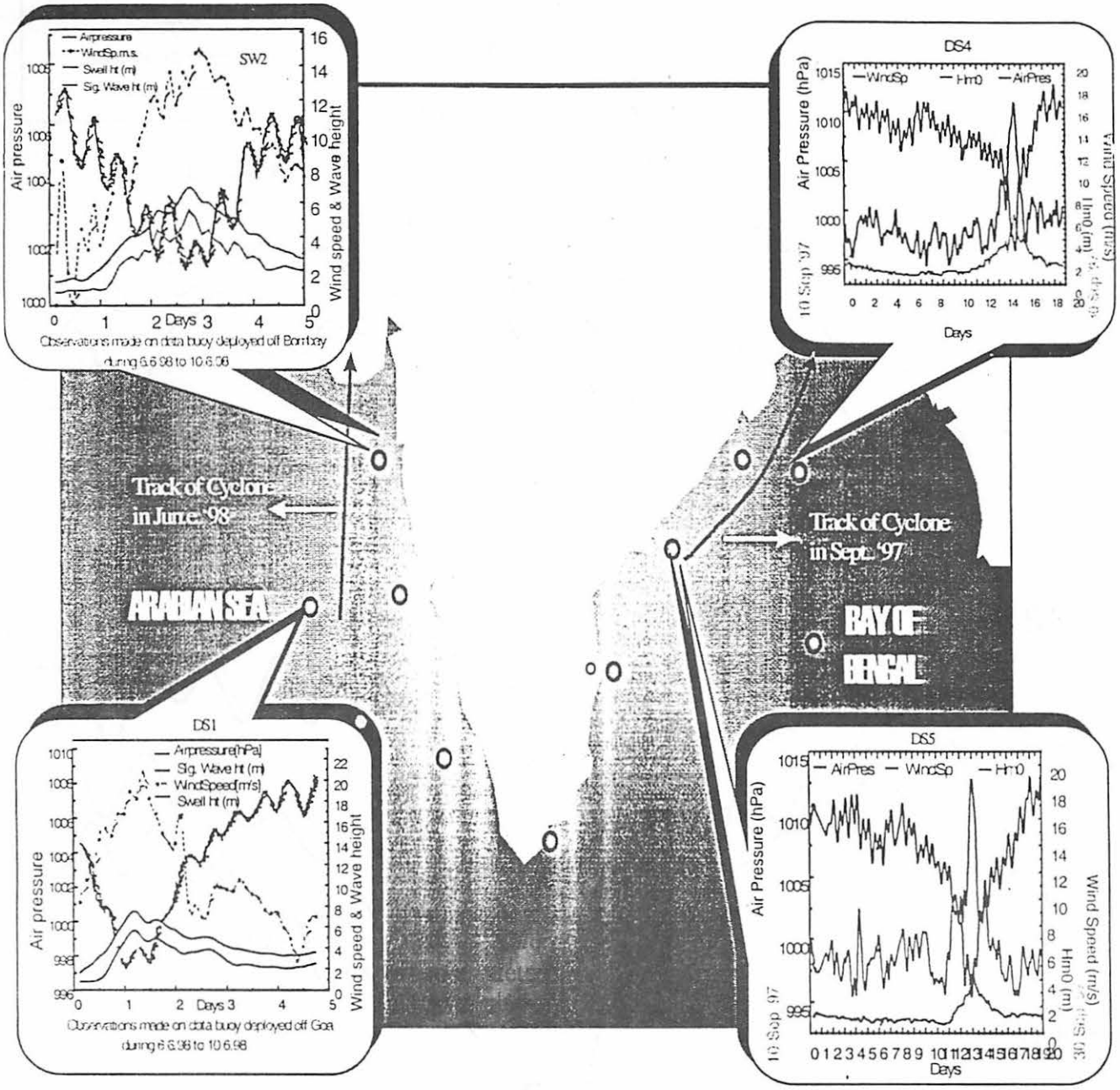
Deep Sea Buoy	Shallow Water Buoy	Shore Station	End Users
• Meteorology • Waves • Current • Water Temperature • Salinity	• Meteorology • Waves • Current • Water Temperature • Salinity • Dissolved Oxygen • Chlorophyll-A • Hydrocarbon/ Yellow Substances • Radioactivity • Bio-Optical properties	• Data Quality Control • Data Analysis and Storage • Situation Reports	• IMD • DOD • Ports • Shipping • Coast Guard • NIOT • NIO • ONGC • Pollution control agencies • Others

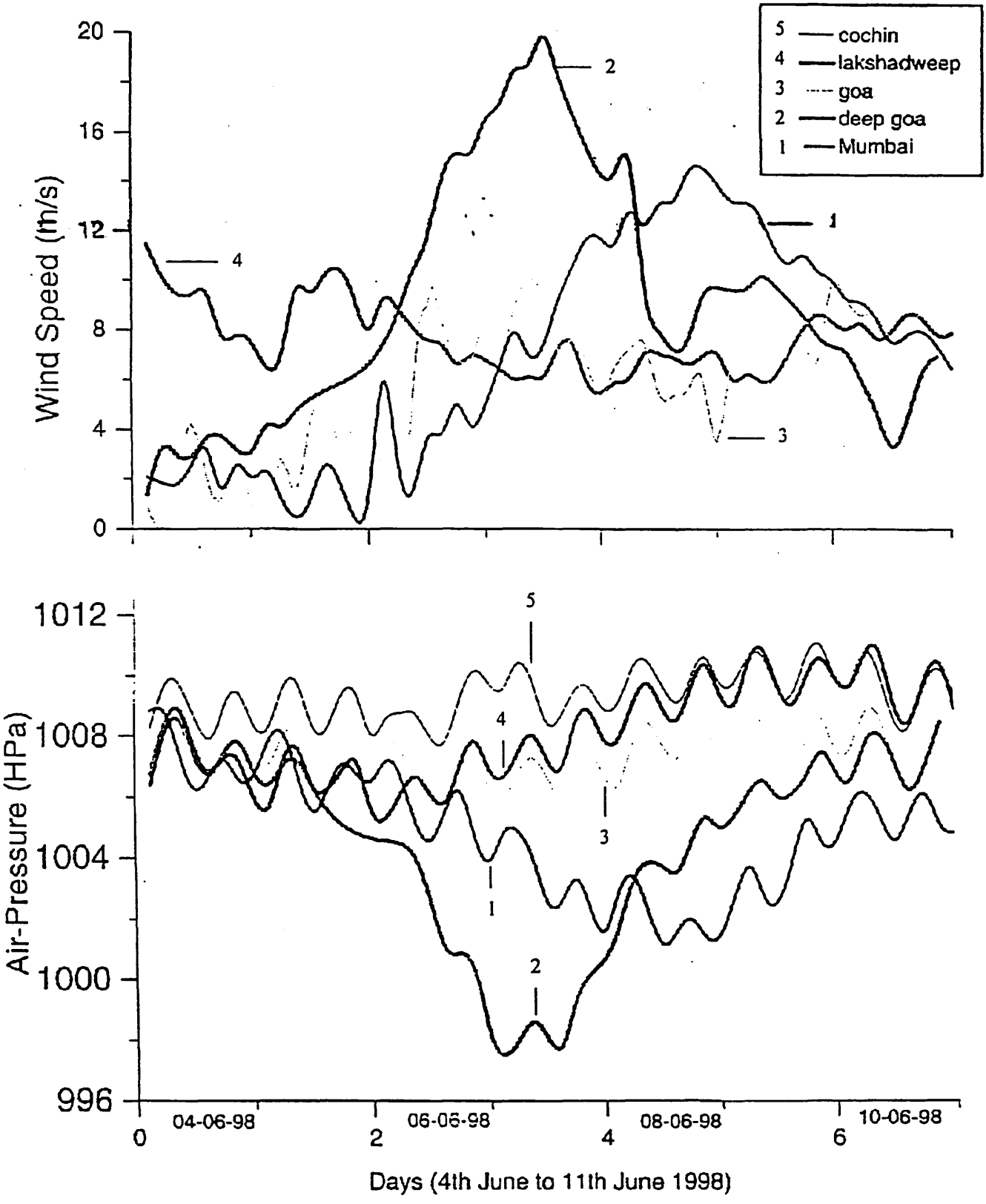
Data Dissemination

Every day data received from the data buoys are sent to India Meteorological Department (IMD) for their weather analysis. IMD has appreciated the importance of the buoy data in providing valuable information during 1997,1998 depressions and cyclonic storms. Buoys data collected during the passage of depression / cyclones is enclosed. Besides data are also supplied to Naval Hydrographic Office for sailing notification, Ports for their developmental activities and Department of Science and Technology for climate research. Oceanographic scientific & research organisations and Academic Institutions are also provided with data upon specific request. By end 1999, the surface met parameters will be put in Global Telecommunication System (GTS) to facilitate the world community to benefit through World Meteorological Organisation (WMO).

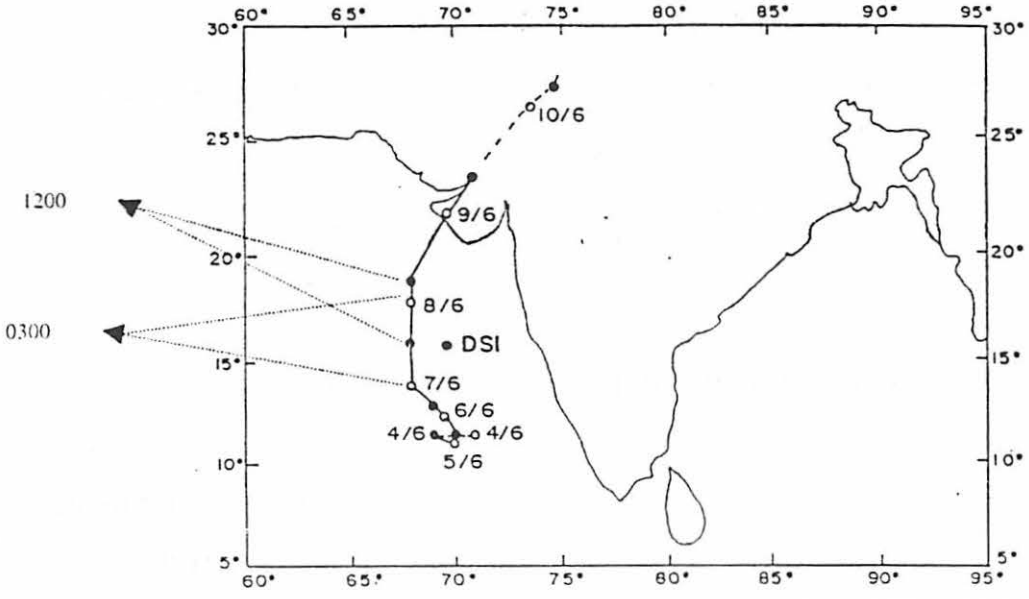
By operating the National Data Buoy Programme, India has enhanced its capacity in OCEAN OBSERVATION SYSTEM.

Typical buoys data during the passage of Depressions / Cyclones in Sept. 1997 & June 1998.

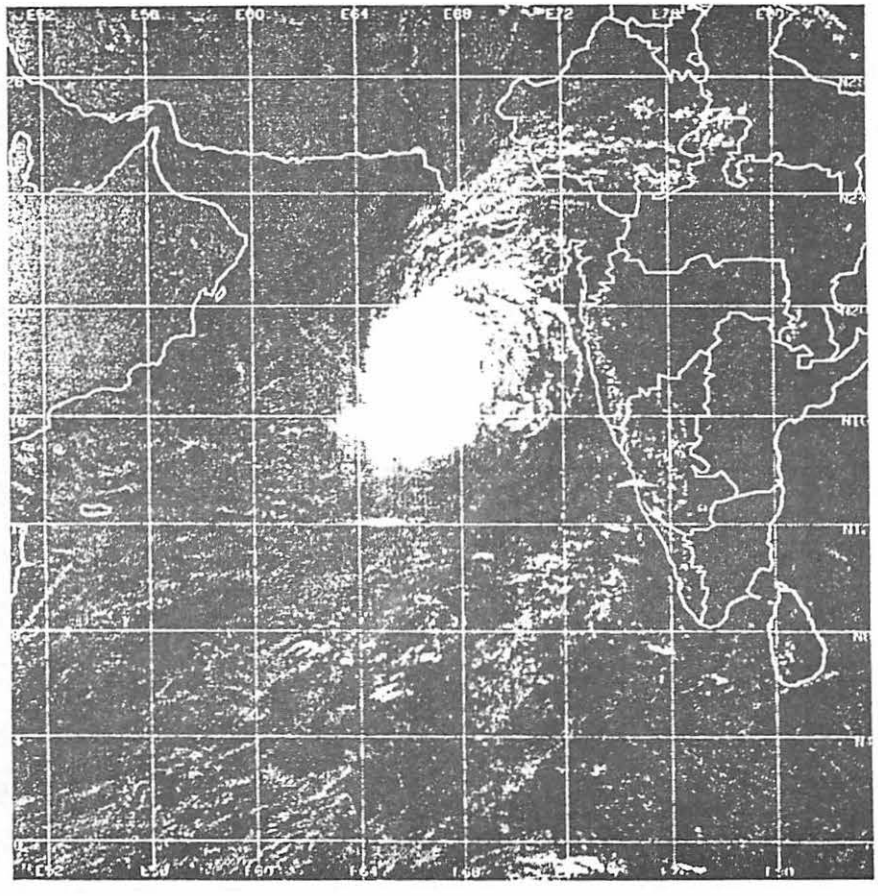




Winds and Air pressure during the Gujarat Cyclone



A



B

A) Track of the June 1998 cyclone in the Arabian Sea from 4th June (4/6) to 10th June (10/6).
B) Visible image of the cyclone at 0600 UTC on 8th June 1998

DRIFTING BUOY PROGRAMME

Department of Ocean Development, Govt. of India.

Implementing Agency:

National Institute of Oceanography, Goa.

Summary of drifter deployment during 1999.

ID	Sensor	Date of deployment
15706*	SST	27.01.99
10208	SST	29.01.99
06375	SST, AP	25.02.99
06376*	SST, AP	26.02.99
06377*	SST, AP	01.03.99
06380*	SST, AP	03.03.99
06381*	SST, AP	09.05.99
11086*	SST, AP	10.05.99
11353*	SST, AP	10.05.99
06382	SST, AP	10.05.99
11087	SST, AP	29.06.99
15702	SST, AP	06.07.99
11356*	SST, AP	21.07.99
11089*	SST, AP	02.08.99
15709	SST, AP	07.09.99
10206	SST	17.09.99

* Not transmitting now

Buoy trajectories for the period 1-1-1998 to 30-9-1999

Number of buoys deployed : 35

Country : **Indonesia**

Year : 1999

CURRENT PROGRAMMES

A. Agency or programme : **SEAWATCH Indonesia Programme**
Agency for the Assessment and Application of Technology (BPPT)

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

Purpose of programme: (a) operational: 6
(b) met/ocean research: 6
(c) developmental: -

Main deployment areas : Malaka strait and Java sea

B. Agency or programme : **SEAWATCH Indonesia Programme**
Agency for the Assessment and Application of Technology (BPPT)

PLANNED PROGRAMMES

A. Agency or programme : **SEAWATCH Indonesia Programme**
Agency for the Assessment and Application of Technology (BPPT)

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

Purpose of programe : (a) operational : 4
(b) met/ocean research : 4
(c) developmental : -

Main deployment areas : Makassar and Lombok straits

B. Agency or programme : **SEAWATCH Indonesia Programme**
Agency for the Assessment and Application of Technology (BPPT)

TECHNICAL DEVELOPMENTS

(a) Buoy design: buoy designed by OCEANOR ASA – Norway.

(b) Instrumentation: sensor used in this buoy come from several companies, measure wind, air temp, air press, water temp, wave, current, conductivity and oxygen. Transmission via INMARSAT satellite every day to read down station at BPPT. Warning for drifting of buoy (position) using ARGOS.

(c) Others: SEAWATCH Indonesia programmes tries to develop buoy in Indonesia.

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

- Some publications as report study in the field of met/ocean.
- On-line connection to several Indonesia institutions using dial-up to access weekly from SEAWATCH server.
- On-line connection using internet (still in prototype).
- Daily print out of data (unpublished).

SPECIAL COMMENTS

(a) Quality of buoy data: good, but in tropical waters we have to maintain the buoys minimum every 2 months. It means higher cost for maintenance (vessel rent).

(b) Communications: good, we use INMARSAT satellite for data transmission, but because of monetary crisis in Indonesia, where the payment for satellite in US dollar currency, so it makes higher cost also for communication.

(c) Buoy lifetimes: good, we only need to maintain every 2 months (minimum), but for the spare parts it is quite difficult to get it because depend on supply from developer (OCEANOR ASA – Norway).

(d) Others:
- Problems due to financing for maintenance and communication during the monetary crisis in Indonesia (needs helps and supports).
- Now we have 12 (twelve) buoys from OCEANOR ASA – Norway, and 2 (two) buoys as our prototype (produced by Indonesia) still in the field testing.

Country: JAPAN

Year: 1999

CURRENT PROGRAMMES.

A. Japan Meteorological Agency (JMA)

Number and type of buoys

(a) deployed during year:

(Type 1)	3 moored buoys with 11 maritime meteorological and oceanographic sensors
(Type 2)	3 PALACE floats

(b) operational at 31 August:

(Type 1)	3
(Type 2)	4
(Type 3)	2 ALACE floats

(c) reporting on GTS at 31 August:

(Type 1)	3
(Type 2)	3

Purpose of programme:

(Type 1)	operational meteorological and oceanographic observation
(Type 2)	ocean research and operational observation
(Type 3)	ocean research and operational observation

Main deployment areas:

(Type 1)	seas around Japan
(Type 2)	western North Pacific
(Type 3)	western North Pacific

B. Meteorological Research Institute, JMA

Number and type of buoys

(a) deployed during year:	10 PALACE floats
(b) operational at 31 August:	10 PALACE floats
(c) reporting on GTS at 31 August:	10 PALACE floats

Purpose of programme: ocean research

Main deployment areas: east of Japan (Oyashio-Kuroshio mixed water region)

C. Maritime Safety Agency

Number and type of buoys

(a) deployed during year:	10 surface drifters with holey sock drogues and SST sensors
(b) operational at 31 August:	8
(c) reporting on GTS at 31 August:	None

Purpose of programme: operational

Main deployment areas: North Pacific, Indian and Antarctic Oceans

D. Japan Marine Science and Technology Center

Number and type of buoys:

(a) deployed during year:

(Type 1)	2 subsurface ADCP moorings
(Type 2)	2 subsurface current meter moorings
(Type 3)	1 subsurface current meter mooring
(Type 4)	6 subsurface ADCP moorings
(Type 5)	1 subsurface current meter mooring
(Type 6)	5 acoustic tomography moorings (200Hz type)
(Type 7)	9 meteorological and subsurface oceanographic surface moorings (TRITON buoys)

(b) operational at 31 August:

(Type 1)	1
(Type 2)	2
(Type 3)	1
(Type 4)	6
(Type 5)	1
(Type 6)	0
(Type 7)	6

(c) reporting on GTS at 31 August:

(Type 7)	6

Purpose of programme:

(Type 1)	ocean research
(Type 2)	ocean research
(Type 3)	ocean research
(Type 4)	ocean research
(Type 5)	ocean research
(Type 6)	ocean research
(Type 7)	met/ocean research, ENSO monitoring

Main deployment areas:

(Type 1)	Arctic Ocean (Beaufort Gyre) and the Sea of Okhotsk
(Type 2)	Arctic Ocean (Beaufort Gyre) and the southeast of Hokkaido (Oyashio region)
(Type 3)	Kuroshio Extension region
(Type 4)	western tropical Pacific
(Type 5)	western tropical Pacific
(Type 6)	central tropical Pacific
(Type 7)	western tropical Pacific

E. Ocean Research Institute, University of Tokyo

Number and type of buoys:

(a) deployed during year:

(Type 1)	7 moored buoys with 31 current meters
(Type 2)	2 ALACE floats
(Type 3)	2 PALACE floats
(Type 4)	10 compact surface drifters with drogues

(b) operational at 31 August:

(Type 1)	7
(Type 2)	2
(Type 3)	2
(Type 4)	10

(c) reporting on GTS at 31 August:

(Type 3)	2

Purpose of programme: ocean research

Main deployment areas:

(Type 1)	tropical western North Pacific
(Type 2)	Japan Sea
(Type 3)	Japan Sea
(Type 4)	east of Japan (Kuroshio Extension region and Oyashio-Kuroshio mixed water region)

F. Tokai University

Number and type of buoys:

(a) deployed during year:	None
(b) operational at 31 August:	2 surface drifters with holey sock drogues and SST sensors
(c) reporting on GTS at 31 August:	None

Purpose of programme: ocean research

Main deployment areas: North Pacific

G. Hokkaido National Fisheries Research Institute, Fisheries Agency

Number and type of buoys:
(a) deployed during year: 3 moored buoys
(b) operational at 31 August: 3
(c) reporting on GTS at 31 August: None

Purpose of programme: ocean research

Main deployment areas: Oyashio region

H. Tohoku National Fisheries Research Institute, Fisheries Agency

Number and type of buoys:
(a) deployed during year: 1 subsurface ADCP mooring
(b) operational at 31 August: 1
(c) reporting on GTS at 31 August: None

Purpose of programme: ocean research (ocean circulation)

Main deployment areas: Oyashio region

I. Central Research Institute of Electric Power Industry

Number and type of buoys
(a) deployed during year: 4 PALACE floats
(b) operational at 31 August: 14 (1 ALACE, 13 PALACE)
(c) reporting on GTS at 31 August: None

Purpose of programme: observation of sub-surface circulation

Main deployment areas: western North Pacific

PLANNED PROGRAMME

A. Japan Meteorological Agency (JMA)

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

(Type 1)	3 moored buoys with 11 maritime meteorological and oceanographic sensors
(Type 2)	2 PALACE floats

Purpose of programme:

(Type 1)	operational meteorological and oceanographic observation
(Type 2)	ocean research and operational observation

Main deployment areas:

(Type 1)	seas around Japan
(Type 2)	western North Pacific

B. Meteorological Research Institute, JMA

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

Purpose of programme: ocean research (sub-arctic circulation)

Main deployment areas: east of Japan (Oyashio-Kuroshio mixed water region)

C. Maritime Safety Agency

Number and type of buoys planned
for deployment in next 12 months: 11 surface drifters with holey sock drogues and SST sensors

Purpose of programme: operational

Main deployment areas: North Pacific, Indian and Antarctic Oceans

D. Japan Marine Science and Technology Center

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

(Type 1)	3 subsurface ADCP moorings
(Type 2)	1 subsurface current meter moorings
(Type 3)	2 subsurface current meter moorings
(Type 4)	6 subsurface ADCP buoys
(Type 5)	8 acoustic tomography moorings (200Hz type)
(Type 6)	9 meteorological and subsurface oceanographic surface moorings (TRITON buoys)

(Type 7)	1 meteorological and subsurface oceanographic surface mooring (TRITON buoy : mid-latitude test buoy)
(Type 8)	5 PALACE floats

Purpose of programme:

(Type 1)	ocean research
(Type 2)	ocean research
(Type 3)	ocean research
(Type 4)	ocean research for climate study
(Type 5)	ocean research
(Type 6)	met/ocean research, ENSO monitoring
(Type 7)	met/ocean research/developmental
(Type 8)	ocean research

Main deployment areas:

(Type 1)	Arctic Ocean (Beaufort Gyre)
(Type 2)	southeast of Hokkaido (Oyashio region)
(Type 3)	Kuroshio Extension region
(Type 4)	western tropical Pacific
(Type 5)	central tropical Pacific
(Type 6)	western tropical Pacific, eastern Indian Ocean
(Type 7)	Kuroshio Extension region
(Type 8)	North Pacific

E. Ocean Research Institute, University of Tokyo

Number and types of buoys planned
for deployment in next 12 months: 2 PALACE floats

Purpose of programme: ocean research

Main deployment areas: Japan Sea

F. Tokai University

Number and types 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. Hokkaido National Fisheries Research Institute, Fisheries Agency

Number and types of buoys planned
for deployment in next 12 months: 3 moored buoys

Purpose of programme: ocean research

Main deployment areas: Oyashio region

H. Tohoku National Fisheries Research Institute, Fisheries Agency

Number and type of buoys planned
for deployment in next 12 months: 1 subsurface ADCP mooring
1 subsurface current meter mooring

Purpose of programme: ocean research (ocean circulation)

Main deployment areas: Oyashio region

I. Central Research Institute of Electric Power Industry

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

Purpose of programme: observation of sub-surface circulation

Main deployment areas: western North Pacific

Country: **THE NETHERLANDS**

Year: 1999

CURRENT PROGRAMMES

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

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

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 0
(b) operational at 31 August 1
(c) reporting on GTS at 31 August 1

Purpose of programme Study of the North Atlantic surface circulation under the terms of the WOCE and CLIVAR programmes. For that reason the kinematics of the surface flow near the European ocean margin, especially in the Bay of Biscay, are monitored in order to identify the mean flow and seasonal and eddy characteristics of the Eastern Boundary Current along the continental slope. In a previous phase the attention was focused on the surface circulation in the north-eastern North Atlantic (Iceland Basin and Rockall Channel) and the exchange of surface water between the North Atlantic Ocean and the Norwegian Sea.

Main deployment areas North Atlantic

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:
6 TOGA-WOCE type drifters

Purpose of programme	To quantify the contribution of leakage and decay of Agulhas rings to the meridional transport of heat and salt in the thermohaline circulation in the Atlantic Ocean. Also to assess the sensitivity of the thermohaline circulation to variations of the Agulhas leakage. This MARE (Mixing of Agulhas Rings Experiment) program is a contribution to CLIVAR. In order to meet the objectives surface drifters will be seeded in a number of Agulhas Rings in order to follow the drift of these rings. This will make it possible to perform a series of consecutive hydrographic surveys of one single ring during a period of 12 months.
Main deployment areas	Atlantic Ocean.

TECHNICAL DEVELOPMENTS

(a)	Buoy design	
(b)	Instrumentation	1 buoy in test with GPS receiver
(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.

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 **1999**

CURRENT PROGRAMMES

A. Agency : **Meteorological Service of New Zealand Ltd (MSNZ)**

Number and type of buoys:
(a) deployed during the year : 5 Drifters - 4 FGGE, 1 WSD
(b) operational at 31 August : 8 Drifters
(c) reporting on GTS as at 31 August : 8 Drifters

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

Main deployment areas: Tasman Sea

B. Agency : **Meteorological Service of New Zealand Ltd (MSNZ) for Global Drifter Centre (GDC)**

Number and type of buoys:
(a) deployed during the year : 7 SVPB
(b) operational at 31 August : 1 SVPB
(c) reporting on GTS as at 31 August : 1 SVPB

Purpose of programme: Weather Forecasting & Oceanographic Research

Main deployment areas: Southern Pacific Ocean

PLANNED PROGRAMMES

A. Agency : **Meteorological Service of New Zealand Ltd (MSNZ)**

Number and type of buoys planned for deployment in next 12 months: 4 drifters, or as many as required to maximise 7.0 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**: MSNZ Buoys give long operational service. MetService has an active Buoy Recovery policy. Buoy positions are monitored as they near the NZ coast and where possible buoys are recovered after beaching. This has resulted in many buoys being recovered, refurbished and redeployed, with some buoys being redeployed more than 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.

Over the twelve years since 1988 MetService has purchased 22 buoys. These buoys have been recycled through a series of deployments to maintain an optimum operating network of 7 buoys. This

has involved 48 deployments.
ie. 84 buoy years (12 years x 7 buoys) have been attained using only 22 buoys. Of the eight buoys operational on 1 October 1999, one is on its first deployment, three buoys are on their second deployment, two buoys are on their third deployment, one on its fourth deployment and one on its fifth deployment.

The high number of recoveries shortens individual buoy lifetimes. In MetService's case it is more representative to look at cumulative lifetimes achieved by buoys over several deployments. Lifetime is counted until barometer failure, transmission failure or recovery. The Average Cumulative Lifetime of the twenty two buoys, including the eight operational buoys at 1 October 1999 is 36.2 months. Looking at individual buoys, #20721 has been deployed twice, is still operational and has given 54 months of cumulative service. Buoy #6439 was deployed 3 times achieving a cumulative lifetime of 80 months and #7176 is on its fifth deployment, and is still operational after 50 months of cumulative service.

D. **Recovered Buoys:**
In the twelve months to 1 October 1999, two buoys (#22188 and #8585) were successfully recovered. Buoy 22188 had been at sea for twelve months and was still fully operational when it washed ashore at Hokio Beach, on the west coast of the North Island of New Zealand. Because this buoy was still transmitting, it was possible to identify the exact location where it beached allowing a recovery operation to take place. The other buoy #8585 was found by chance on Swain Reef, Queensland, Australia by a fisherman. This buoy was on its second deployment and had stopped transmitting seven months before it was found when its battery power failed after 26 months of operational service. Both buoys were intact and recovered in good condition.

The sensors of all recovered buoys are calibrated and compared with pre-deployment calibrations to find out how they performed during their time at sea. Particular attention is paid to any sensors flagged as defective during operational data monitoring.
Pressure Sensors : There was no shift in the calibration of the Paroscientific barometers on both buoys when tested over the pressure range 900 to 1050 hPa.
Temperature Sensors : The air and sea temperature sensors on both buoys were checked and found to be satisfactory.
Wind Speed and Direction: Buoy 8585 was a WSD buoy. However the wind data was removed from GTS three months after deployment when the output locked up on the same values. Post recovery WSD tests showed both sensors were outputting base values.

Buoy 22188 was fitted with new batteries and drogue and following a complete calibration of all sensors, was redeployed in February 1999. Buoy 8585 required a new hull, batteries and drogue and will be redeployed for the third time as a basic buoy (without winds) in early October 1999.

Country: **South Africa**

Year: 1998-1999

South Africa started the year (inter-sessional period Aug 1998 - July 1999) with 47 drifters operational. The South African Weather Bureau (SAWB) drifter programme is maintained mainly to supply data for use in operational forecasting. The deployments are done in data spares areas, but also where these positions would compliment deployments by other agencies. The vast majority of deployments done by the SAWB are a mixture of SAWB and AOML SVP-B drifters.

1998					1999						
Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	Jun	Jul
nil	4	nil	nil	7	1	8	nil	1	nil	nil	nil

DEPLOYMENT TEMPO OF 21 DRIFTERS

The United States Navy air deployed 5 drifters in December 1998 just east of the South American coast on their way to the Falklands, while the 16 remainder drifters was deployed during routine voyages to Antarctica, Gough and Marion Islands. Two drifters air deployed failed, one on deployment and the other two days later. A third air deployed drifter pressure sensor went faulty. An experimental drifter from METOCEAN failed to transmit just after deployment.

The SAWB experienced problems with the DCP on Tristan da Cunha. The humidity sensor went faulty and the time could not be set correctly. The DCP was brought back to South Africa, while a drifters was placed on the Island. The pressure sensor also went faulty. The automatic weather station on South Thule also gave problems and a drifter was placed on the Island. After 111 the transmission timer went faulty.

The TOGA drifter from the UK that was deployed in May 1998 just off the South-west coast of South Africa is still operating but has moved northeast- wards and run-ashore on the coast of Brazil at the beginning of July 1999. The Brazilian authorities will be approached to assist in retrieving the drifter. The three SVPBW drifter that was deployed in September 1998 is still operating except for one who=s pressure sensor went faulty.

Except for these failures with the air deployments and pressure sensors the program had a productive inter-sessional period. 21 Drifters stopped transmitting but it can be expected after they operated on average between 600 and 700 days. One drifter even continued to transmit for 876 days. A drifter that stopped transmitting after 374 was also successfully retrieved in September 1998. A SVPB drifter that was deployed at 57S, 02E on 13 January 1997 moved rapidly eastwards across the Atlantic into the Indian and Pacific oceans. It stopped transmitting after 670 days but started transmitting again after 880 days and is presently at 52S, 170W transmitting occasionally. The question is what must be the time lapse after a drifter stopped transmitting before the ID is used again.

FUTURE PLANS

AOML has send 6 SVP drifters that must be deployed in the Indian ocean, while 4 more SVP-B drifters is on its way for deployment in the Atlantic ocean. Technocean is also sending us two experimental drifters for deployment in the Atlantic ocean. SAWB has also ordered 10 SVP-B from Metocean. These drifters will mainly be used to maintain the existing network of drifters in the South Atlantic.

Approximately 10 drifters will be deployed during the routine voyage to Gough Island in September 1999. During this voyage it is planned to replace the drifter on Tristan da Cunha. The remainder will be deployed during the voyage to Antarctica in December 1999. During this voyage the drifter on South Thule will be replaced. See the attached map on the deployment programme and deployment opportunity on the SA Agulhas.

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

DATA BUOY CO-OPERATION PANEL
Format for national reports on current and planned programmes

Country : Thailand
Year : 1999

CURRENT PROGRAMMES

A. Agency or programme : Thai Data Buoy Operating Center (TDBOC), National Research Council of Thailand
Number and type of buoys :
(a) deployed during year 1999: 9 Moored Buoys
(b) operational at 31 August : 7 Moored Buoys
(c) reporting on GTS at 31 August : -
Purpose of programme:
(a) operational : 11
(b) met/ocean research : 11
(c) developmental : -
Main deployment areas : Gulf of Thailand , Andaman Sea

B. Agency or programme : Thai Data Buoy Operating Center (TDBOC) , National Research Council of Thailand

PLANNED PROGRAMMES

A. Agency or programme : Thai Data Buoy Operating Center (TDBOC) , National Research Council of Thailand
Number and type of buoys planned for deployment in next 12 months : 9 Moored Buoys
Purpose of programme:
(a) operational : 11 Moored Buoys
(b) met/ocean research : 11 Moored Buoys
(c) developmental : -
Main deployment areas : Gulf of Thailand , Andaman Sea

B. Agency or programme : Thai Data Buoy Operating Center (TDBOC) , National Research Council of Thailand

TECHNICAL DEVELOPMENTS

(a) **Buoy design** : by Oceanor ASA, Norway

(b) **Instrumentation** : Wind Speed, Wind Direction, Air Pressure, Air Temperature, Wave Height, Wave Period, Wave Direction, Current Speed, Current Direction, Oxygen Saturation Percentage, Conductivity and Temperature Profile, Light Attenuation. Data transmission via Inmarsat system. ARGOS is used for buoy positioning and warning.

(c) **Others** :

PUBLICATIONS

- Annual Reports
- Brochures
- General information published via web pages at http://www.nrct.go.th/seawatch/
- Average meteorological data published daily via world wide web.
- Data distribution via Bulletin Board System (BBS) to members.

SPECIAL COMMENTS

(a) Quality of buoy data : Quality of oceanographical data tends to degrade with time due to marine fouling. Fouling greatly affects light sensor and oxygen sensor, limiting the operating time to about 1 month.

(b) Communications : Data transmission via Inmarsat system. ARGOS is used for positioning and warning when drifting.

(c) Buoy lifetimes : Buoy deployments are scheduled 3-4 times yearly, depending on vessels availability and budget.

(d) Others : -

Country: ***United Kingdom***

Year: ***1999***

CURRENT PROGRAMMES

Institute: Meteorological Office

Programme: EGOS

Number & type of buoys:

a) deployed during year: 21 drifters (5 WOCE + 16 TOGA), 2 moored*

b) operational at 31 August: 17 drifters (all TOGA), 16 moored

c) reporting on GTS at 31 August: 17 drifters (all TOGA), 15 moored

Note: 2 of the 16 moored buoys are joint projects between the UK Meteorological Office and Météo-France.
* The K7 buoy was deployed in June 1999; an experimental buoy was deployed in St Bride's Bay in July 1999.

Purpose of programme: Operational meteorology, oceanography and climate research

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

Institute: Meteorological Office

Programme: IABP

Number & type of buoys:

a) deployed during year: 1 ice buoy (air-dropped)

b) operational at 31 August: 1

c) reporting on GTS at 31 August: 1

Purpose of programme: Operational meteorology, oceanography and climate research

Main deployment areas: Arctic Ocean

Institute: Meteorological Office

Programme: ISABP

Number & type of buoys:

a) deployed during year: 1 TOGA WSD drifter (scheduled for late 1999)

b) operational at 31 August: 0

c) reporting on GTS at 31 August: 0

Purpose of programme: Operational meteorology and oceanography

Main deployment areas: South Atlantic

Institute: CCMS Dunstaffnage and Plymouth Marine Laboratories

Programme: Tracer release

Number & type of buoys:

a) deployed during year: 1 SVP, 1 GPS SVP

b) operational at 31 August: 0

c) reporting on GTS at 31 August: 0

Purpose of programme: Physical oceanography

Main deployment areas: North Atlantic

Institute: University College of North Wales - Bangor

Programme: Eastern Boundary Current Studies

Number & type of buoys:

a) deployed during year: 9 surface mixed layer holey sock

b) operational at 31 August:

c) reporting on GTS at 31 August:

Purpose of programme: Physical oceanography

Main deployment areas: North Atlantic

PLANNED PROGRAMMES

The above agencies all plan similar levels of activity during 2000.

TECHNICAL DEVELOPMENTS

Trials of alternative satellite communications systems (CCMS Dunstaffnage Marine Laboratory).

NATIONAL DATA BUOY REPORT – 2000
UNITED STATES OF AMERICA

The United States of America plans to deploy more than 3,000 platforms around the world in the year 2000. Of these, approximately 1,983 platforms will be moored and drifting data buoys, including profiling floats, for oceanic and atmospheric research and operational programs.

These platforms will be sponsored by the National Oceanic and Atmospheric Administration (NOAA); US Coast Guard; National Science Foundation; Minerals Management Service; Department of Defense, including the US Navy and Army Corps of Engineers; and by several non-government groups.

The following list indicates the specific organizations, the number of data buoy systems each operated during 1999, and platform estimates for 2000. Most of these systems report through Service Argos; however, some report via NOAA's Geostationary Operational Environmental Satellite (GOES) communications system.

A. National Oceanic and Atmospheric Administration

Number of type of buoys:	(a) drifting buoys/floats – 741 (b) moored buoys – 154
Estimates for 2000:	(a) drifting buoys/floats – 802 (b) moored buoys – 155
Purpose of programs:	Monitor and predict climate change; operational meteorological and oceanographic data; study biological and physical processes
Main deployment areas:	Atlantic and Pacific Oceans; Arctic

B. US Coast Guard (Department of Transportation)

Number and type of buoys:	drifting buoys – 45
Estimates for 2000:	drifting buoys – 30
Purpose of program:	Iceberg movement monitoring; search and rescue
Main deployment areas:	Atlantic and Pacific Oceans

C. National Science Foundation

Number and type of buoys:	(a) drifting buoys/floats – 772 (b) moored buoys – 12
Estimate for 2000:	(a) drifting buoys/floats – 440 (uncertain) (b) moored buoys – 10 (uncertain)
Purpose of programs:	Oceanic circulation studies; meteorology; marine ecology studies
Main deployment areas:	Not specified

D. Minerals Management Service (Department of the Interior)

Number and type of buoys:	drifting buoys – 24
Estimate for 2000:	drifting buoys – 16
Purpose of programs:	Ocean circulation studies
Main deployment areas:	US continental shelf

E. Department of Defense (US Navy, US Army)

Number and type of buoys:	(a) drifting buoys/floats – 494 (b) moored buoys – 15
Estimate for 2000:	(a) drifting buoys/floats – 400 (b) moored buoys – 3
Purpose of programs:	Operational meteorological and oceanographic analysis and forecasting; studies of oceanographic paramenters; pollution studies
Main deployment areas:	Not specified

F. Non-government organizations

Number and type of buoys:	(a) drifting buoys – 18 (b) moored buoys – 29
Estimate for 2000:	(a) drifting buoys – 86 (b) moored buoys – 22
Purpose of programs:	Assist in monitoring movement of marine animals; oceanographic studies; weather and climate observations

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 DBC 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 co-ordinator and the Secretariats of WMO and IOC as far as resources allow.

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

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

EUROPEAN GROUP ON OCEAN STATIONS (EGOS)

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 Secretariat and managed by the Management Committee, composed of one representative from each of the participating states.

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 49. A total of 73 buoys were deployed and 63 buoys ceased to operate in the intersessional period. The average operational lifetime of the EGOS drifting buoys that ceased to operate in the period was 234 days, however, if the buoys that suffered very early failure are excluded the average operational lifetime increases to 283 days. In 1996 this number was 336 days, in 1997 252 days and in 1998 278 days. As of July 15th 1999, the average age of the EGOS operational buoys was 160 days.

In addition to the drifting buoys 6 moored buoys west of the British Isles belonging to the UK Met. Office and two moored buoys operated jointly by France and UK were part of EGOS.

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 asynoptic observation together with stored (synoptic) observations.

The drifting buoy data are transmitted via the NOAA/Argos satellite system and received by three Local User Terminals, located in Søndre Strømfjord, Oslo and Lannion. The data are further disseminated via the GTS on a near real-time basis.

Data quality and data regularity are controlled and monitored on a quasi real-time basis. On average the data are received at the meteorological centres about 20-30 minutes after the observations are made.

The group has formalised its extended area of primary interest to cover the sea area from the European coastline out to 50 °W, between 30 and 65°N. 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 will be updated in 1999. EGOS is on the World Wide Web as one of the DBCP Action Groups (*http://www.shom.fr/meteo/egos)*.

1. INTRODUCTION

The European Group on Ocean Stations (EGOS), an Action Group of the DBCP, was formally established on December 1, 1988. 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. 77 ('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.

2. THE MANAGEMENT COMMITTEE OF EGOS

The Management Committee met twice during the reporting period:

- The winter meeting was held at the WMO headquarters in Geneva, December 8-9, 1998. At this meeting the Management committee re-elected Mr. Wynn Jones (UKMO) and Mr. Wil C. M. van Dijk (KNMI) as respectively Chairman and Vice-Chairman. Météo-France offered to host the 1999 summer meetings of EGOS. A report on the conclusions and recommendations of the December 99 meeting is in EGOS Tech. Doc. No. 167.

- The EGOS summer meeting was held at the Etablissement Principal du Service Hydrographique et Oceanographique de la Marine (EPSHOM) in BREST- FRANCE during May 26 –27 1999. At this meeting, the Management Committee decided 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 responsabilty for deployment co-ordination and GTS matters. Mr Pierre Blouch would continue to act as Chairman of the EGOS Technical Subgroup until the Deceber 99 meeting. 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. It is also discussing the possibility of including adjacent seas, such as the Baltic and Mediterranean.

3. THE TECHNICAL SUBGROUP OF EGOS

The Technical Subgroup met twice during the reporting period, in combination with the Management Committee meetings (see above):

- At the WMO headquarters in Geneva, December 8-9, 1998. At this meeting the Technical Subgroup unanimously re-elected Mr. Pierre Blouch as Chairman, to hold office until the end of the next December session of the Technical Subgroup. The minutes from the meeting have been issued as EGOS Technical Doc. No. 188.

- At the Etablissement Principal du Service Hydrographique et Oceanographique de la Marine EPSHOM) in Brest- France during May 26 –27 1999. As trhe Management

Committee decided to merge the Technical Subgroup with the Management Committee, this was the last regular meeting of the EGOS Technical Subgroup.

4. MEMBERSHIP OF EGOS

In 1997 the members of EGOS were:

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

At the winter meetings in Paris, December 2-3, 1997, and at the Summer meeting in Brest, during May 26-27, 1999 Spain was represented by observers. Spain has expressed a wish to become a member of EGOS.

5. THE EGOS TECHNICAL SECRETARIAT

The Technical Secretariat has 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 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 co-ordinate the EGOS drifting buoy programme, following the established routines. The status of the operating buoys has been closely monitored in close co-operation with Mr. Hreinn Hjartarson in Iceland and Mr. Pierre Blouch at CMM in Brest.
Other routine actions have included:

To co-ordinate information to CLS Argos and the LUTs operators whenever
- a new buoy is deployed, for insertion on GTS,
- an operating buoy has failed or run ashore, for removal from GTS,
- the status of a buoy or one of its sensors has changed.

To co-ordinate information to respective owners of buoys whenever
- a new buoy is deployed
- an operational buoy has failed or its operative status has changed
- a buoy has run ashore
- a buoy has been reported recovered by e.g. local fishermen.

To update the database at CMR on the history and status of each EGOS buoy.

To maintain the list of WMO numbers and PTT numbers relevant to EGOS.

Discussions have continued on the possibilities of sharing work task between CMR and CMM, during the intersessional period. 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.

6. LIAISON WITH INTERNATIONAL ORGANISATIONS

In 1998/1999 EGOS maintained 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 meetings in December 1998 by Mr. Peter Dexter of the WMO.

DBCP
The Technical Co-ordinator of the DBCP, Mr. Etienne Charpentier, attended both the December 98 meetings in Geneva and the Summer 99 meetings in Brest.

The day-to-day control for the EGOS drifting buoys at the Technical Secretariat was maintained and supported by the Technical Co-ordinator of the DBCP. The mail distribution list for data quality control *buoy-qc@vedur.is* was used at an increased level for communication and information exchange.

The DBCP Internet server address for GTS buoy dataflow control:

http://www.shom.fr/meteo/rechstat/

had frequently been used by the Technical Secretary to inspect if a certain buoy was transmitting or not on GTS, and also active sensors. The service provides overview, statistics and last position, but not true data. The server is updated at regular intervals, usually once or twice per month.

EGOS was represented by Chairman of the Management Committee, Mr. Wynn Jones at the DBCP session which was held in Marathon, Florida on 12-16 October 1998. Mr. Hreinn Hjartarson represented EGOS at the CGC meeting in Copenhagen, in August 1998. Reports on EGOS were presented at these meetings by the EGOS representatives (EGOS Technical Docs. No 177 and 183).

Others
In October 1998, a request was made at DBCP XIV for EGOS to consider establishing a study group to undertake co-operative research on the climate of the North Atlantic. It was anticipated that group would involve researchers and buoy programme operators from NOAA, and other North American and European institutions. Mechanisms for this, and for formalising the closer collaboration that has developed in recent years between EGOS and operational buoy operators in North America, are now being discussed.

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 has shown steady increase during the previous years. In this context, operational is defined as transmitting at air pressure data of useable quality on GTS. The number for each month varied between 31 and 49 buoys in the intersessional period (see Fig. 1).

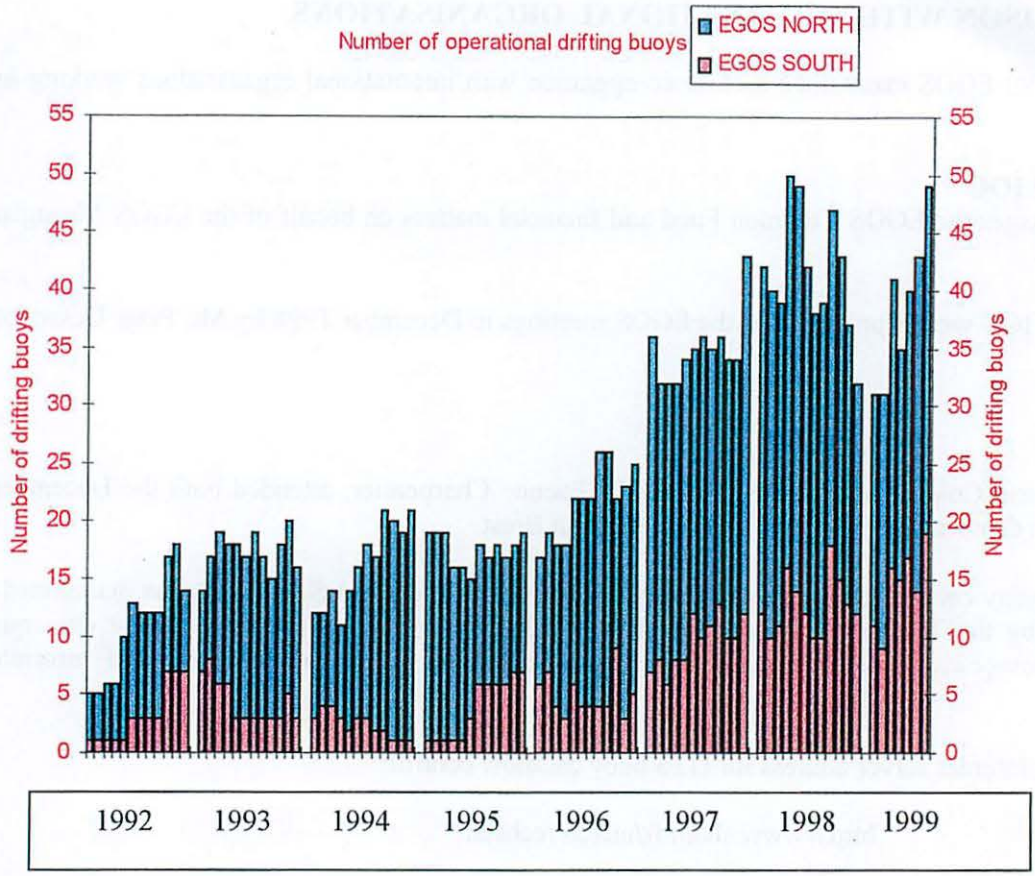


Figure. 1. *Number of operational drifting buoys in EGOS at the end of each month, for the years 1992-June 1999.*

As of July 15, 1999, a total of 49 drifting buoys were operating in EGOS, 30 in EGOS North and 19 in EGOS South area. (Figure 2) 6 of these were ConMar buoys, of which 4 have GPS receiver, 20 were Metocean TOGA type, of which 3 had wind sensors, 3 were Marisonde buoys, 4 were CMOD buoys and 17 were of SVP-B type. 1 of the SVP-Bs had wind sensors (see Fig. 2).

7.2 **Deployment of new buoys** (see Table 1)

Drifting buoys are supplied by most EGOS members. Most members supply 1 or 2 buoys per year. UKMO and Météo- France has so far been the biggest contributors in, both with 26 deployments in the intersessional period.

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 71 drifting buoys were deployed in EGOS in the intersessional period. These were either ConMar buoys (5), Metocean TOGA (FGGE) type buoys (17), Marisonde buoys (6) or SVP-B type buoys (40). 3 of the SVP-Bs had wind sensors. 3 of the ConMar buoys had a GPS receiver. See Table 1 and Fig. 4 for other details.

Most buoys are still deployed from ships of opportunity, primarily between Iceland and North America, and Denmark and Greenland. However, an increasing number are also being deployed from research vessels in the seas around Iceland, and by air, by NAVOCEANO, into areas not normally available by ship.

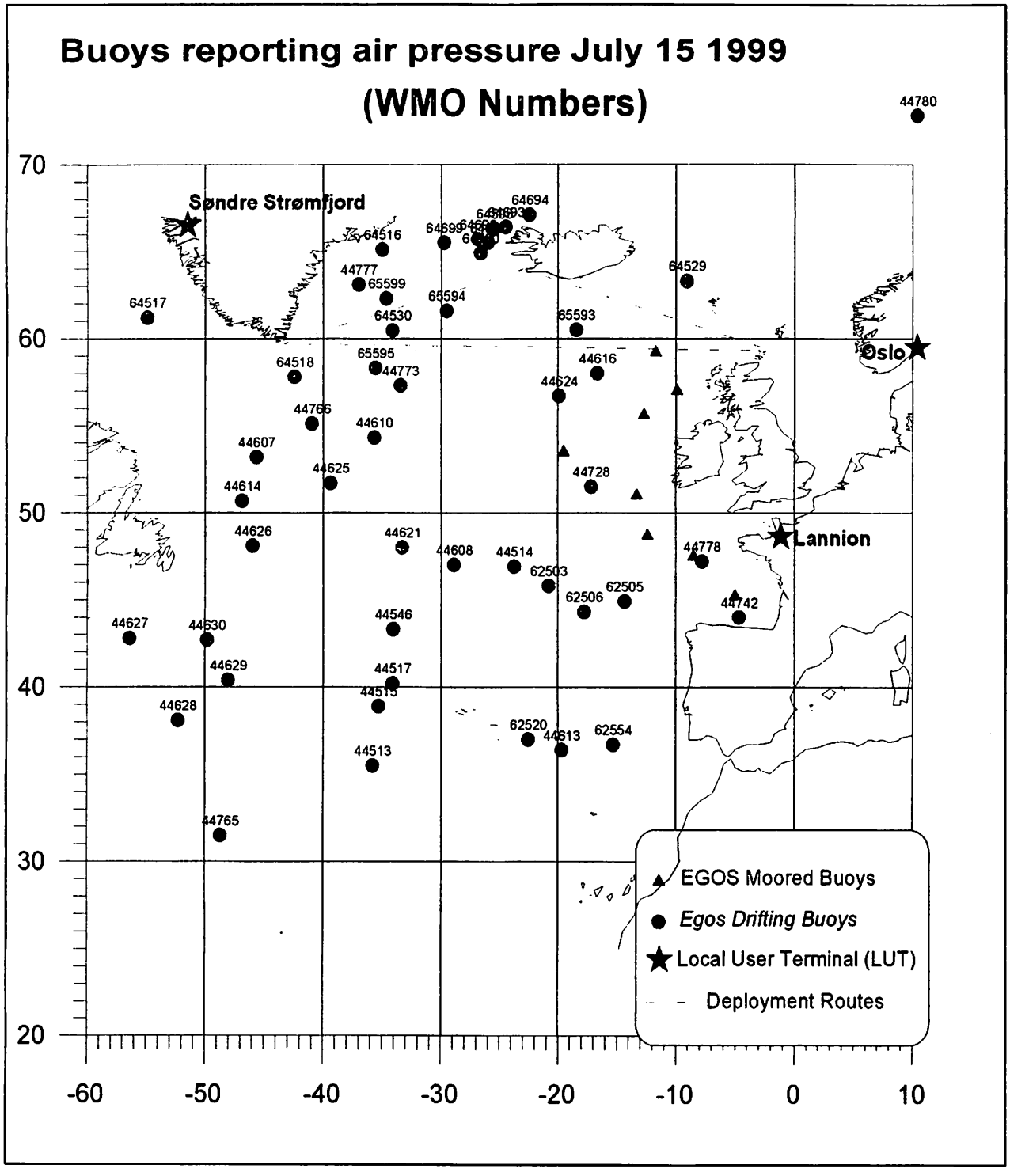


Figure. 2. Distribution of EGOS buoys at July 15, 1999

Table. 1. EGOS drifting buoys deployed July 15 1998- July15 1999

WMO	ARGOS	Owner	Buoy	DepDate	OpStatus	Cause of Fail	Deployed from	Comment
	12575	UK	SVP-B	17.08.98	-	Failed	Air Depl	Failed
44772	12577	UK	SVP-B	17.08.98	-	Ashore	Air Depl	
	12579	UK	SVP-B	17.08.98	-	Failed	Air Depl.	Failed
	12578	UK	SVP-B	17.08.98	-	Failed	Air Dep.	Failed
62514	6151	FR	SVP-B	17.08.98	-	Faded	Air Depl.	
62515	6569	FR	SVP-B	17.08.98	-	Faded	Air Depl.	
62516	1363	FR	SVP-B	17.09.98	-	Failed	France	Failed
62519	6570	FR	SVP-B	18.09.98	-	Faded	France	
62513	12731	FR	SVP-BS	18.09.98	-	Faded	France	
62520	14431	FR	MS-B	18.09.98	Operating		France	
62517	5823	FR	MS-Gi	18.09.98	-	Ashore	France	AP fail 10.12.98
62511	12729	FR	SVP-BS	19.09.98	-	Faded	France	
62512	12730	FR	SVP-BS	19.09.98	-	Faded	France	
62518	6149	FR	SVP-B	19.09.98	-	Faded	France	
62554	14430	FR	MS-B	19.09.98	Operating		France	
65599	28477	UK	MO-W	27.09.98	Operating		Iceland	
44764	28464	UK	MO	29.09.98	-	Ashore	Iceland	
	12580	UK	SVP-BW	01.10.98	-	Failed	Env.Canada	Failed
44762	12594	UK	SVP-BW	01.10.98	-	Faded	Env. Can.	
44760	28469	UK	MO	27.10.98	-	Ashore	Iceland	
44616	28468	UK	MO	18.01.99	Operating		Iceland	
44624	28470	UK	MO	18.01.99	Operating		Iceland	
44608	14540	FR	SVP-B	19.01.99	Operating		Iceland	
44607	6216	FR	SVP-B	19.01.99	Operating		Iceland	
65593	4228	NL	C/S	22.01.99	Operating		Bergen-RAL	
64518	14180	FR	SVP-B	09.02.99	Operating		Icel-IMRI	
64517	14178	FR	SVP-B	10.02.99	Operating		Icel-IMRI	
64520	14198	FR	SVP-B	10.02.99	-	Faded	Icel-IMRI	
44610	12734	FR	SVP-B	17.02.99	Operating		Iceland	
44621	12372	UK	MO	07.03.99	Operating		Air Depl.	
44614	12575	UK	SVP-B	07.03.99	-	Failed	Air Depl.	Failed
44728	12375	UK	MO	08.03.99	Operating		Air Depl	
62503	14536	FR	SVP-B	08.03.99	-	Failed	Air Depl.	Failed
44766	28465	UK	MO	08.03.99	Operating		Air Depl.	
44761	12578	UK	SVP-B	09.03.99	-	Failed	Air Depl.	Failed
44763	12579	UK	SVP-B	09.03.99	-	Failed	Air. Depl	Failed
44547	14539	FR	SVP-B	09.03.99	-	Failed	Air. Depl	Failed
44546	14538	FR	SVP-B	10.03.99	Operating		Air Depl.	
44765	28466	UK	MO	11.03.99	Operating		Air Depl.	
44516	26233	US	CMOD	11.03.99	-	Faded	Air Depl	
44517	26234	US	CMOD	11.03.99	Operating		Air Depl	
44514	26235	US	CMOD	11.03.99	Operating		Air depl.	
44515	26236	US	CMOD	11.03.99	Operating		Air Depl	
44513	26237	US	CMOD	11.03.99	Operating		Air Depl	
62675	26238	US	CMOD	11.03.99	-	Faded	Air Depl.	
64516	14176	FR	SVP-B	14.03.99	Operating		Iceland	
64519	14183	FR	SVP-B	14.03.99	-	Faded	Iceland	
65594	2295	GE	C/B-GPS	17.03.99	Operating		Bergen-RAL	
65595	4229	NL	C/S	18.03.99	Operating		Bergen-RAL	
64595	15111	IC	SVP-B	14.04.99	Operating		Iceland	
62503	1362	FR	SVP-B	02.05.99	Operating		France	
62504	3009	FR	MS-GI	02.05.99	-	Fadad	France	
62506	12733	FR	SVP-BW	02.05.99	Operating		France	
62505	5790	FR	MS-GI	03.05.99	Operating		France	
64696	15124	IC	SVP-B	07.05.99	-	Ashore	Icel-IMRI	
44777	12377	UK	MO-W	09.05.99	Operating		Iceland	
64697	15128	IC	SVP-B	09.05.99	-		Icel-IMRI	
44773	12415	UK	MO-W	10.05.99	Operating		Iceland	
64691	15032	IC	SVP-B	15.05.99	-	Failed	Icel-IMRI	
64698	29867	IC	SVP-B	10.06.99	Operating		Icel-IMRI	
64694	15108	IC	SVP-B	13.06.99	Operating		Icel-IMRI	
64699	29868	IC	SVP-B	14.06.99	Operating		Icel-IMRI	
64692	15088	IC	SVP-B	15.06.99	Operating		Icel-IMRI	
64700	29870	IC	SVP-B	16.06.99	Operating		Icel-IMRI	
64693	15100	IC	SVP-B	16.06.99	Operating		Icel-IMRI	
64530	4272	GE	C/B-GPS	04.07.99	Operating		Iceland	
44614	3037	GE	C/B-GPS	06.07.99	Operating		Iceland	
44625	12283	UK	MO	15.07.99	Operating		Air Depl	
44626	12284	UK	MO	15.07.99	Operating		Air Depl.	
44627	12285	UK	MO	15.07.99	Operating		Air Depl	
44628	12287	UK	MO	15.07.99	Operating		Air Depl.	
44629	12374	UK	MO	15.07.99	Operating		Air Depl	
44630	12376	UK	MO	15.07.99	Operating		Air Depl.	

7.3 Operational lifetime in the intersessional period

63 EGOS buoys ceased to operate in the intersessional period July 15 1998 – July 15 1999. Details are 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. Of the total 63 buoys ceased to operate, 11 failed shortly after deployment, 35 faded, 15 ran ashore, and two were picked up.

The average lifetime for the drifting buoys that ceased to operate in 1998 was 281 days. In 1997 it was 252 days, in comparison to 336 days the previous year (1996), which was the highest average since EGOS was established. For the intersessional period, the average is 234 days. Fig. 6 shows the development of annual average lifetimes for EGOS drifting buoys for the last 9 years (see Fig. 6).

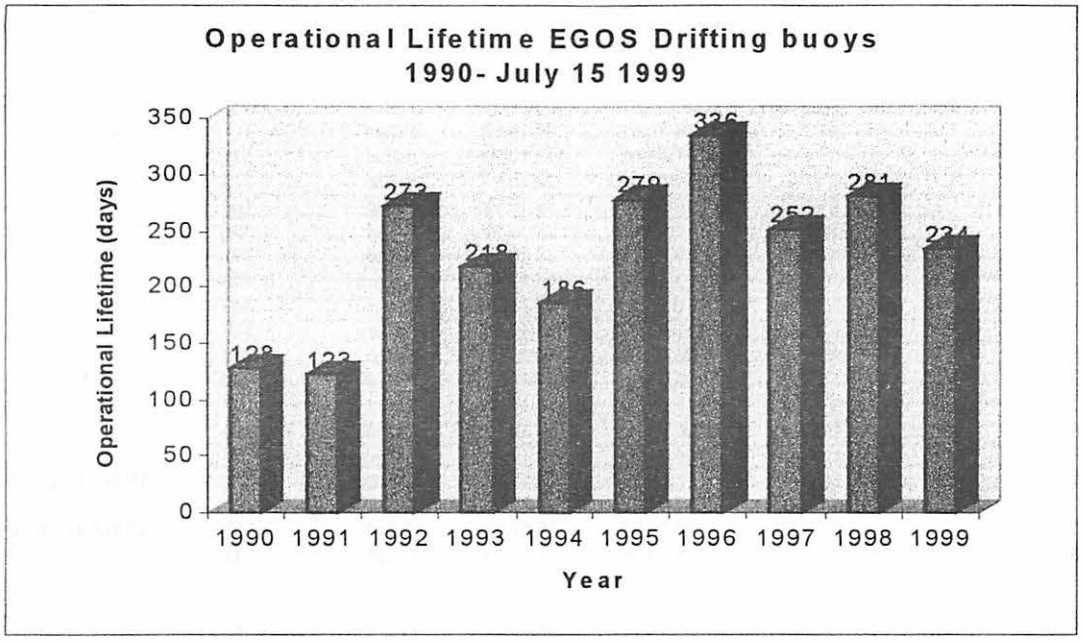


Fig. 6. Average operational lifetimes of EGOS drifting buoys, 1990-July 15 1999.

The decline in the average lifetime in 1997,1998 and 1999 is due to many of the SVP-B drifters had very short lifetime. The average lifetime for the 11 SVP-Bs that failed in 1997 was 145 days, in comparison to 303 days for the other types of buoys. In 1998 the average lifetime for the EGOS SVP-Bs was 158 days, while other types of buoys had an average lifetime of 464 days in 1998. For the intersessional period the average lifetime for the SVP-Bs was 146 days. 11 of the total of 39 SVP-Bs that were deployed in the intersessional period suffered a total early failure, giving a failure percentage of 28 %. The average lifetime for the SVP-Bs, excluding the early failures was 158 days in 1998, and 202 days for the intersessional period. For the TOGA (FGGE) style buoys the average lifetime was 378 days in the intersessional period. The average lifetime for all EGOS drifting buoys, excluding the early failures was 283 days for the intersessional period (see Table 2).

The reasons for the many failures of SVP-B drifters are subject to further investigation. The EGOS definition of buoy lifetime is the number of days the buoy has been transmitting air pressure data of usable quality on GTS. If a buoy is recovered and re-deployed, the lifetime for the two or more deployments is calculated separately (the operational lifetime for the two deployments is not added).

7.4 Data reception and dissemination

The data from the buoys in the EGOS North are received by CLS-Argos in Toulouse and by the 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 CLS-Argos in Toulouse, and the data are therefore disseminated on the GTS mainly by Météo- France in Toulouse (LFPW).

Table 2 List of all EGOS buoys that ceased to operate July 15,1998 –July 15, 1999.

WMO	ARGOS	Owner	Buoy	DepDate	Stopped	CauseofFailure	Oper Days	Comment
44616	12661	UK	SVP-B	17.10.97	31.07.98	Faded	281	
62557	27930	FR	SVP-B	12.09.97	03.08.98	Faded	322	
	12575	UK	SVP-B	17.08.98	18.08.98	Failed	1	Failed
	12579	UK	SVP-B	17.08.98	18.08.98	Failed	1	Failed
	12578	UK	SVP-B	17.08.98	18.08.98	Failed	1	Failed
44765	12662	UK	SVP-B	02.10.97	21.08.98	Faded	323	
62553	3009	FR	MS-G	11.04.97	26.08.98	Faded	501	Recovered 1.9.98
44621	26752	UK	MO-W	10.06.97	08.09.98	Ashore	453	
44609	5879	FR	SVP-BW	08.12.97	18.09.98	Faded	284	
44727	3098	UK	MO	14.04.97	28.09.98	Faded	530	
62516	1363	FR	SVP-B	17.09.98	02.10.98	Failed	15	Failed
	12580	UK	SVP-BW	01.10.98	02.10.98	Failed	1	Failed
62514	6151	FR	SVP-B	17.08.98	13.10.98	Faded	57	
44767	12576	UK	SVP-B	09.06.98	23.10.98	Faded	115	
44776	12540	UK	SVP-B	12.05.98	26.10.98	Faded	166	
62512	12730	FR	SVP-BS	19.09.98	28.10.98	Faded	39	
62518	6149	FR	SVP-B	19.09.98	28.10.98	Faded	39	
64561	1247	UK	MO	23.11.96	03.11.98	Ashore	706	
44617	26744	UK	MO	10.11.97	03.11.98	Ashore	349	
44773	26751	UK	MO-W	12.05.97	03.11.98	Ashore	537	
62506	5826	FR	MS-Gi	26.03.98	10.11.98	Faded	229	
44770	12542	UK	SVP-B	08.06.98	17.11.98	Faded	140	
44743	12541	UK	SVP-B	17.04.98	30.11.98	Faded	224	
64563	3679	NO	C/S	06.04.97	03.12.98	Faded	604	
65597	4273	NL	C/S	06.04.97	07.12.98	Ashore	608	
62517	5823	FR	MS-Gi	18.09.98	10.12.98	Ashore	72	AP fail 10.12.98
44606	6148	FR	SVP-BW	18.04.98	15.12.98	Faded	241	
44603	6571	FR	SVP-B	14.04.98	28.12.98	Faded	252	AP failure 28.12.98
44779	12543	UK	SVP-B	18.04.98	28.12.98	Faded	245	
44602	5883	FR	SVP-BW	13.04.98	07.01.99	Faded	269	
65562	3675	NO	C/S	01.02.98	08.01.99	Ashore	336	Recov
64528	4274	NL	C/S	28.05.97	08.01.99	Faded	589	
44775	26741	UK	MO	08.06.98	13.01.99	Faded	219	Redeployed Iceland 8.6.98 in N.57.4W40.
44774	28472	UK	MO	18.04.98	16.01.99	Ashore	267	
41597	6573	FR	SVP-B	31.03.98	23.01.99	Faded	298	
44604	6572	FR	SVP-B	15.04.98	13.02.99	Faded	304	
44772	12577	UK	SVP-B	17.08.98	16.02.99	Ashore	176	
65571	4275	IR	C/B-GPS	26.04.98	18.02.99	Ashore	289	
44601	5878	FR	SVP-BW	14.04.98	22.02.99	Faded	314	
44726	12539	UK	SVP-B	13.05.98	02.03.99	Ashore	293	
62511	12729	FR	SVP-BS	19.09.98	04.03.99	Faded	166	
44614	12575	UK	SVP-B	07.03.99	07.03.99	Failed	1	Failed
62503	14536	FR	SVP-B	08.03.99	07.03.99	Failed	1	Failed
44761	12578	UK	SVP-B	09.03.99	07.03.99	Failed	1	Failed
44763	12579	UK	SVP-B	09.03.99	07.03.99	Failed	1	Failed
44547	14539	FR	SVP-B	09.03.99	07.03.99	Failed	1	Failed
44760	28469	UK	MO	27.10.98	11.03.99	Ashore	125	
64520	14198	FR	SVP-B	10.02.99	29.03.99	Faded	47	
65591	26748	UK	MO	03.12.97	07.04.99	Ashore	485	
62513	12731	FR	SVP-BS	18.09.98	09.04.99	Faded	203	
44768	26746	UK	MO	18.03.97	13.04.99	Ashore	755	
65592	4270	GE	C/B-GPS	23.11.97	16.04.99	Faded	508	
44516	26233	US	CMOD	11.03.99	19.04.99	Faded	38	
62758	15516	FR	MS-GT	01.02.98	21.04.99	Recov	442	
62515	6569	FR	SVP-B	17.08.98	27.04.99	Faded	253	
65581	2294	GE	C/B-GPS	08.07.98	28.04.99	Recov	265	Recov.
62519	6570	FR	SVP-B	18.09.98	18.05.99	Faded	242	
64519	14183	FR	SVP-B	14.03.99	21.05.99	Faded	67	
64691	15032	IC	SVP-B	15.05.99	30.05.99	Failed	15	Failed
44762	12594	UK	SVP-BW	01.10.98	09.06.99	Faded	244	
62675	26238	US	CMOD	11.03.99	23.06.99	Faded	103	
62504	3009	FR	MS-GI	02.05.99	24.06.99	Faded	53	
64696	15124	IC	SVP-B	07.05.99	13.07.99	Ashore	67	

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 three LUTs, 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 respectively.

7.5 Data Quality and Data Quality Control

The data quality control for the EGOS buoys is based on the quasi-real-time control carried out at the Meteorological Office in Iceland and on the weekly and monthly statistics produced by the UK Meteorological Office, and on the quarterly reports on drifting buoys in the North Atlantic made by the UK Met Office.

Dubious or erroneous data are reported to the Technical Secretary who instructs the CLS Argos and the other LUT operators to delete the erroneous information from the GTS messages.

The data quality control information is available on the INTERNET through the mailing list, which is operated by the Icelandic Meteorological Office.

Météo- France in Brest provides regularly data quality information for the EGOS buoys. Monthly statistics are shared according to the origin of the reports on GTS. The statistics are available on http://www.shom.fr/meteo/rcchstat

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 through 1998 and the intersessional period. A variety of other Barometer types are also in use, including *AIR SB-2A, Vaisala PTB-100 Vaisala PT201A or Air DB-2A..*

8.2 GPS Navigation Receiver in Drifting Buoys

In December 1994 the first EGOS drifting buoy (Dutch C/S buoy, Argos Id. No. 3036) with a GPS receiver installed was deployed in EGOS North, as a test on equipment performance and data output. The objectives of introducing the GPS option were to improve position accuracy and to increase data reception from areas or time periods with poorer Argos satellite coverage. Also by using the buoy's own GPS position Argos positioning might become superfluous; the transmission rate could be reduced from 90 sec to 200 sec. with a consequential saving in Argos cost. The GPS also ensures that the real time clock on the buoy is updated and correct.

The test in 1994 was only partially successful, as the buoy suffered an early failure. However, it was recovered, refurbished and re-deployed in November 1996, now modified to transmit at the 200 sec repetition rate. The buoy was still in operation by the end of 1997. A new C/S (Irish, Argos Id. No 3039) with GPS was deployed in January 1997. Although the lifetime of buoy 3039 was acceptable (275 days) the reception remained poor relative to 3036 and other buoys. Buoy 3039 had a slight change in the antenna fixture (bracket) relative to 3036, and the poor reception could be attributed to this. A total of 4 GPS positioned ConMar Drifters (C/S and C/B) are now operational. The Technical Secretary presented a study of the performance of the GPS at the EGOS summer meeting in Reykjavik. It was concluded that the GPS is now nearly 100% effective. Another 3 GPS buoys were deployed in the intersessional period, ARGOS 2295 WMO 65594, ARGOS 3037 WMO 44614 and ARGOS 4272 WMO 64530 (all German). At the summer meeting in Brest, it was shown that the GPS technology is now fully implemented and operational.

8.3 New buoy types

A wider variety of buoy types has been used in the intersessional period, compared to previous years. A description of all buoy types used in EGOS is found below.

SVP-B	Surface Velocity Programme – Barometer 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	MetOcean 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, cylidrical aluminum hull with gas infated 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 precition barometer. Measrues AT, SST and AP and TZ

8.4 SVP-BW Drifters

During the winter 1996-97, Météo--France tested a Metocean SVP-BW drifter able to report wind observations. Wind speed is obtained acoustically using an hydrophone assembly suspended approximatively 10 metres below the surface unit. As for FGGE type buoys, wind direction is obtained using a fixed vane in combination with a compass located in the surface unit. No significant differences in measurements were found when compared to other buoys. Since this test, other drifters of that kind have been deployed in various areas inclusing in the tropics. Studies of the perfomance of the SVP-BW has continued in the intersessional period, and results have been presented at the EGOS meetings.

8.5 Air Deployments

The number of air deployments in EGOS has increased during 1998/1999. In 1995 no air deployments were made, in 1996 5, in 1997 none, in 1998 14, and 22 air deployments were made during the first eight months of 1999.

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.

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). The compliance of the suggested format with other buoy systems was discussed, in particular it was noted that the format had no provision for the use of GPS derived locations. . The format continues to be refined; members are encouraged to use standard formats in the EGOS area.

9. EGOS MOORED BUOYS

The United Kingdom has continued to operate a network of 6 moored buoys in the Atlantic west of the British Isles (K1-K5 and RARH). The UK also has established a moored buoy station at about N 47.3°, W 9° (the 'Brittany' buoy). In July 1998, a new station, the 'Gascoine' station in N45.23°, W005° was established in co-operation with Météo-France. All these eight buoys are part of EGOS. See Fig 2 for locations.

10. PARTICIPATION IN INTERNATIONAL MEETINGS

In the intersessional period EGOS has been represented at the following international meetings:

- CGC meeting held in Copenhagen on 26-28 August, 1998. EGOS was formally represented by Mr. Hreinn Hjartarson, Iceland.

- DBCP-XIV in Miami, on October 12. - 16. 1998. EGOS was formally represented by Mr. Wynn Jones, UKMO.

Annual report on EGOS activities were prepared and presented at both these meetings. (EGOS Technical Docs. No. 176 and 183.)

INTERNATIONAL ARCTIC BUOY PROGRAMME (IABP)
CHAIRMAN'S AND COORDINATOR'S REPORT
for the Fifteenth Session of the DATA BUOY CO-OPERATION PANEL
Wellington, New Zealand, 26 to 30 October 1999
prepared 13 August 1999

This report focuses on activities of the International Arctic Buoy Programme that have occurred since the report filed August 1998 for the 14th session of the Data Buoy Co-operation Panel.

Up-to-date listing of IABP participants, monthly maps of the IABP buoys in place and their status, buoy diagrams, IABP images and plots to browse and borrow, IABP data animations, pointers to ice charts, and more are available on the IABP web site maintained at the Polar Science Center, Applied Physics Laboratory, University of Washington: http://IABP.apl.washington.edu

INTERNATIONAL ARCTIC BUOY PROGRAMME (IABP) NINTH ANNUAL MEETING, BREMERHAVEN, GERMANY, JUNE 1999 - Members of the International Arctic Buoy Programme met 2-4 June in Bremerhaven, Germany, for the ninth annual business meeting of the program. The meeting was hosted by the Alfred Wegener Institute for Polar and Marine Research. Meeting "minutes" and participants' reports can be viewed at : http://IABP.apl.washington.edu/IABP-9/Minutes.html. The year 2000 meeting will be held in Geneva, Switzerland.

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

Chairman:	Tim Goos, Environment Canada, Canada
Vice Chairman:	Thor Kvinge, Christian Michelsen Research, Norway
Member:	Ivan Frolov, Arctic and Antarctic Research Institute, Russia
Member:	Dave Benner, U.S. National Ice Centre, U.S.A.
Coordinator:	Ignatius Rigor, Polar Science Centre, U.S.A.

BUOY ARRAY 02 JUNE 1999 AND 02 AUGUST 1999 - A total of 16 buoys were deployed since the IABP meeting of July 1998, the majority of which were deployed summer of 1998. However, 25 buoys ceased functioning during the same time period leaving 22 buoys "operational" at the time of the June 1999 IABP meeting. The map of 02 August 1999 which accompanies this report shows 23 operational buoys of which 14 provide atmospheric air pressure and atmospheric air temperature, 3 provide atmospheric air pressure only and 1 provides atmospheric air temperature only, leaving 5 buoys which are position only.

PARTICIPANTS OF THE IABP - Participants of the IABP 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. The UK Meteorological Office (UKMO), a Participant of the IABP since the IABP came to be 1991, has withdrawn from the IABP. The UKMO graciously provided an ICEX buoy for the August 1999 *"White Trident"* exercise. The UKMO's and their representative's, Anthony Bentley, contributions to the IABP will be missed.

PARTNERS AND NEW PARTICIPANTS SOUGHT - 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 grow. 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.

1999 DEPLOYMENTS TO COME - The following outlines deployments planned for later in August 1999. The proposed deployment sites have been pasted on the buoy array map of 02 August 1999.

- 2 CALIB buoys provided by Environment Canada via air drop on ice the Beaufort (blue ●) courtesy Canadian Forces late August
- 7 ICEX air buoys provided by Alfred Wegener Institute for Polar and Marine Research (AWI) (2), US National Ice Center (NIC) (2), UK Meteorological Office UKMO (1), Norwegian Meteorological Institute (NMI) (1), and Environment Canada (EC) (1) via air drop courtesy U.S. Naval Oceanographic Office C-130 "*White Trident*" exercise (red ●)

RECENT PUBLICATIONS

Reviewed Journal articles

Rigor, I., R. Colony, and S. Martin, Variations in surface air temperatures over the Arctic Ocean from 1979 to 1997, J. Climate, in press, 1999.

Jones, P.D. , M. New, D.E. Parker, S. Martin, and I.G. Rigor, Surface air temperature and its changes over the past 150 years, Rev. of Geophysics, v. 37, no. 2, pp. 173 - 199, 1999.

Thomas, D., The quality of sea ice velocity estimates, J. Geophys. Res., in press, 1999.

Zhang, J., D.A. Rothrock, and M. Steele, Recent changes in arctic sea ice: The interplay between ice dynamics and thermodynamics, J. Clim., submitted, 1998.

Buoy Reports

Rigor, I., and M. Ortmeyer, International Arctic Buoy Program (IABP) data report, 1 January 1997 - 31 December 1997, APL-UW TM 05-99, Applied Physics Laboratory, University of Washington, 1999.

Rigor, I., and M. Ortmeyer, International Arctic Buoy Program (IABP) data report, 1 January 1998 - 31 December 1998, APL-UW TM 06-99, Applied Physics Laboratory, University of Washington, 1999.

Rigor, I., and M. Ortmeyer, A Summary of Observed Sea Level Pressure, Surface Air Temperature and Ice Motion from the International Arctic Buoy Programme, APL-UW TR 9902, Applied Physics Laboratory, University of Washington, 1999.

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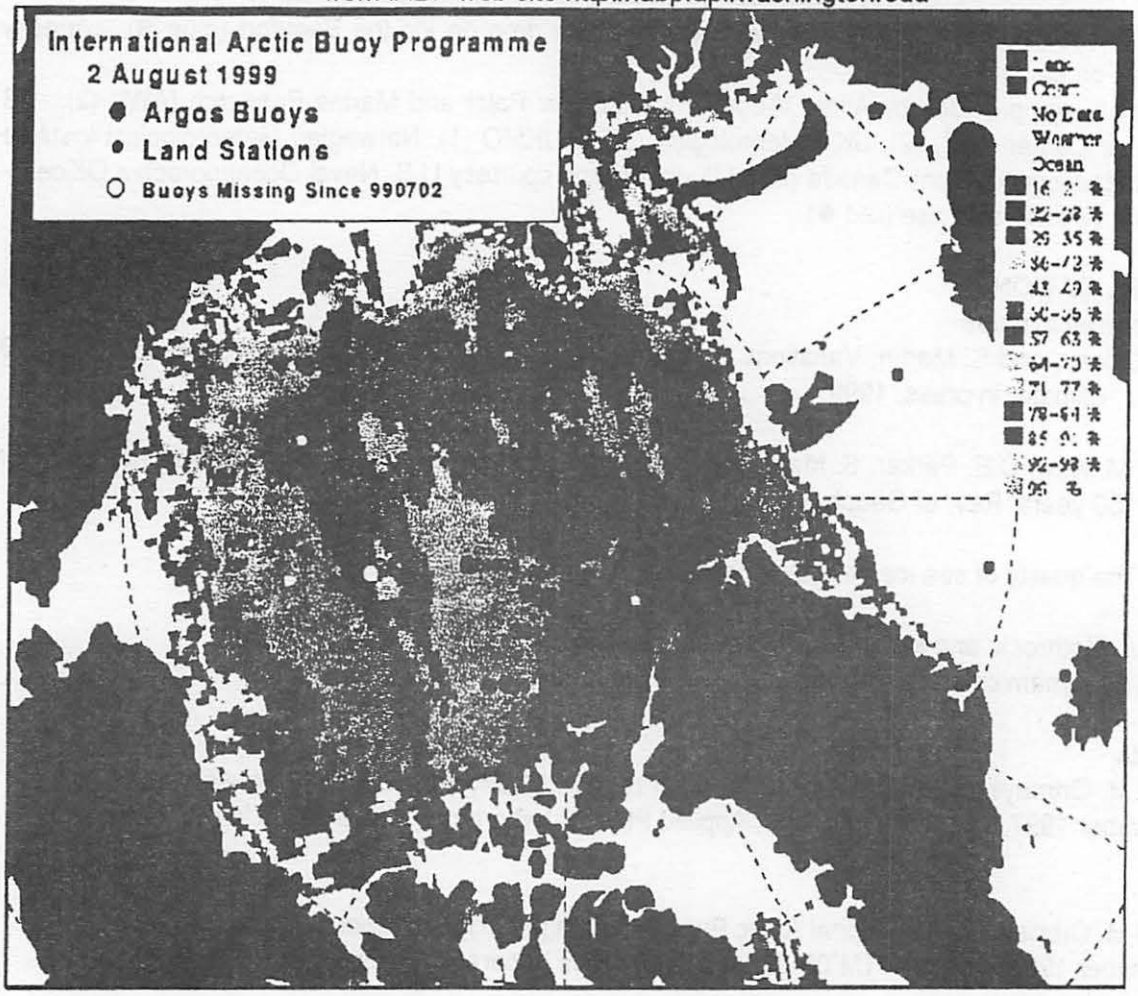
Figure 1. IABP Buoy map and table - 02 August 1999
from IABP web site http://iabp.apl.washington.edu



DATE DEPLOYED	ARGOS ID	WMO ID	YPR NUMBER	GTS HEADER	POSITION LAT	POSITION LONG	DATA BYTES	P	T	BUOY DESCRIPTION
Aug 96	1261	48102	484	SSVX01-LFPW	73.711	-170.465	17			ICEX-AIR
Apr 98	1301	48581	1053	SSVX02-CWEG	84.604	-75.753	16	Y	Y	Metocean IOSA
Aug 98	1351	48532	484	SSVX01-LFPW	81.050	-150.619	17	Y	Y	ICEX-AIR
Aug 96	1556	48111	314	SSVX01-LFPW	81.539	-114.697	16			ICEX-AIR
Aug 98	1793	48533	29	SSVX01-LFPW	78.344	-148.716	17	Y	Y	ICEX-AIR
Aug 97	1902	25522	557	SSVX12-KARS	86.533	-163.020	21	Y	Y	ICEX-AIR
Aug 98	1905	25525	557	SSVX12-KARS	75.897	157.230	21	Y	Y	ICEX-AIR
Aug 98	1906	25526	557	SSVX12-KARS	78.379	168.320	21	Y	Y	ICEX-AIR
Sep 98	2398	25557	1053	SSVX12-KARS	78.915	-161.605	32	Y		CES/Zeno Ice Buoy
Apr 98	2416	47523	1053	SSVX02-CWEG	79.798	-129.568	32		Y	ZENO-3211
Aug 98	3004	25535	1053	SSVX12-KARS	79.156	151.736	17	Y	Y	ICEX-AIR
Aug 98	3690	25011	314	SSVX01-LFPW	77.098	-145.590	17	Y	Y	ICEX-AIR
Apr 98	4954	48580	1053	SSVX02-CWEG	79.480	-129.860	32	Y	Y	ZENO-3211
Mar 99	**5313**	**47538**	**627**	**SSVX02-CWEG**	**81.900**	**-109.700**	**16**	**Y**		**EC**
Mar 99	**5314**	**48521**	**627**	**SSVX02-CWEG**	**84.100**	**-112.800**	**16**	**Y**	**Y**	**EC GPS**
Jul 99	8356	25537	282	SSVX06-KARS	83.514	140.536	12	Y	Y	AARI Air Dog
Aug 98	14955	25574	919	SSVX01-LFPW	83.370	167.598	21	Y	Y	ICEX-AIR
Aug 96	19577	47601	1053	SSVX12-KARS	72.430	-161.930	16			ICEX-AIR
Mar 96	26693	48578	1053	SSVX02-CWEG	84.718	-148.818	32	Y	Y	CES/Zeno Ice Buoy
Jul 96	26699	48573	1053	SSVX02-CWEG	85.704	-115.657	32			CES/Zeno Ice Buoy
SHEBA										
Sep 97	2417	48572	1053	SSVX02-CWEG	80.589	-151.541	32	Y		CES/Zeno Ice Buoy
Sep 97	22204		695		80.406	-163.742	32			PMEL GPS Buoy
Sep 97	26696	48576	1053	SSVX12-KARS	79.688	-163.788	32	Y	Y	CES/Zeno Ice Buoy

Ice drift and meteorological observations in the Antarctic sea ice zone: the International Programme for Antarctic Buoys (IPAB).

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The WCRP/International Programme for Antarctic Buoys (IPAB), an Action Group of DBCP, is a consortium of 18 agencies and institutions with interests in near-surface meteorology and oceanography in the Antarctic and Southern Ocean. It seeks to develop and maintain an observational network of drifter buoys and other appropriate data collection systems south of 55°S, a region within the maximum Antarctic seasonal sea-ice extent. The majority of IPAB buoy deployments are made to support specific research programs, rather than as part of operational networks, and much of this research is concerned with the movement of Antarctic sea ice. The drift and deformation of the ice, not just thermodynamic processes, determine the thickness and other characteristics of the ice cover which control air-sea interaction at high latitude. A number of specialised platforms and techniques are used by IPAB members to both suit the environment, and to provide high-resolution ice deformation data. Compilations of IPAB data have provided new insight to the pattern and variability of Antarctic sea-ice drift. Further applications of the IPAB data will be illustrated with results from a recently completed winter research cruise to the Mertz Glacier Polynya. This polynya, an area of open ocean on the Antarctic coast at 145°E, is an area of high sea ice production and export, and is believed to be an important source region for Antarctic Bottom Water.

IPAB buoys1999

IPAB No.	Argos PTT	Deployment			Buoy Type	GTS	Drogue	Deployed	P	Ta	SST	W	Other	WDC
		First date	Lat	Long										
AAD48	18654	May-98	-63.0	96.0	MetOcean Ice TOGA	73506	n	thin ice	y	y	y			
AAD49	18655	May-98	-64.3	109.6	MetOcean Ice TOGA	73507	n	new ice	y	y	y			
AAD51	18651	Mar-99	-66.5	67.1	MetOcean Ice TOGA	74531	n	amidst ice	y	y	y			
AAD52	18652	Mar-99	-66.0	79.5	MetOcean Ice TOGA	74532	n	on ice	y	y	y			
AAD53	18659	Apr-99	-64.7	109.2	MetOcean Ice TOGA	73509	n	amidst ice	y	y	y			
AWI86	8059	Jan-97	-73.7	322.3	MetOcean Ice TOGA	71541	n	on ice	y	y			Ti, GPS	
GIA08	13947	Jan-99	-72.0	135.0	tba	tba		on ice	?	?				
GIA09	13948	Jan-99	-73.0	135.0	tba	tba		on ice	?	?				
LDO01	4897	Aug-97	-62.0	316.1	MetOcean Ice Beacon	n	n	on ice	y					
LDO02	4893	Aug-97	-62.8	317.1	MetOcean Ice Beacon	n	n	on ice	y		y			
LDO03	4894	Aug-97	-63.8	319.0	MetOcean Ice Beacon	n	n	on ice	y		y			
LDO04	4895	Aug-97	-64.3	320.0	MetOcean Ice Beacon	n	n	on ice	y		y			
LDO05	4898	Aug-97	-63.3	319.9	MetOcean Ice Beacon	n	n	on ice	y					

IPAB buoys1998

IPAB No.	Argos PTT	Deployment			Buoy Type	GTS	Drogue	Deployed	P	Ta	SST	W	Other	WDC
		First date	Lat	Long										
AAD40	24668	Apr-97	-64.9	117.3	MetOcean Ice TOGA	73501	n	on ice	y	y	y			Y
AAD42	18647	Apr-97	-65.2	140.0	MetOcean Ice TOGA	73503	n	on ice	y	y	y			Y
AAD46	18646	Apr-98	-66.2	143.6	MetOcean Ice TOGA	73505	n	new ice	y	y	y			Y
AAD47	18653	May-98	-64.8	77.7	MetOcean Ice TOGA	74540	n	new ice	y	y	y			Y
AAD48	18654	May-98	-63.0	96.0	MetOcean Ice TOGA	73506	n	thin ice	y	y	y			Y
AAD49	18655	May-98	--64.3	109.6	MetOcean Ice TOGA	73507	n	new ice	y	y	y			Y
AAD50	18656	May-98	-64.0	118.4	MetOcean Ice TOGA	73508	n	new ice	y	y	y			Y
AAD51	24771	Jul-98	-65.1	145.3	AAD/Telonics	-	n	on ice						Y
AWI86	8059	Jan-97	-73.7	322.3	MetOcean Ice TOGA	71541	n	on ice	y	y			Ti, GPS	Y
AWI87	8060	Jan-97	-74.4	319.8	MetOcean Ice TOGA	71542	n	on ice	y	y			Ti, GPS	Y
AWI89	8064	Jan-97	-75.1	326.5	MetOcean Ice TOGA	71544	n	on ice	y	y			Ti, GPS	Y
AWI91	8057	Apr-98	-69.4	359.9	tba	tba	n	tba	y	y				Y
AWI92	9356	May-98	-69.7	355.2	tba	tba	n	tba	y	y				Y
GIA01	13930	May-98	?	?	MetOcean Ice TOGA	tba	tba	on ice	y	y				
GIA02	13932	May-98	?	?	MetOcean Ice TOGA	tba	tba	on ice	y	y				
GIA03	13933	May-98	?	?	tba	n	n	on ice						
GIA04	13945	May-98	?	?	tba	n	n	on ice						
GIA05	13946	May-98	?	?	tba	n	n	on ice						
GIA06	13931	May-98	?	?	tba	n	n	on ice						
GIA07	?	May-98	?	?	tba	n	n	on ice						
LDO01	4897	Aug-97	-62.0	316.1	MetOcean Ice Beacon	n	n	on ice	y					
LDO02	4893	Aug-97	-62.8	317.1	MetOcean Ice Beacon	n	n	on ice	y		y			
LDO03	4894	Aug-97	-63.8	319.0	MetOcean Ice Beacon	n	n	on ice	y		y			
LDO04	4895	Aug-97	-64.3	320.0	MetOcean Ice Beacon	n	n	on ice	y		y			
LDO05	4898	Aug-97	-63.3	319.9	MetOcean Ice Beacon	n	n	on ice	y					
LDO06	4896	Aug-97	-62.3	320.0	MetOcean Ice Beacon	n	n	on ice	y		y			

1999 activity

IPAB No.	Argos PTT	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AAD48	18654	X											
AAD49	18655	X	X	X	X	X	X						
AAD51	18651	X	X	X	X	X	X						
AAD52	18652	X	X	X	X	X	X						
AAD53	18659	X	X	X	X	X	X						
AWI86	8059	?											
GIA08	13947	X											
GIA09	13948	X											
LDO01	4897	X											
LDO02	4893	X											
LDO03	4894	X											
LDO04	4895	X											
LDO05	4898	X											
Buoys reporting													

1998 activity

IPAB No.	Argos PTT	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AAD40	24668	X	X	X	X	X	X	X	X				
AAD42	18647	X	X	X	X	X	X	X	X				
AAD46	18646				X	X							
AAD47	18653					X	X						
AAD48	18654					X	X	X	X				
AAD49	18655					X	X	X	X				
AAD50	18656					X	X	X	X				
AAD51	24771							X	X				
AWI86	8059	X	X	X	X	X	X	X	X				
AWI87	8060	X	X										
AWI89	8064	X	X	X	X								
AWI91	8057				X	X							
AWI92	9356					X	X						
GIA01	13930					X							
GIA02	13932					X							
GIA03	13933					X	?	?	?	?	?	?	?
GIA04	13945					X	?	?	?	?			
GIA05	13946					X	?	?	?	?			
GIA06	13931					X	?	?	?	?			
GIA07	?					X							
LDO01	4897	X	X	X	X	X	X	X	X	X	X	X	X
LDO02	4893	X	X	X	X	X	X	X	X	X	X	X	X
LDO03	4894	X	X	X	X	X	X	X	X	X	X	X	X
LDO04	4895	X	X	X	X	X	X	X	X	X	X	X	X
LDO05	4898	X	X	X	X	X	X	X	X	X	X	X	X
LDO06	4896	X	X										
Buoys reporting		11	11	9	11	22	17	11	16				

REPORT BY THE INTERNATIONAL BUOY PROGRAMME FOR THE INDIAN OCEAN (IBPIO)

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, co-ordination...).

2. ANNUAL MEETING

The fourth Programme Committee meeting of the IBPIO was held in Cape Town, South Africa, from the 28th to the 29th of July 1999, in conjunction with the annual meeting of the International South Atlantic Buoy Programme Programme Committee (ISABP). The meetings, hosted by the South African Weather Bureau (SAWB) at the Marine and Coastal Management conference facility, were preceded on the 26th and 27th of July by a joint ISABP/IBPIO Workshop.

In addition to the presentations of the two international buoy programmes and to the reports on individual buoy programmes by the participants, more than 15 papers were presented on various subjects. The advantages and disadvantages of different types of buoys, the evolution of the Argos system, the use of buoy data for weather forecasting and for oceanographic applications, the timeliness and availability of buoy data on the GTS and the quality control procedures and their outputs were discussed among other subjects. The proceedings of this workshop will be available within a few months.

The participants in IBPIO and ISABP meetings recognized the considerable value of such a workshop and by holding joint meetings. In the future, such joint meetings could be held alternately in both Indian Ocean and South Atlantic Ocean. The participants decided jointly to trial the proposal by holding a second joint workshop and meeting in the year 2000, possibly in Salvador de Bahia, Brazil.

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).

The participants re-appointed Mr. Graham Jones (BoM), as Chairman and Dr. Gangadhara Rao (NIO), as Vice-Chairman. Mr. Pierre Blouch (Meteo-France) and Mr. Johan van der Merwe (SAWB) were respectively re-appointed as Programme Co-ordinator and Programme Committee member. Mr. Craig Engler (GDC) was appointed as new Programme Committee member as substitute for Mr. Warren Krug. Dr. K. Premkumar was provisionally appointed to the committee, subject to a formal letter of accession to the programme by NIOT being received by the Chairman.

Dr. Alui Bahari, représentative of the Malaysian Meteorological Service (MMS), participated in the meeting as observer.

3. OPERATIONAL PROGRAMME

3.1 Drifting buoys

More than 120 drifting buoys have been deployed from July 1998 to June 1999. Most of them have been lagrangian drifters. However, 40% of them have been measuring air pressure. Also, of the 18 SVP-B drifters deployed by air in November 1998, only 5 survived. As a consequence, the number of buoys carrying out air pressure measurements is actually decreasing in the Indian Ocean, although the overall number of drifting buoys remains stable (fig. 1).

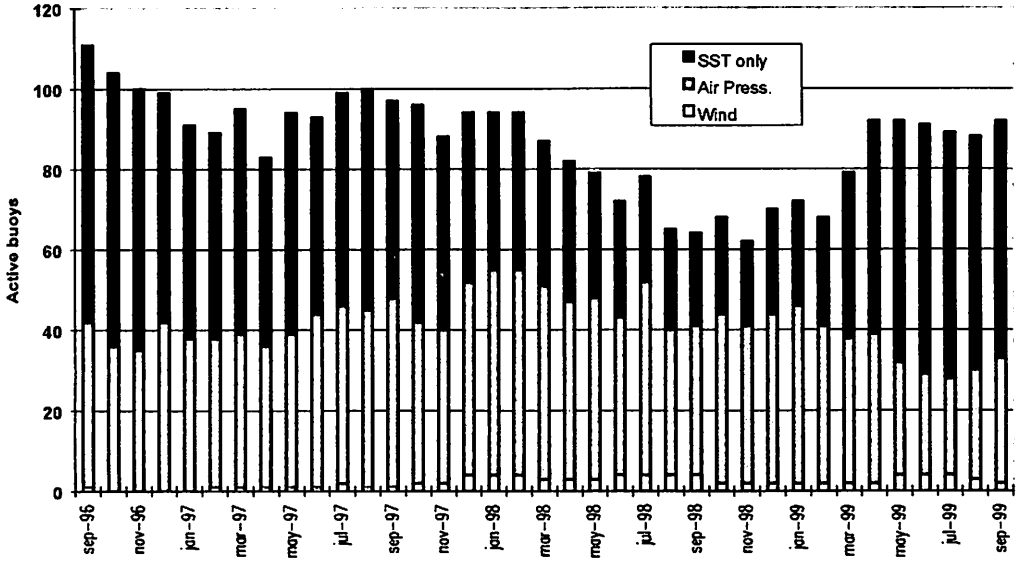


Figure 1. Number of drifting buoys operating in IBPIO according to the parameters they measure

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.

Owner	SST only	Air Pressure	Wind
Australian Bureau of Meteorology	1	2	2
Global Drifter Center	55	16	-
Météo-France	-	1	-
National Institute of Oceanography	1	5	-
Navoceano	2	2	-

South African Weather Bureau	-	5	-
Total	**59**	**31**	**2**

Table 1. Operating drifting buoys by the end of September 1999

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.

3.2 Moored buoys

The National Institute of Ocean Technology (NIOT), India, operates a network of moored buoys in Indian waters. Unfortunately, these buoys which provide many meteorological and oceanographic parameters are subject to vandalism. The surface meteorological parameters should be sent on the GTS by the end of 1999 through the Indian Meteorological Department.

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) for October 2000.

3.3 Data recovery

Studies on data availability and data timeliness showed that many reports from buoys are missing on the GTS, or arrive with longer delays than expected. This is mainly obvious for SVP-B drifters having the SVPB2 format.

The local reception station of La Reunion (Argos LUT) has been operational since September 1998. The mean delay of data reception on the GTS has been reduced from about one hour for the buoys drifting in the surroundings.

3. PLANS

The lack of buoys in the tropical region, between 10°S and 20°S, is less acute than in the past, however, there remain serious gaps in other regions, mainly in those located to the south of 40°S. IBPIO participants are encouraged to increase their contributions of buoys, or to fund barometers to equip SVP drifters, especially as the GDC has announced that henceforth they will purchase SVP drifters only (i.e. without barometers). Meteorological services are invited to fund the upgrade of SVP drifters to barometer drifters, which could be then deployed in the area of their convenience. For the fourth consecutive year, Meteo-France has been funding 10 barometers for the Indian Ocean. Other services, such as ABoM and SAWB, expressed their intention to follow on.

4. TECHNICAL ISSUES

The IBPIO Programme Co-ordinator monitors and reports on buoy technology and communications. The ISABP/IBPIO annual workshop is a good forum for participants to exchange technical information about data formats, SVP-B and SVP-BW drifter evaluations, techniques to measure wind on drifting buoys, and data quality controls etc, especially for those who don't necessarily attend the DBCP workshop in October.

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.

The distribution of the promotional leaflet on the IBPIO was delayed. It should be soon available.

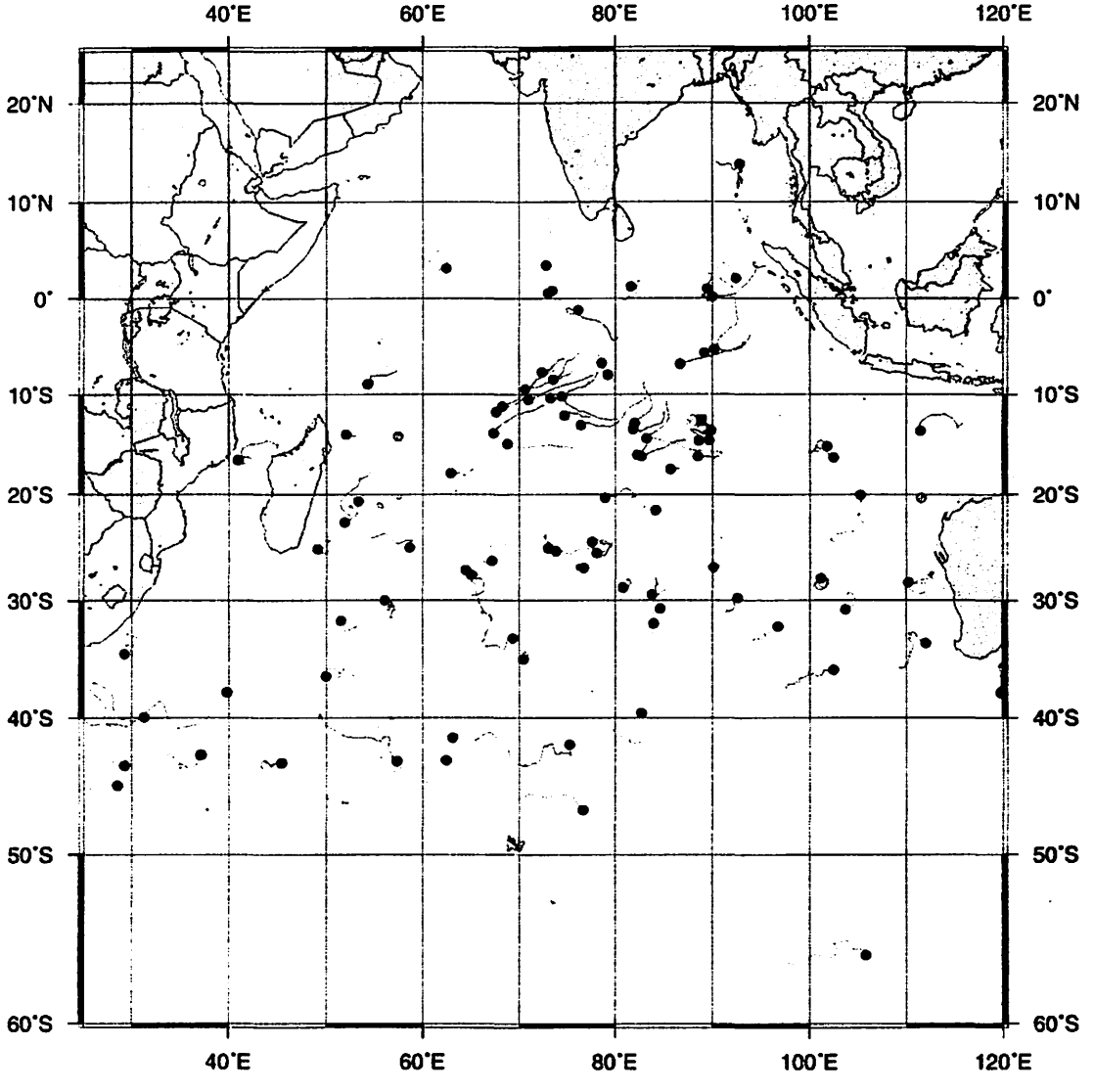


Figure 2. Buoys drifting in the Indian Ocean - September 1999

REPORT BY THE INTERNATIONAL SOUTH ATLANTIC BUOY PROGRAMME (ISABP)

INTRODUCTION

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

ANNUAL MEETING

A joint Sixth ISABP and Fourth IBPIO was held in Cape Town, South Africa, from the 26th to the 29th July 1999. The meeting was hosted by the South African Weather Bureau. It was the first joint meeting and it was successful, productive and very enjoyable. The meeting lasted four days. The first two days were devoted to workshops and the rest of the time in the meeting. Participants were also taken on a tour of Council for Scientific Industrial Research (CSIR) in Stellenbosch and on a sight seeing tour around the Cape Peninsula.

The participants elected Alaor Moacyr Dall' Antonia Jr, Brazil, as chairman and Manuel Picasso, Argentina, as vice-chairman. Louis Vermaak, South Africa, was re-appointed as Programme Co-ordinator. At the end of the meeting it was decided to have another joint meeting in Brazil next year.

OPERATIONAL PROGRAMME

3.1 Data coverage in the ISABP area

The inter-sessional period has again been a good year as far as the ISABP is concerned. Data coverage in the South Atlantic south of 40S is good and the array is mainly SVPB type drifters. Further deployments are planned for September and December 1999 in this area. The drifters deployed in this area are mainly a mixture of SAWB and AOML drifters.

In the mid-Atlantic south of 10S deployments are still needed in this area to increase the array. South of 20S mainly SVPB type drifters are deployed and north of 20S SVP type. South of 20S the drifters deployed are a mixture of SAWB and AOML drifters, while north of 20S AOML and BRAZIL deployed drifters.

In the Tropical Atlantic south of 20N the drifters are mainly SVP type but the array in the Caribbean is a mixture of SVP and SVPB drifters. The array has increased dramatically in this area and deployments are mainly from AOML.

3.2 Buoy deployments

In the ISABP area AOML deployed a total of 161 drifters during this inter-session period of which 114 is the SVP type and 47 SVPB using ships of opportunity and some deployments by air. SAWB deployed 21 SVPB type drifters using the SA Agulhas with 5 drifters being air-deployed off the east coast of South America. PNBOIA deployed 8 SVPB drifters and 14 SVP in the mid-Atlantic using the Brazilian Navy, while PIRATA program moored 12 Atlas buoys in the Tropical Atlantic. Our thanks to Navoceano who did all the air-deployments.

Drifters deployed in the South-Atlantic were mainly deployed to maintain the array. A number of drifters started to fail during the inter-session period, which can be expected since they were in operation between 600 and 800 days. One SVPB type drifter that was deployed off the south-west coast of South Africa drifted into the Indian and Pacific ocean and is near the Drake passage still transmitting occasionally after 888 days. Some deployment failures in the South-Atlantic also occurred, especially those that was air-deployed off the east coast of South-America.

3.3 Data recovery

The data are recovered through the Argos system and sent on the GTS through the processing centres of Toulouse and Landover. The Argos Local User Terminal (LUT) is operated by the SAWB and the data is reported to CLS/Argos in Toulouse.

The SAWB is also operating LUT's on Gough and Marion Islands and they plan to send this data to Argos for processing. The UKMO is also operating a LUT on the Falkland Island. The data is send to Bracknell and distributed on the GTS.

4. INFORMATION ON THE ISABP

Besides the monthly newsletter, 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.

The ISABP brochure is available in English, Spanish and Portugese.

5. CONCERNS

All participants endure budget cuts from time to time and remain concerned by the very high Argos processing costs. This is having a negative effect on our programme. We foresee that this negative effect will get worse unless savings are brought about. We feel strongly that the DBCP should during this session look into ways and means of reducing user costs.

Louis Vermaak
ISABP Programme Co-ordinator.

The Global Drifter Programme (GDP)
October 1999 - Wellington, New Zealand

Since last years meeting in Marathon, Florida the Global Drifter Program (GDP) has been busier than usual with the merging of the Global Drifter Center (GDC) into NOAA's Global Ocean Observing System (GOOS) Center within the Physical Oceanography Division located at the Atlantic Oceanographic & Meteorological Laboratory (AOML) and the departure of some senior personnel. However, the GDP has continued to cooperate with many national and international programs and institutions during this time and has continued see the global Drifter network increase from about 650 last October to 820 at the end of September 1999. Almost 20% growth in one year.

The GDP continues to deploy about 40 buoys per month with 18 going into the tropical Pacific, 4 into the tropical Indian, 7 into the southern oceans, and 12 into the tropical Atlantic.

Participating international members of the GDP are presently Australia, Brazil, France, Iceland, India, Korea, South Africa, United Kingdom as well as our own national efforts within the U.S. Navy, National Science Foundation, National Weather Service, and Oregon State University, U. of Maine, U. of Miami and Woods Hole Oceanographic Institute.

We are finishing up our Year Of The Ocean (YOTO) Deployments, increased our cooperation with South Africa, India, France, Brazil as well as our own U.S. Navy and private industry. We have finalized a Memorandum of Understanding with France and in the process of finalizing another with Fugro GEOS Inc., that will allow the GDP to make more efficient use of its resources.

Plans are to continue to work closely with our international colleagues to increase communication thereby improving the efficiency and effectiveness all buoy deployments as well their tracking and insertion onto the Global Telecommunication System. We expect to continue our cooperation with the National Weather Service, Meteo France and Navy to deploy SVPW Buoys into the most active hurricane development areas in the tropical Atlantic.

We are in the process of improving our Operational (i.e. metadata data) Data Base by merging it with a more efficient Data Base Management system. The diligent data processing personnel within the Data Assembly Center (DAC) have improved the processing of our Delayed Mode Data processing so that it is only two months behind our Real-Time Data processing.

We still encourage the use of Standard data formats for all new deployments which reduce the problems of having to write new de-coders for just a few buoys. The GDC presently doesn't have the resources to devote to this type of processing.

As buoys evolve (depart from the original area of interest) from other nations or organizations programs and are then absorbed into the GDC tracking responsibilities it is most important that we know the individual specifications for those buoys and, as such, encourage the flow of this information in a timely manner.

New or renewed cooperative agreements in 1999 are:

-YOTO deployments (20 more) will completed by the end of 1999.
-U.S. Navy air deployment re-certification for Technocean and Clearwater
-About 30 upgrades from SVP to SVPB between South Africa, Australia and France.
-University of Maine for 20 deployments in the east China Sea.

1999 Accomplishments

(As of September 1999)

- Merging of the GDC into the NOAA/GOOS Center

- 820 Drifters in the water

- Up from 650 last October - 20 % Growth

- Average 40 deployments per month
  - 18 into the tropical Pacific
  - 12 into the tropical Atlantic
  - 7 into the southern oceans
  - 4 into the tropical Indian

- YOTO deployments completed by November

- Approximately 30 upgrades from SVP to SVPB
  - Australia
  - France
  - South Africa

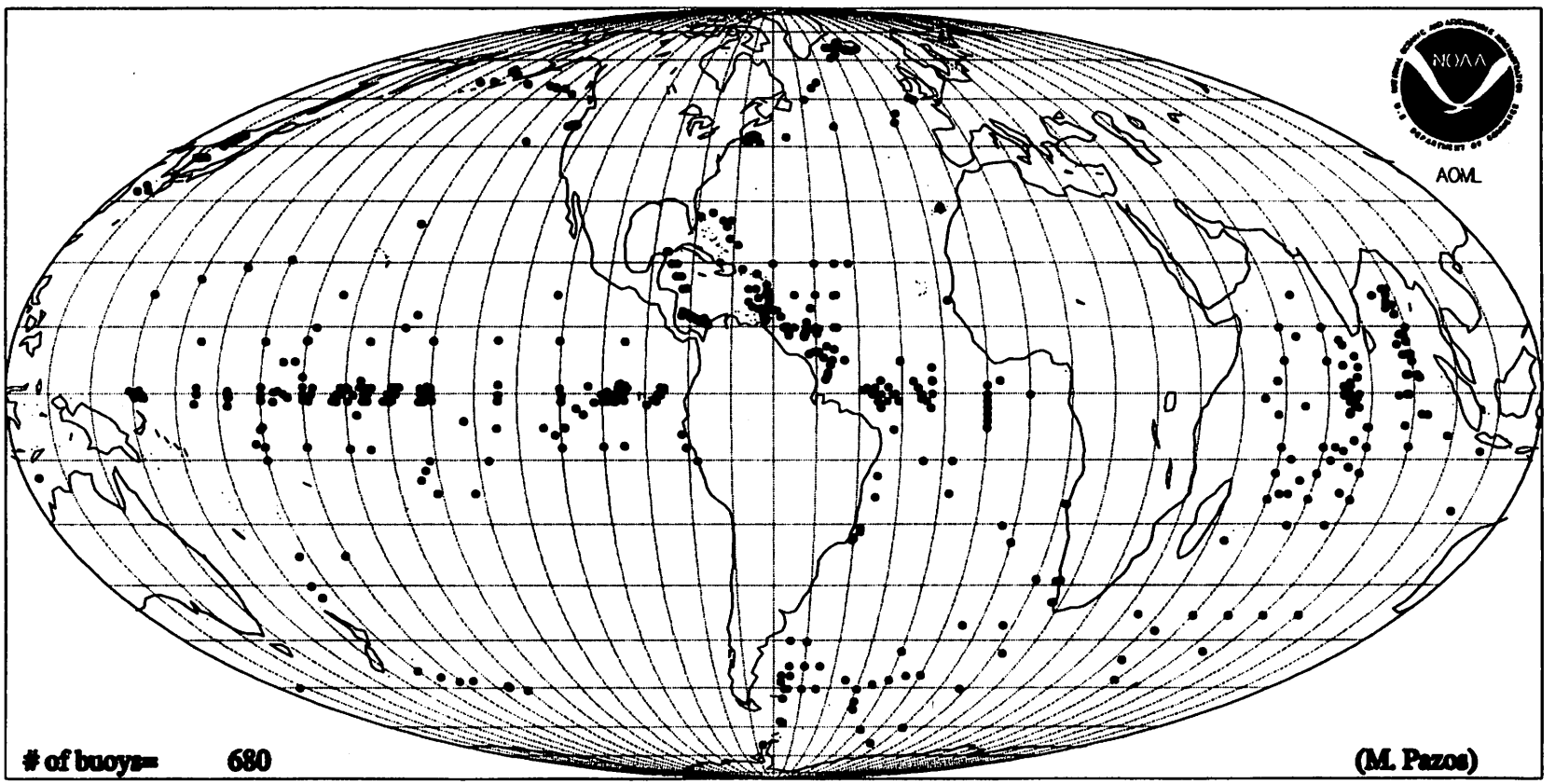
- Data Assembly Center update time lag reduced to about 60 days

- Finalized Memorandum of Understanding with France

- Successful deployment of 10 SVPB Drifters for the HRC.

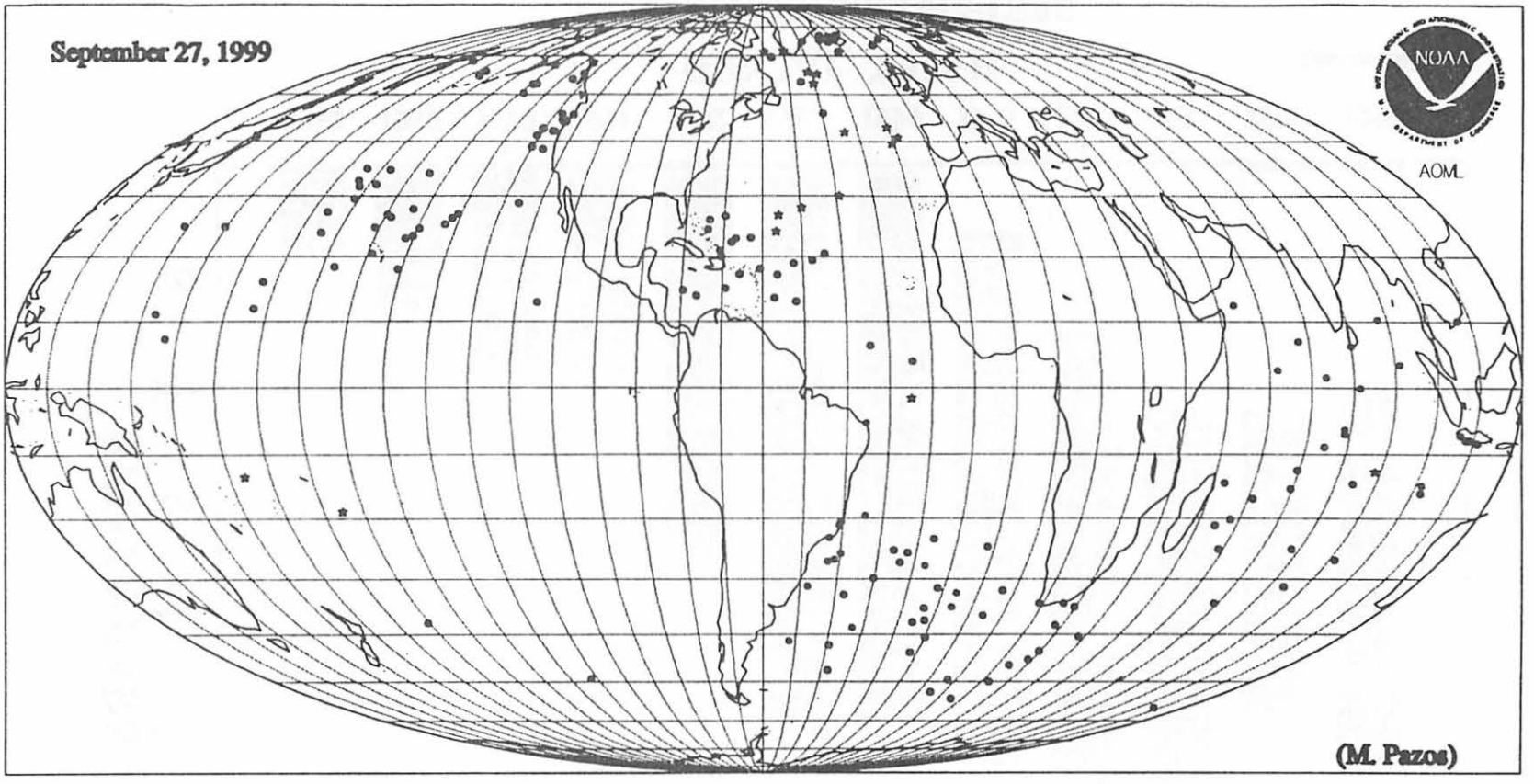
- Continued cooperation with Meteo France, U.S. Navy & NWS

GDP DEPLOYMENTS FY99



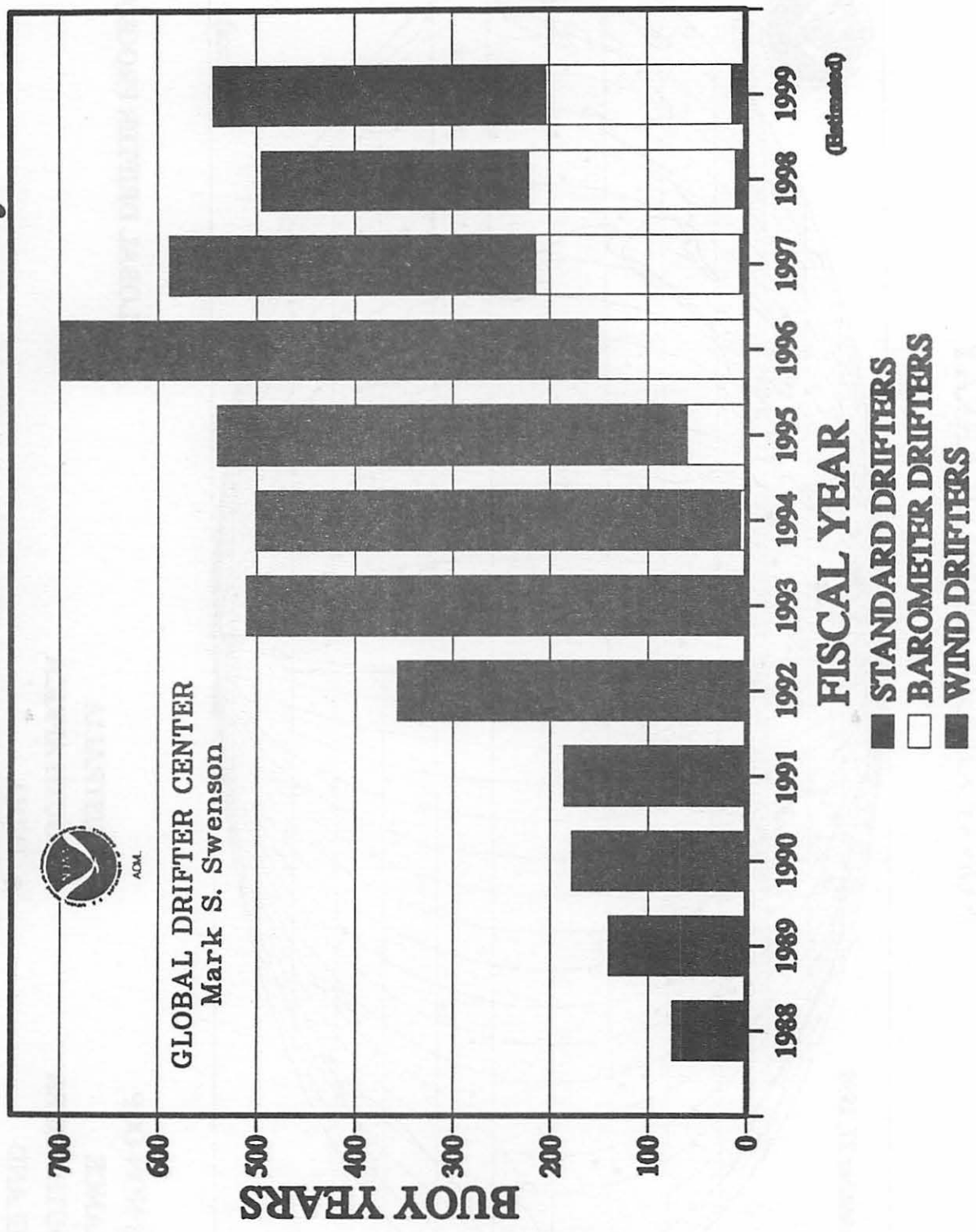
- OGP
- OTHERS

NON GOOS/GDC DRIFTER ARRAY

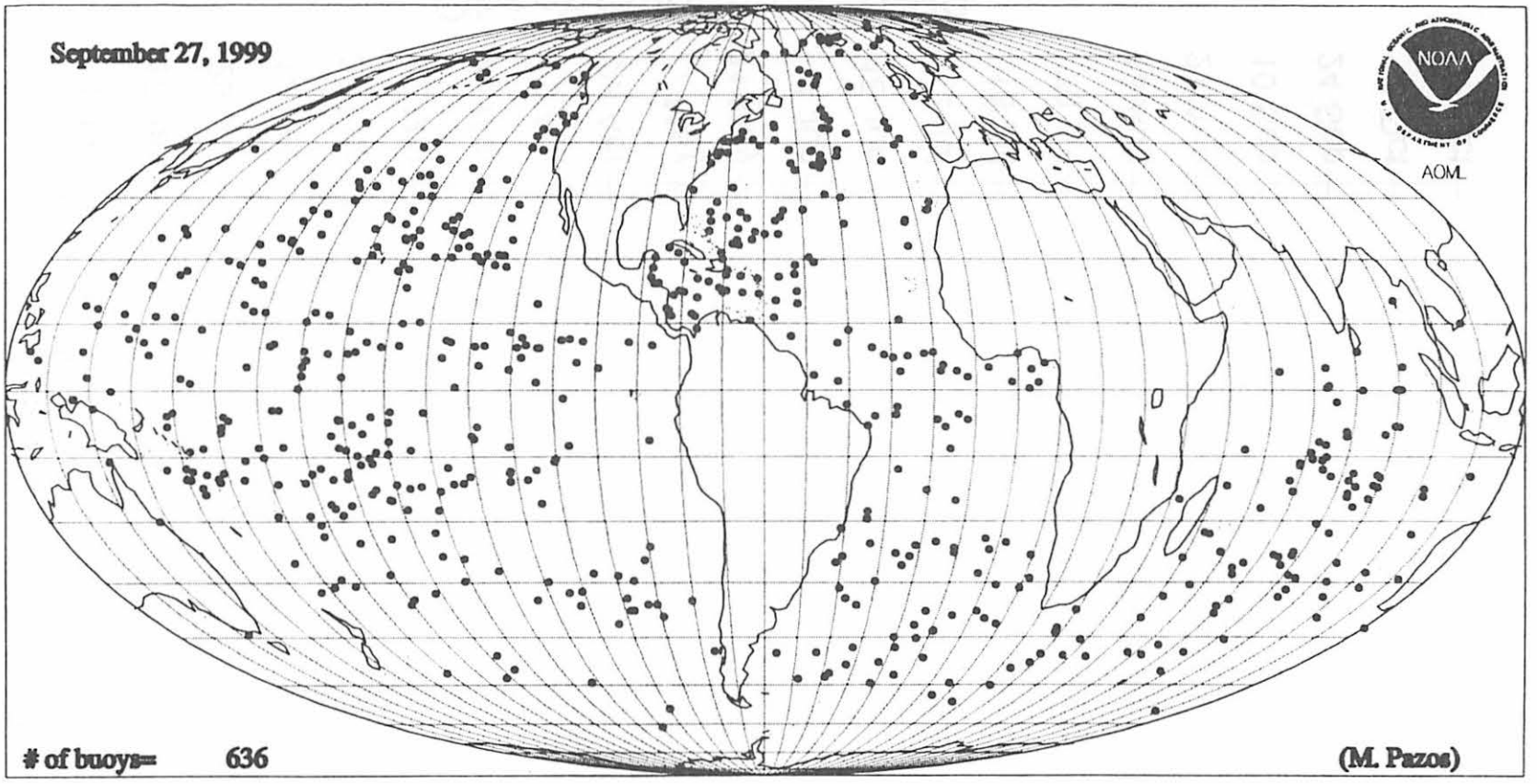


- U.S NON-OGP
- ★ FRANCE
- SOUTH KOREA
- ICELAND
- UNITED KINGDOM
- AUSTRALIA
- SOUTH AFRICA
- INDIA
- BRAZIL

GLOBAL DRIFTER PROGRAM

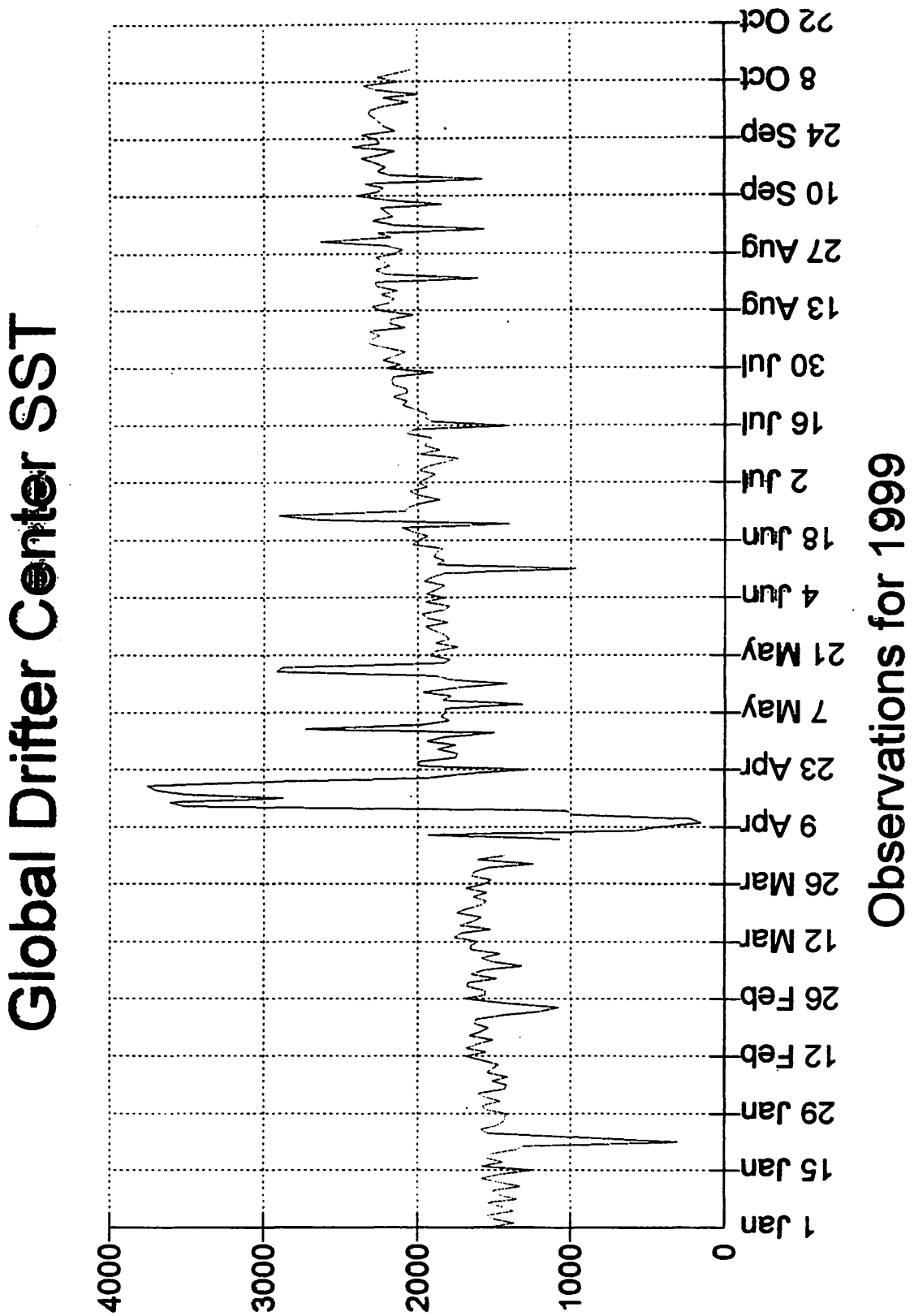

Evolution of Global Drifter Array
GLOBAL DRIFTER CENTER
Mark S. Swenson
AOML
BUOY YEARS
0
100
200
300
400
500
600
700
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
FISCAL YEAR
(Estimated)
STANDARD DRIFTERS
BAROMETER DRIFTERS
WIND DRIFTERS

SST ON GTS

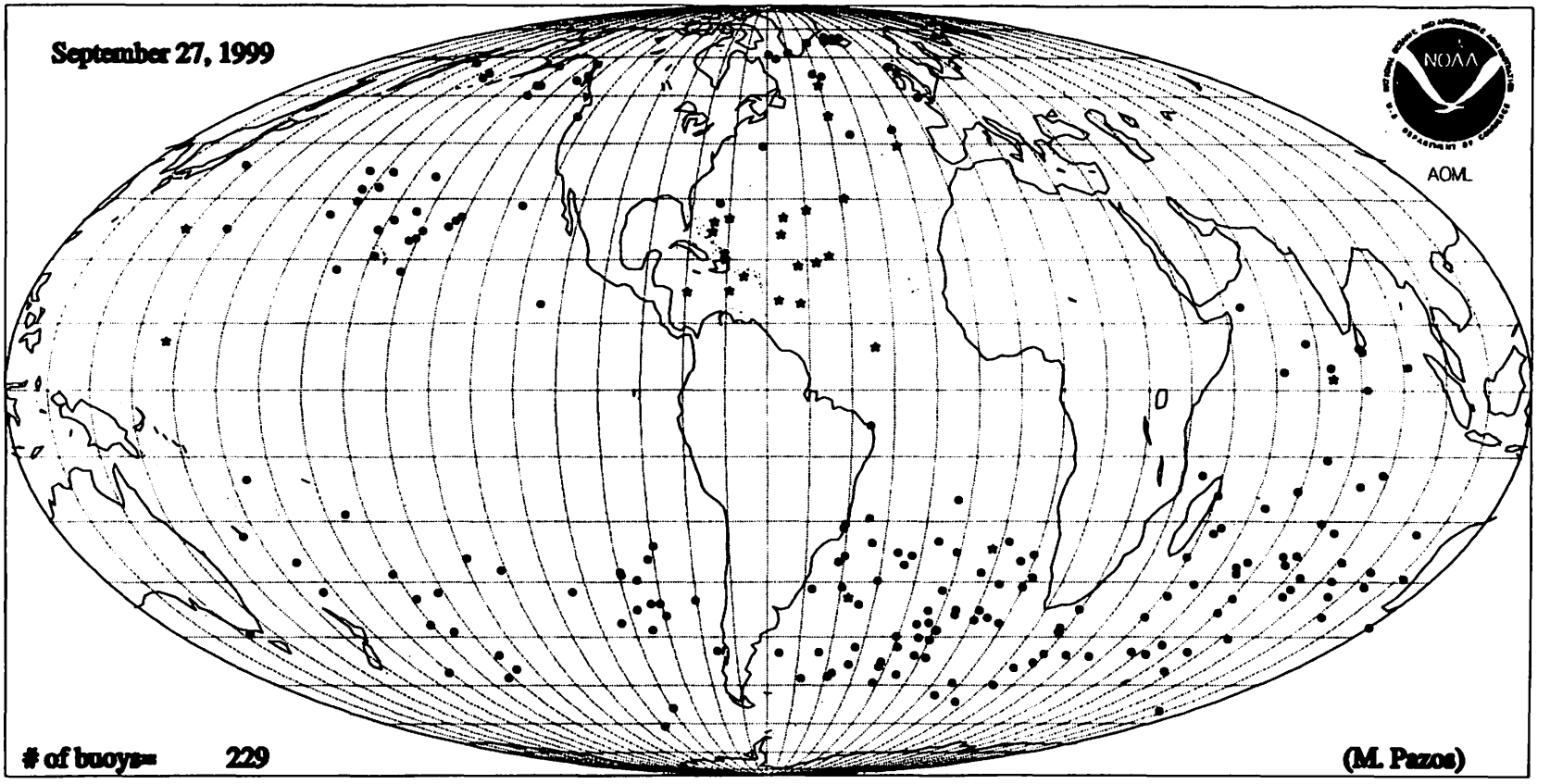


- GOOS/GDC
- OTHERS

GLOBAL DRIFTER PROGRAM
Mark Swenson


Global Drifter Center SST
Observations for 1999
4000
3000
2000
1000
0
1 Jan
15 Jan
29 Jan
12 Feb
26 Feb
12 Mar
26 Mar
9 Apr
23 Apr
7 May
21 May
4 Jun
18 Jun
2 Jul
16 Jul
30 Jul
13 Aug
27 Aug
10 Sep
24 Sep
8 Oct
22 Oct

GDP METEOROLOGICAL DRIFTERS

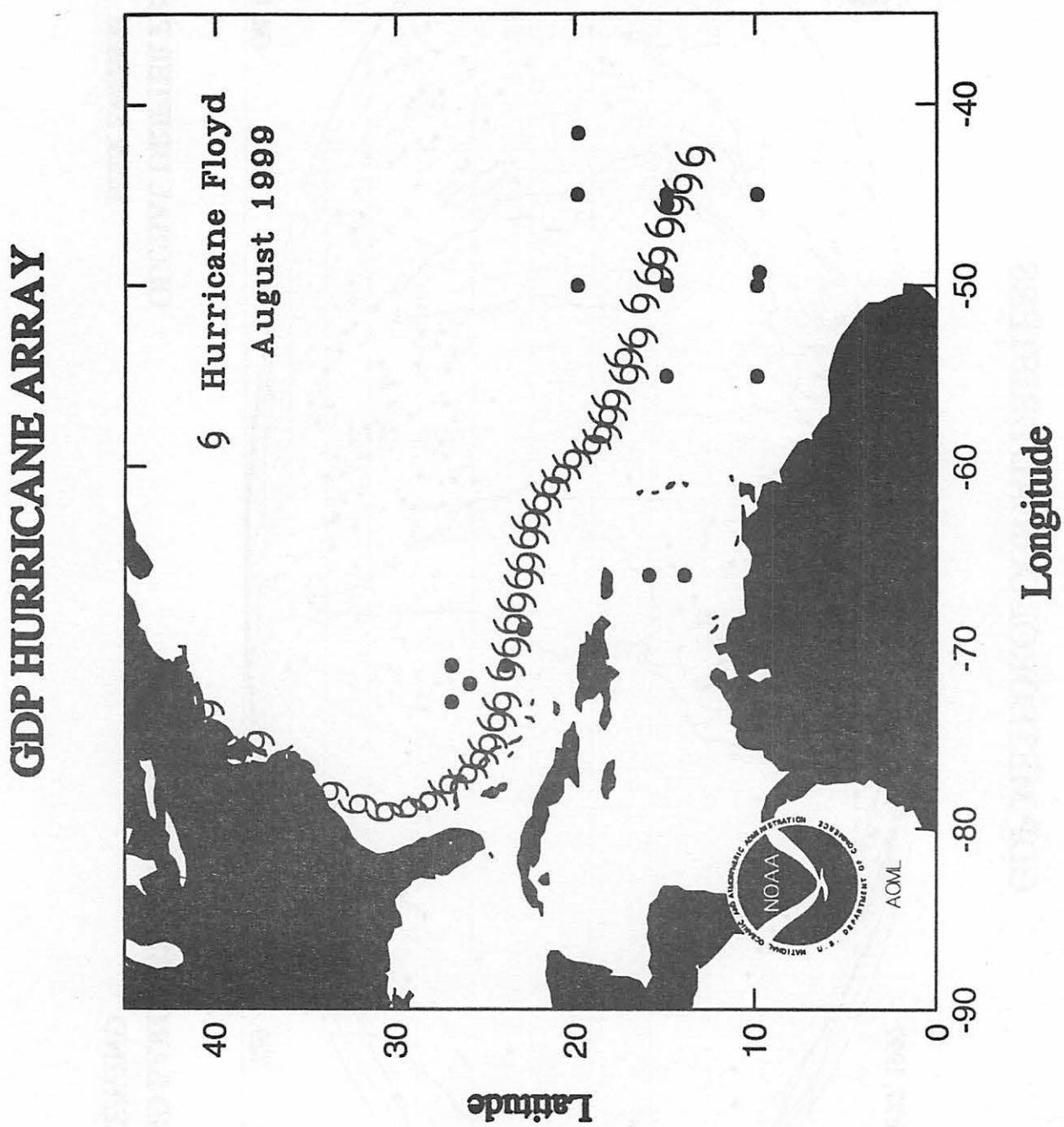


● SST AND BAROMETRIC PRESSURE

★ SST/SLP/WIND

GLOBAL DRIFTER PROGRAM

Mark Swenson


GDP HURRICANE ARRAY
6 Hurricane Floyd
August 1999
Latitude
Longitude
40
30
20
10
0
-90
-80
-70
-60
-50
-40
NOAA
AOML

Global Drifter Program Recommendations

The international cooperative atmosphere within the Drifter community encourages the most efficient use of all resources. As such, as the Global Drifter Program increases in both size and number of participants the following recommendations are encouraged.

We support the use of the Standard Data Formats that can be found on the following Web Site:

http://dbcp.nos.noaa.gov/dbcp/1ramf.html

We encourage the timely submission of Drifter Specification Sheets to the GOOS/GDP prior to deployment to ensure the most efficient use of resources in tracking Drifter data. This information is always available from the Drifter manufacturers.

We encourage the timely submission of Drifter Deployment Reports to the GOOS/GDP to ensure the most cost effective use of tracking resources. An example of which can be found at the following Web Site:

http://www.aoml.noaa.gov/phod/dac/dep_form.html

NOAA's Global Ocean Observing System (GOOS) Center

- Created to maximize the quality and quantity of real-time oceanographic and meteorological data, track the flow of that data on the Global Telecommunications System, identify and correct data drop out problems and make more efficient use of the Voluntary Observing Ship (VOS) Program.

- The GOOS Center presently consists of the following operational programs:

  -Global Drifter Center
  - VOS - SEAS XBT/Met. Program
  - VOS - Thermosalinograph effort

- Pertinent Web Sites:

  GDC: http://www.aoml.noaa.gov/phod/dac/

  GOOS: http://www.aoml.noaa.gov/phod/goos/

  GOOS Data Plots: http://www.dbcp.nos.noaa.gov/seas/goosplots.html

  SEAS: http://www.dbcp.nos.noaa.gov/seas/

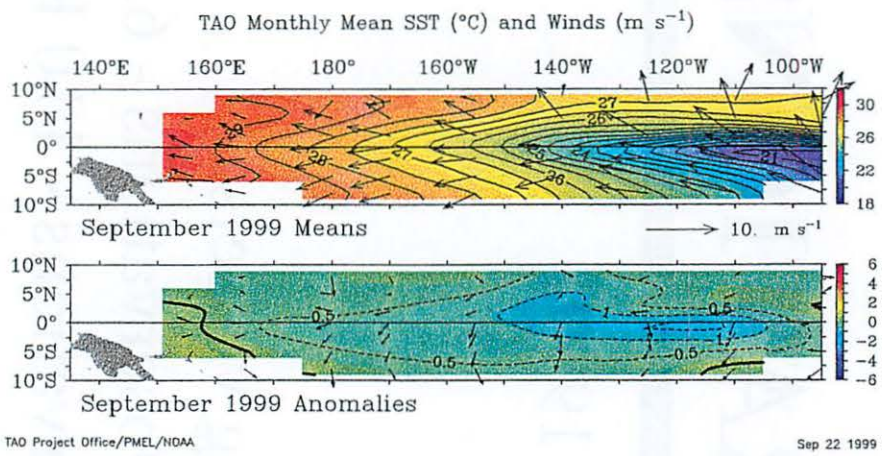
GOOS OPERATIONS

(OCTOBER 1999)

- Over 450 participating vessels.
- Drifting Buoy SST Observations - 630 K/Yr.
- Meteorological Observations - 110 K/Yr.
- Bathythermograph Observations - 15 K/Yr.
- Thermosalinograph - 16 Vessels - 30 K/Yr.

TAO Implementation Panel Report

The Tropical Ocean Atmosphere (TAO) Array, supported by the U.S., Japan, France, and Taiwan, presently consists of moorings at 64 sites in the tropical Pacific. At all sites, surface moorings measure surface winds, air temperature, relative humidity, sea surface temperature, and subsurface temperatures. Daily mean data from these sites are telemetered in near real-time via Service Argos and are displayed and delivered on the Internet from the TAO web page at http://www.pmel.noaa.gov/toga-tao/home.html . These daily means, plus 2 to 3 hourly surface meteorological observations per day are also placed on the GTS by Service Argos. Near surface (upper 200–300 m) ocean currents are measured at 5 equatorial sites (147°E, 165°E, 170°W, 140°W and 110°W) from subsurface moorings, the data from which are displayed and delivered from the TAO web page in delayed mode.



TAO is in the second year of a 4-year plan to modernize and enhance ATLAS mooring hardware, electronics, and sensors, by replacing standard ATLAS moorings with Next Generation (NX) ATLAS moorings. NX ATLAS moorings are modular in design, giving the option to add enhanced sensors such as shortwave and longwave radiation, rainfall, barometric pressure, conductivity and/or current meters. NX instrumentation also offers an increase in temporal resolution for delayed mode data, with surface observations increasing from hourly to 10-min values and subsurface data from daily means to 10-min values. At present, 22 sites have been converted to the new systems.

TAO has continued to collaborate with other research projects:

- In PIRATA (Pilot Research Moored Array in the Tropical Atlantic, http://www.ifremer.fr/orstom/pirata/pirataus.html), NX ATLAS moorings have been deployed at 10 sites in the tropical Atlantic. The array, which is supported by the U.S., France, and Brazil, will be increased to12 moorings in 2000.

- Three moorings will be added to the TAO array along 95°W in fall 1999, and all moorings along that longitude will have enhanced instrumentation as part of EPIC (Eastern Pacific Investigation of Climate Processes in the Coupled Ocean-Atmosphere System, http://www.atmos.washington.edu/gcg/EPIC/EPIC_rev.pdf).

- Three NX moorings are deployed in the South China Sea in collaboration with National Taiwan University.

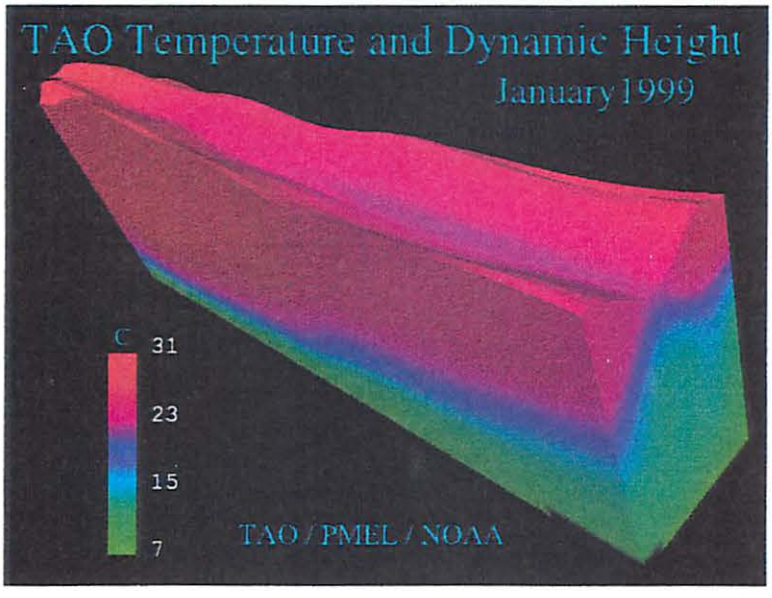
- TAO is also a participant in NOPP (National Ocean Partnership Program, http://core.cast.msstate.edu/NOPPpg1.html), in which moorings will be deployed in the Pacific subtropical gyre and Gulf of Alaska.

Other TAO collaborations include NASA/TRMM (Tropical Rainfall Measuring Mission, http://trmm.gsfc.nasa.gov:80/), DOE/ARM (Atmospheric Radiation Measurement, http://www.arm.gov/), and EqPROBES (Equatorial Pacific Real-Time Oceanic Biogeochemical and Environmental Sensors, http://www.pmel.noaa.gov/co2/co2-home.html).

TRITON (Triangle Trans-Ocean buoy network, http://www.jamstec.go.jp/jamstec/TRITON/) moorings have been deployed by JAMSTEC (Japan Marine Science and Technology Center) in tandem with TAO moorings along 156°E and westward since February 1999. The TAO moorings will be removed in fall 1999, after which JAMSTEC will solely maintain these sites. Intercomparisons are being made between TAO and TRITON data to insure a seamless transition. Data will be shared, displayed and disseminated by both institutions.

TAO data return remains good, with an overall value for real-time data availability of 85%. Damage to moorings and sensors continues to be of concern, which accounts for a significant amount of data loss, especially in the far eastern and far western portions of the Pacific basin, presumably due to a higher density of fishing activity.

TAO data displays have been enhanced to provide more selectable options, so that users may tailor displays to their needs. In addition, emerging technologies are being utilized to access and visualize TAO data. A selection of visualizations of TAO temperatures are rendered and animated, in 3D, with other parameters, such as wind vectors, 20° isotherm surface, and dynamic height. These are available on the Web at http://www.pmel.noaa.gov/toga-tao/vis .



ANNEX III

REPORTS FROM DATA MANAGEMENT CENTRES

The following pages contain the reports by the:

RESPONSIBLE
NATIONAL
OCEANOGRAPHIC
DATA
CENTRE

for Drifting Buoys

Marine Environmental Data Service Report

15th Session of the Data Buoy Co-operation Panel

Wellington, New Zealand

October 1999

REPORT OF THE WMO/IOC RESPONSIBLE NATIONAL OCEANOGRAPHIC CENTRE FOR DRIFTING BUOYS

Introduction

The Marine Environmental Data Service (MEDS) in Canada became a Responsible National Oceanographic Data Centre (RNODC) for Drifting Buoy Data on behalf of the Intergovernmental Oceanographic Commission (IOC) and the World Meteorological Organization (WMO) in January 1986. The purpose of this report is to describe the activities of the RNODC-MEDS in acquiring and making drifting buoy data available to the scientific community during the last nineteen months (January 1998 - July 1999).

Data Flow

Table 1 shows various statistics derived for this last 19-month period of activity. The first column of the table gives the month and year, the second column provides the number of messages archived by MEDS for this particular month-year while the third column provides the ratio in percentage of messages with the quality flags equal to 1 for position and date/time. A quality flag of 1 means that no errors were found either in the date/time stamp of the message nor in the observed data themselves. The next two columns provide the statistics on the buoys themselves; columns 4 shows first the number of buoys reporting on the GTS and for which MEDS is receiving the data while column 5 gives the number of operational drifting buoys according to the Technical Coordinator DBCP. The last column of this table gives the ratio expressed in percentage of the number of buoys for which MEDS is receiving data during each particular month.

Figure 1 is an illustration of the level of activities performed by MEDS during this same 19-month period. For each month, it displays the number of messages received, the number of messages received with both quality flags (position and date/time) equal to 1 and the number of messages received from drifting buoys only (the difference is received from fixed platforms). The total number of messages received, processed and archived by MEDS each month for this time period is 2,741,413 with an average of 144,285 messages per month (an increase of 8.7% over last year figure).

With regard to the ratio describing the quality of the messages received (see Figure 1), it must be pointed out that this ratio was higher by approximately 15% a few years ago. The decrease of the ratio is not caused by poor data being reported but is a reflection of the processing of the drifting buoy messages received on the GTS. Positions received an automatic flag of 3 (suspicious) when the same message is reported by an ARGOS Centre and a LUT centre (LUT gets the level 3 rating). Messages are also flagged as suspicious (QC=3) when an old position is being reported on any satellite pass.

Figure 2 illustrates, over the same 19-month time period, the number of buoys for which MEDS is receiving data via the GTS route over the number of physical drifting buoys that transmitted at least once

during that month. The second number is provided by the Technical Coordinator of the DBCP (TC DBCP). The average gap between each value is 1,437 buoys per month but the gap seems to decrease with time. It was 1,518 in last year's report. It must be pointed out though that the number of physical buoys provided by the DBCP TC includes all drifting buoys which have transmitted during that particular month. Therefore, this number includes operational buoys, buoys with no localization computed, backup buoys, inactive buoys and buoys near their death.

With regard to the number of messages received by MEDS, this number is inflated by two different sources. Multiple messages are reported on the GTS as they are processed by an ARGOS centre (KARS or LFPW) and a LUT centre (EDMO, OSLO or BGSF). In this case, MEDS keeps both messages. It may be picked up by a single LUT, but having different parameters (channels) echoed back by the satellite. In this case, a message is not a duplicate message if it has different parameters. Otherwise, MEDS keeps the best (most complete) message. Inflation is also caused by multiple messages on the same satellite pass. Identical messages are deleted during processing when the information is exactly the same within some tolerance limits (35-minute window on time and smaller than 15 km in space, 5 knots in speed) where reported positions are not old positions. If the information from multiple messages is outside these tolerance limits, then duplicate messages are being kept.

An interesting occurrence is the significant increase between March and July 1999 after the decline observed at the end of year 1998 of sub-surface measurements as illustrated by Figure 3. This graph provides the number of messages received by MEDS for which there are sub-surface observations attached to the GTS message. These messages are for drifting buoys only and do not reflect the sub-surface measurements carried routinely by fixed platforms. In March and July of 1999, there were respectively 2,307 and 2,344 messages with sub-surface observations. While on the average there is 3,311 messages per month with sub-surface observations, there is no significant trend in this type of measurement.

Figure 4 describes the number of messages per buoy per day of operation. This number is fairly constant over the 19-month period as there are on the average 6.6 messages per buoy per day of operation (compared to 6.3 in last year report).

Historical Data Acquisition

Since the FGGE program and since January 1986 when MEDS became the RNODC for Drifting Buoys Data, the archive has grown constantly as shown in Figures 5 and 6. These two figures illustrate the same type of information. Figure 5 provides the number of messages received by MEDS each year while Figure 6 shows the growth of MEDS Drifting Buoys Archive. At the end of December 1998, it contained a total of 14,151,318 messages, an increase of 13.3% over last year's total. More than 65% of these messages have a quality flag equal to 1 (good quality on position and date/time) and 87.0% of these messages are

originating from a drifting buoy as opposed to a fixed platform. Sub-surface data are available from these buoys since 1987 and the archive now contains a total of 246,434 messages with sub-surface information.

Development

Most of the resources for development were spent this year in the improvment of services available from the RNODC. Two main projects were undertaken: the improvement of our website and the delivery of Buoy QC messages on MEDS website.

1) Website Improvement

The access to the buoy track maps and buoy data inventories has been modified to be quicker and to provide more maps. Monthly maps and inventories are now available for the whole oceans since 1986. After selecting the year, the user can specify the month required. The same process applies to maps and inventories.

Being the RNODC for Drifting Buoy, MEDS has developed a website page on this important activity (http://www.meds-sdmm.dfo-mpo.gc.ca/Meds/RNODC/MAIN.SHTML). Among the topics, the user can chose to read about are "What is the RNODC?", "What is available from the RNODC?", "Data Maps and Inventories", "Buoy QC Information", "Regional Specific Programmes and Associated Links". Different layouts of maps are now available from this new section of MEDS website. Regional maps and inventories were developed according to the regional programmes of the DBCP. The time period and area coverage have been selected according to the definition of each regional programme and are shown in the table below:

DBCP Programme	Time Period	Area Coverage
International Arctic Buoy Programme	1990 - 1999	180°W - 180°E 65°N - North Pole
International Programme for Antarctic Buoys	1994 - 1999	180°W - 180°E 50°S - South Pole
International Southern Atlantic Buoy Program	1994 - 1999	80°W - 20°E 60°S - 20°N
International Buoy Programme for the Indian Ocean	1997 - 1999	30°E - 120°E 55°S - 20°N

It is hoped that these new maps and inventories, produced regularly each month and available through our website, will provide the necessary information to the managers of these regional programmes.

2) Buoy QC messages

MEDS is receiving on a routine basis all Buoy QC (Quality Control) messages originating from buoy operators. A database has been built to archive these messages. Now users can access old messages through MEDS website:
http://www.meds-sdmm.dfo-mpo.gc.ca/Meds/RNODC/buoyqc/scarch_c.asp.

The website consist of two pages: a search page and a result page. With the search page, the user specifies his search criteria. He can enter the Buoy Id (WMO number), the date range (last 7 days, last 30 days, all, other), a specific data range if other is used, and finally a key word. If a key word is entered, the system will search in the subject and the content of the message.

The result page displays the results of the search. Information displayed are the Buoy Id, the date of the message, the originator of the message (From), the sender of the message (Vedur.is), the addressee of the message (To), the subject of the message, when the message was loaded in the archive (Last update), and finally the content of the message including its signature if any. The number of messages satisfying the search criteria is displayed at the very top of the page.

Services

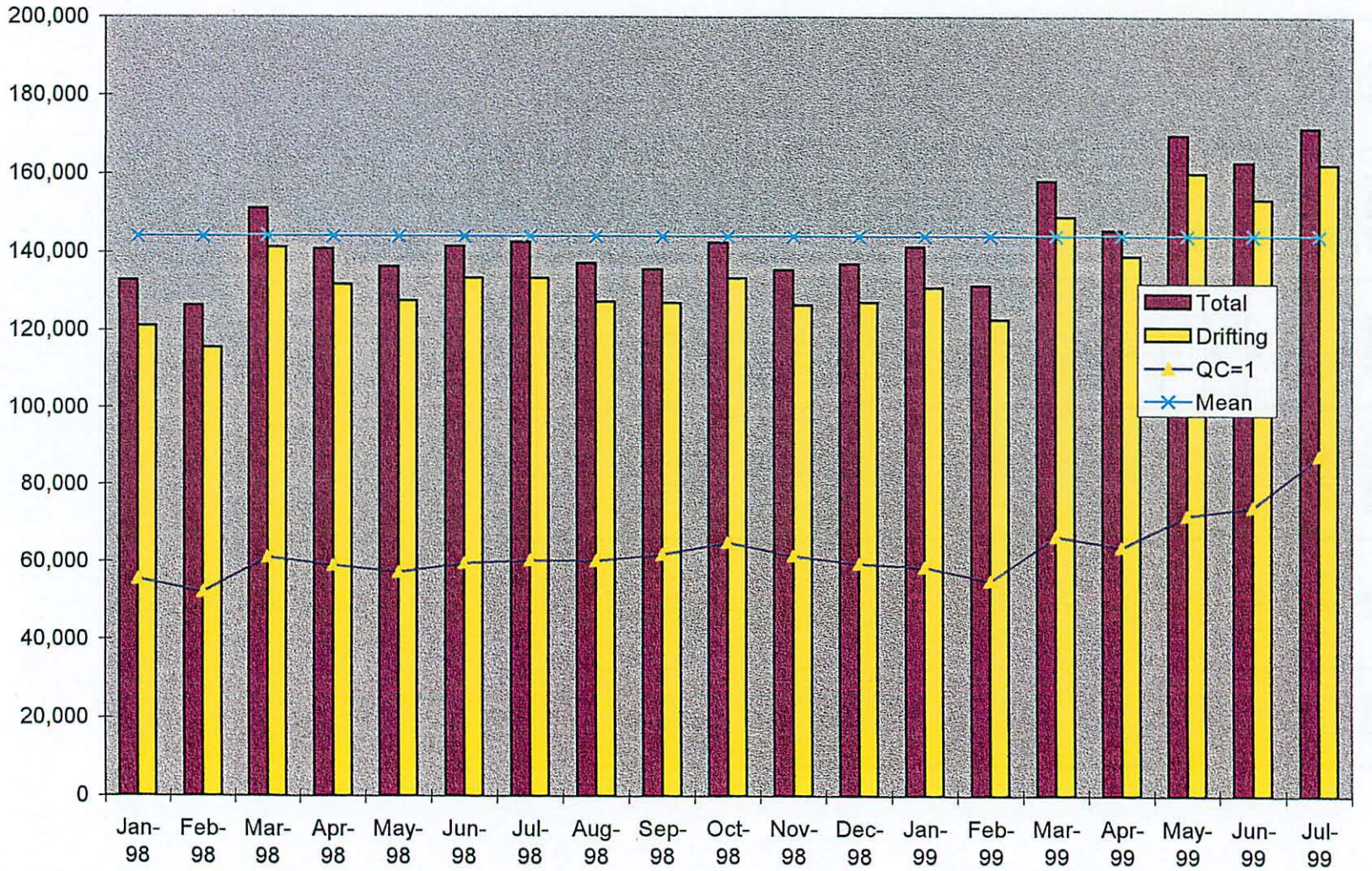
All MEDS annual reports are now available through its website. No paper copy will be further issued. MEDS delivers data for a user specified area, time and range of buoys in GF-3 format (also available now as a CSV data file) on various computer media (such as compact disk, computer diskette or Exabyte cartridge). Displays of buoy tracks are also available for any ocean area and time frame upon request.

Report prepared by: Paul-André Bolduc
Marine Environmental Data Service
29 September 1999 Ottawa, Canada.
E-mail: bolduc@meds-sdmm.dfo-mpo.gc.ca
URL: http://www.meds-sdmm.dfo-mpo.gc.ca

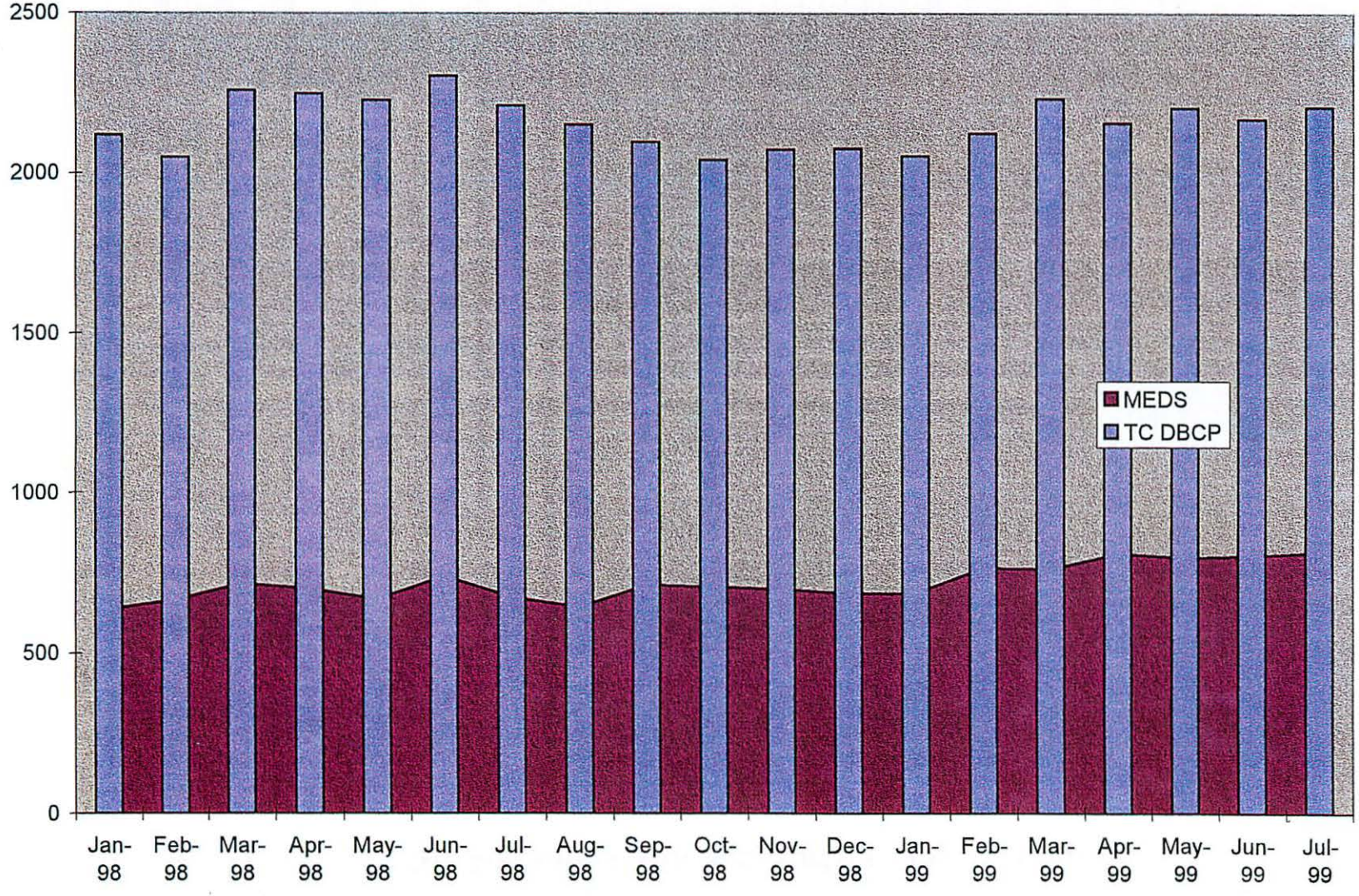
Table 1: Monthly Statistics on
Number of Buoys and Number of Messages received at MEDS
from January 1998 to July 1999
with Evaluation of the QC and
Comparison with DBCP TC Reported Numbers

Month/ Year	# of messages archived	Ratio in % of messages QC OK	# Buoys MEDS	# of Buoys TC/DBCP	Ratio in %
Jan 98	132 962	41.9	637	2 118	30.1
Feb 98	126 370	41.4	667	2 050	32.5
Mar 98	151 188	40.5	717	2 259	31.7
Apr 98	140 796	42.0	702	2 248	31.2
May 98	136 429	42.1	669	2 229	30.0
Jun 98	141 564	42.2	741	2 304	32.2
Jul 98	142 685	42.4	675	2 211	30.5
Aug 98	137 187	44.0	645	2 152	30.0
Sep 98	135 789	45.7	714	2 098	34.0
Oct 98	142 541	45.7	708	2 043	34.7
Nov 98	135 627	45.5	701	2 075	33.8
Dec 98	137 098	43.5	687	2 078	33.1
Jan 99	141 394	41.5	689	2 055	33.5
Feb 99	131 534	41.9	767	2 125	36.1
Mar 99	158 214	42.2	764	2 234	34.2
Apr 99	145 613	43.9	812	2 157	37.6
May 99	169 900	42.5	800	2 205	36.3
Jun 99	162 898	45.6	805	2 170	37.1
Jul 99	171 626	51.1	817	2 208	37.0

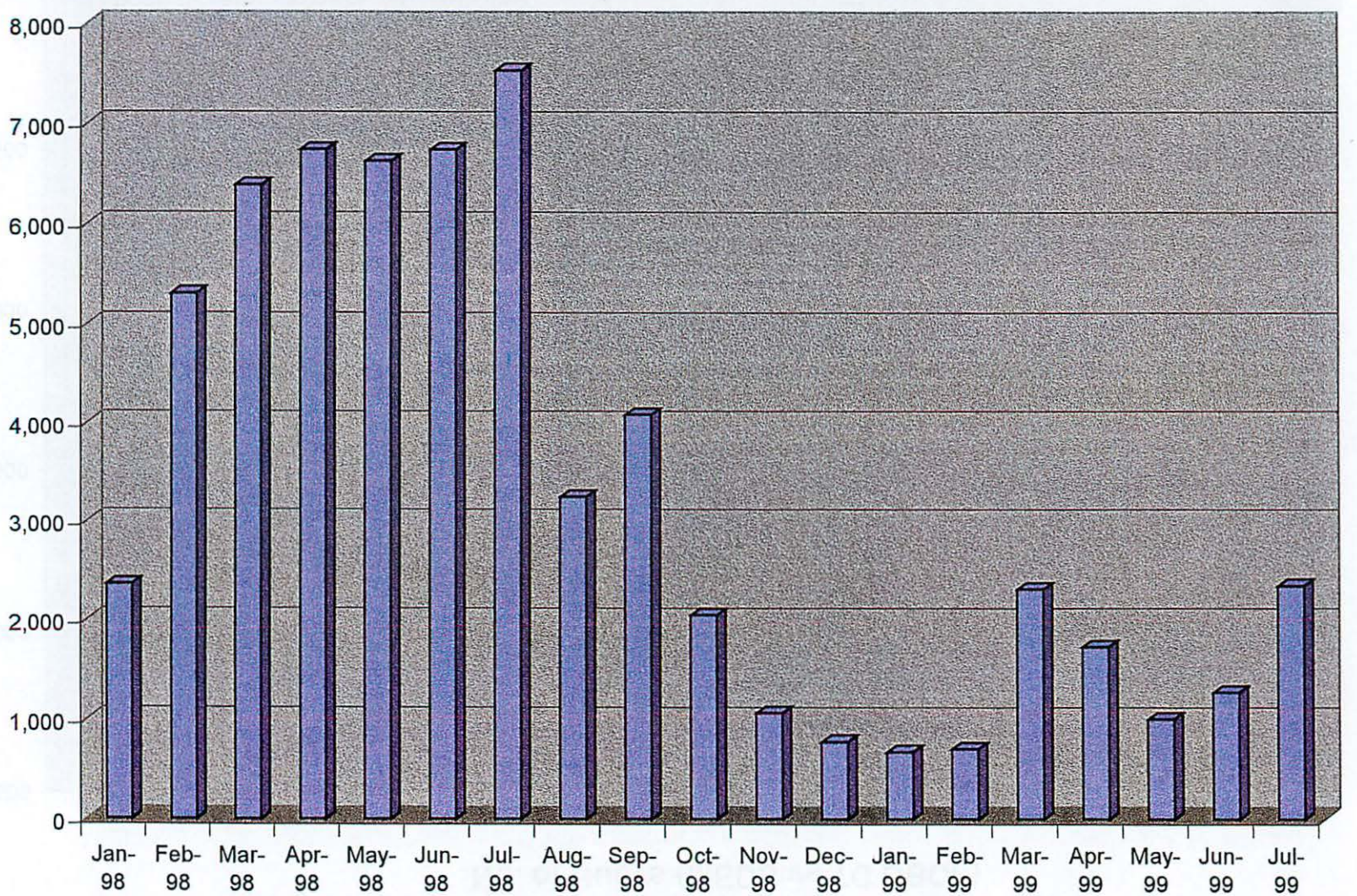
BUOY Messages archived by MEDS

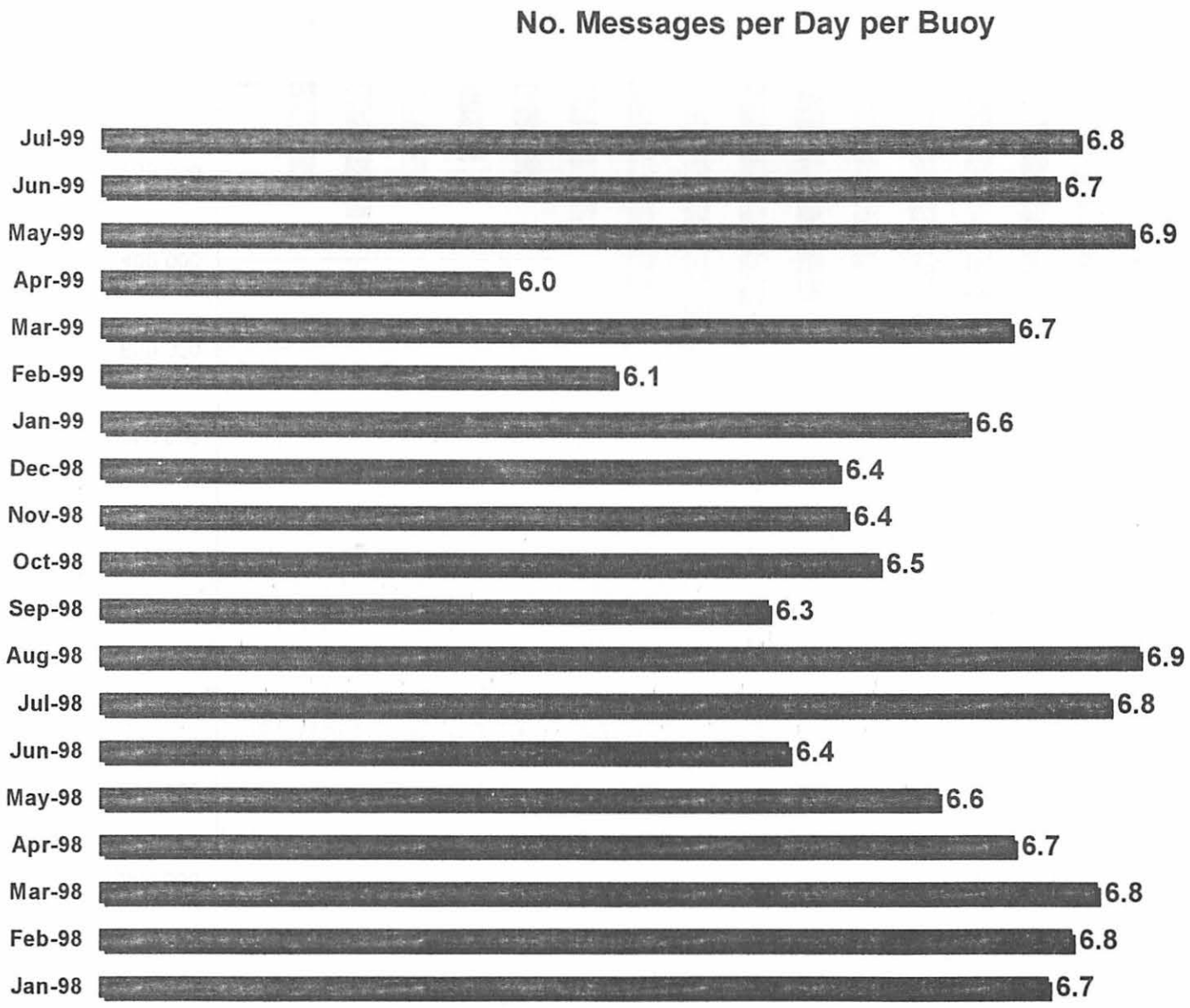


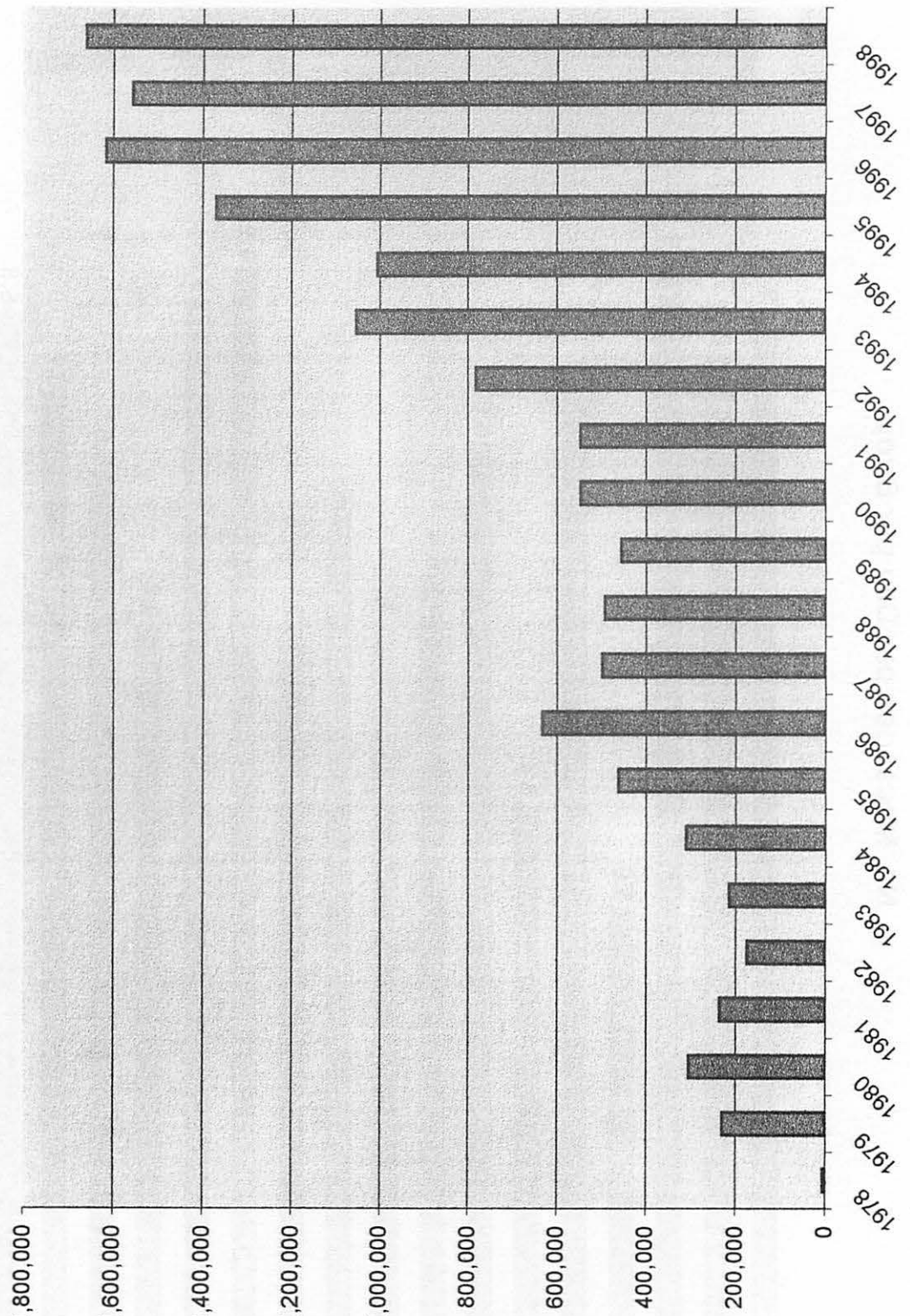
No. of Buoys (MEDS vs TC DBCP)

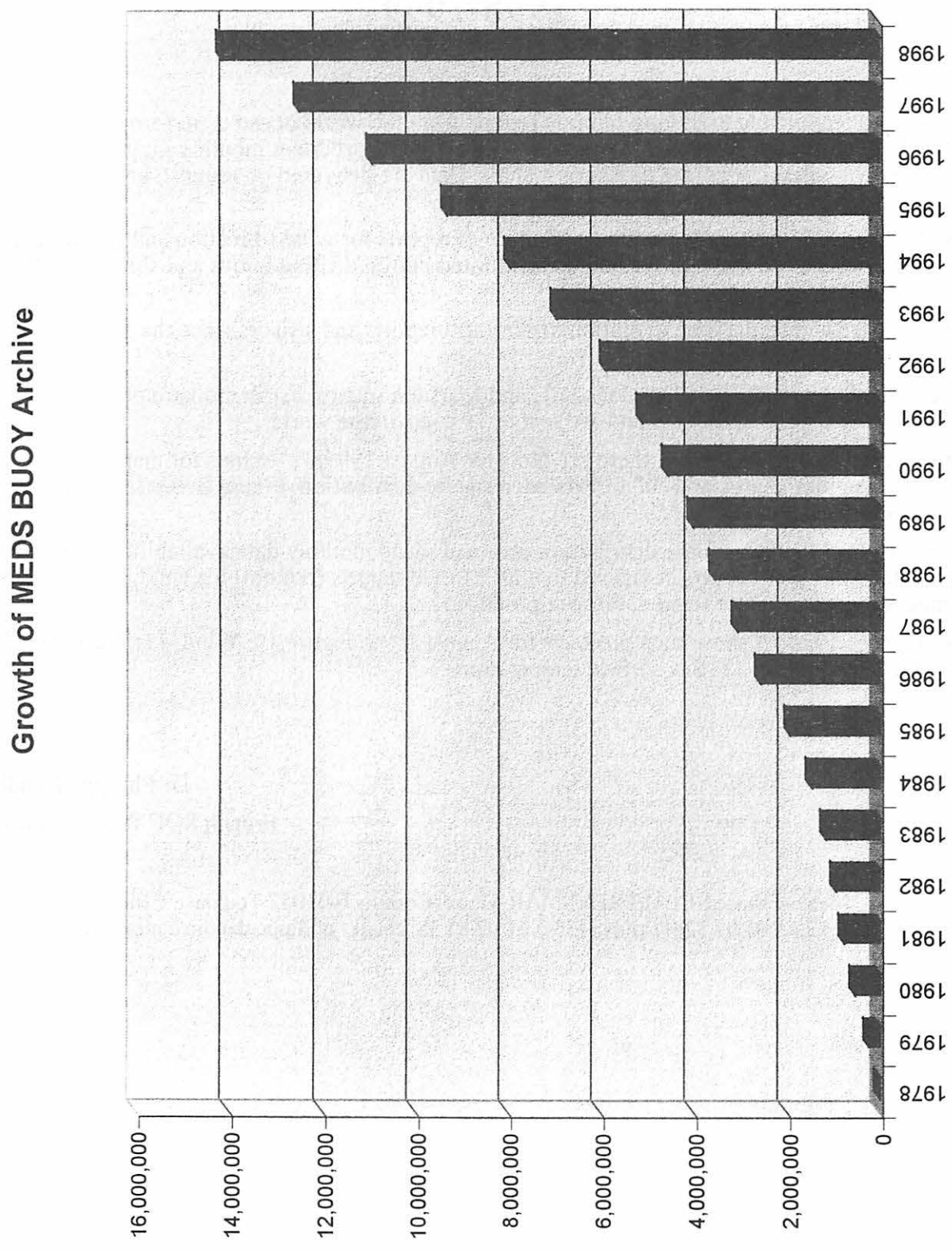


No. Messages with Sub-Surface Observations




No. Messages per Day per Buoy
Jul-99
6.8
Jun-99
6.7
May-99
6.9
Apr-99
6.0
Mar-99
6.7
Feb-99
6.1
Jan-99
6.6
Dec-98
6.4
Nov-98
6.4
Oct-98
6.5
Sep-98
6.3
Aug-98
6.9
Jul-98
6.8
Jun-98
6.4
May-98
6.6
Apr-98
6.7
Mar-98
6.8
Feb-98
6.8
Jan-98
6.7


No. BUOY Messages archived by MEDS per year
1,800,000
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998


Growth of MEDS BUOY Archive
16,000,000
14,000,000
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
0
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998

SOC for Drifting Buoy Report

1998-1999

A daily collection and archiving of buoy reports from the world ocean is performed by the French Meteorological service. As usual the French SOC produces monthly graphic products for buoys, moored buoys, drifting buoys, ships. Data are delivered on request, or on a regular basis.

- Figures 1, 2, 3, 4, show the time evolution of reports for wind (direction and speed) and for pressure respectively for all buoys, moored buoys, drifting buoys and ships since the 1st of January 1998.
- Figure 5 shows the time evolution of WAVEOB reports and sensors since the 1st of January 1998.

Each month, mapping position plot charts and Marsden square distribution are produced for BATHY, TESAC, SHIP and BUOY and are sent to 70 users in the world.

- Figures 6a,b to 9a,b show these products for August 1999. "a" stands for mapping position plot charts, and "b" for Marsden square distribution. Figure 6: BATHY, 7: TESAC, 8: SHIP, and 9: BUOY.

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

- Figures 10 to 13 show such products for August 1999. Figure 10: Wind, 11: Pressure, 12: Air temperature, 13: Sea surface temperature.

Dr Philippe Dandin
French SOC Representative

Météo-France SCEM/PREVI/MAR 42, av. Coriolis F-31057 Toulouse Cedex
Tel: +33 5 61 07 82 90 Fax: +33 5 61 07 85 38 email : philippe.dandin@meteo.fr

Time evolution of BUOY reports for wind and pressure

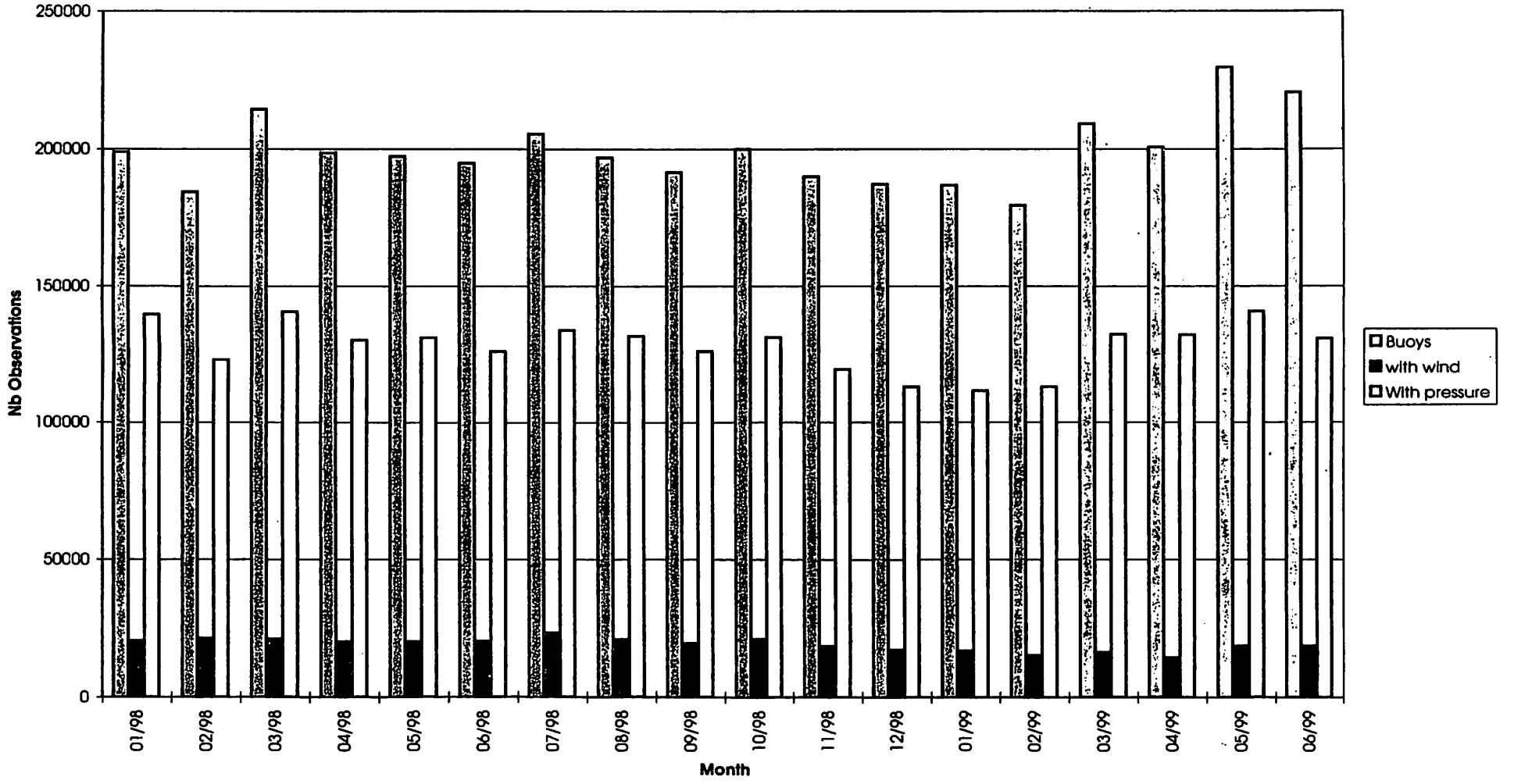


Figure 1

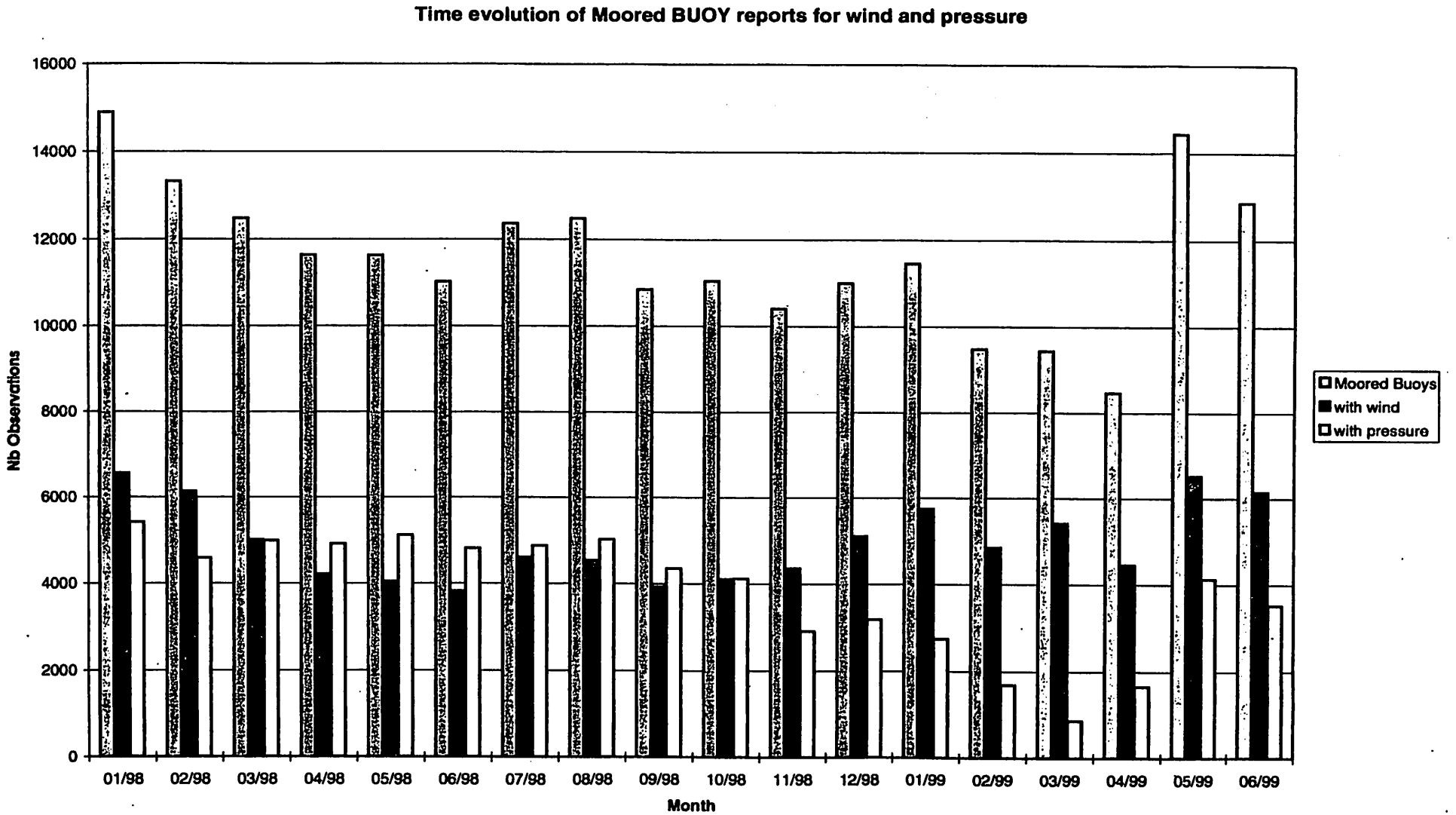

Time evolution of Moored BUOY reports for wind and pressure
Nb Observations
16000
14000
12000
10000
8000
6000
4000
2000
0
01/98
02/98
03/98
04/98
05/98
06/98
07/98
08/98
09/98
10/98
11/98
12/98
01/99
02/99
03/99
04/99
05/99
06/99
Month
Moored Buoys
with wind
with pressure

Figure 2

Time evolution of Drifting BUOY reports for wind and pressure

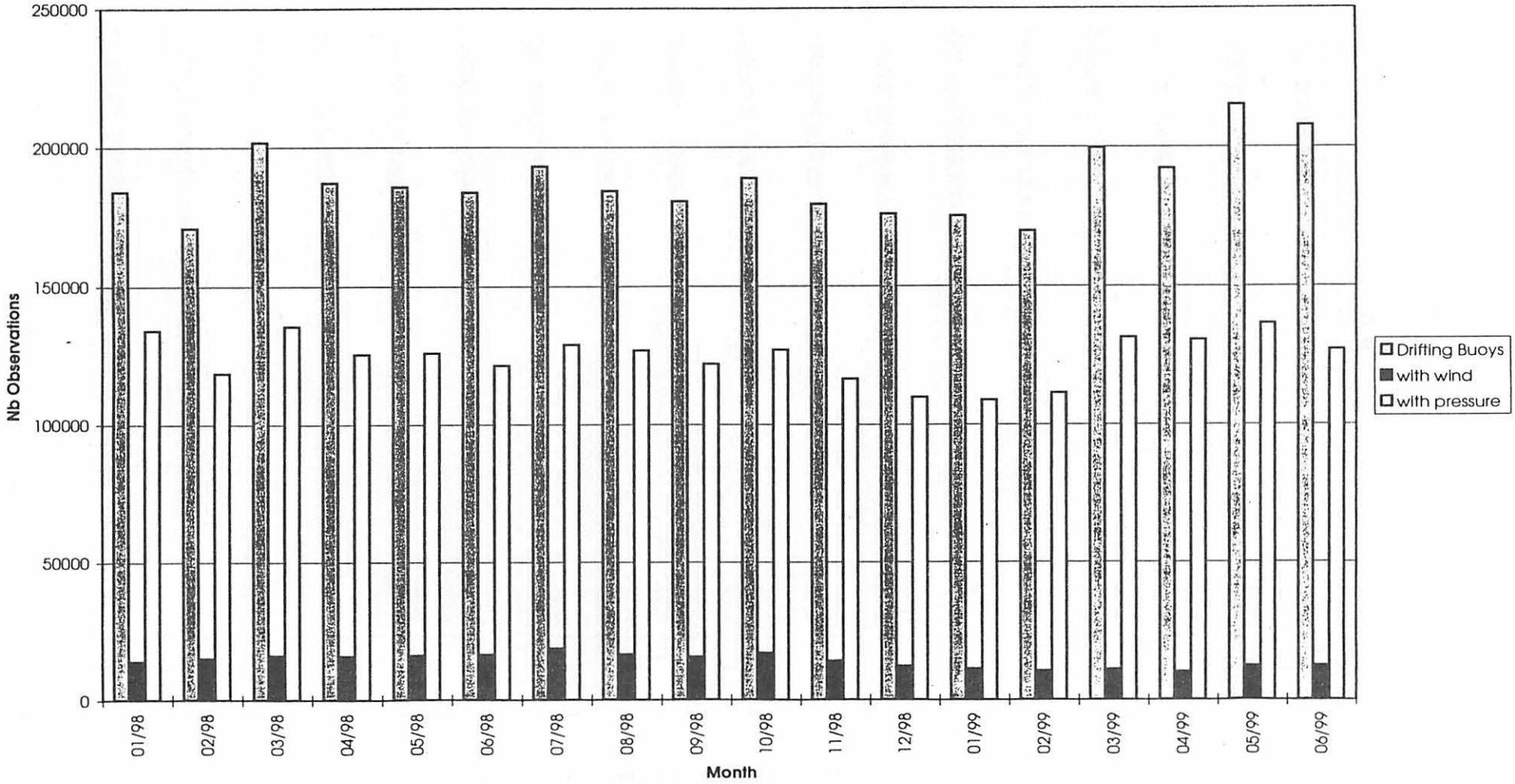


Figure 3

Time evolution of SHIP reports for wind and pressure

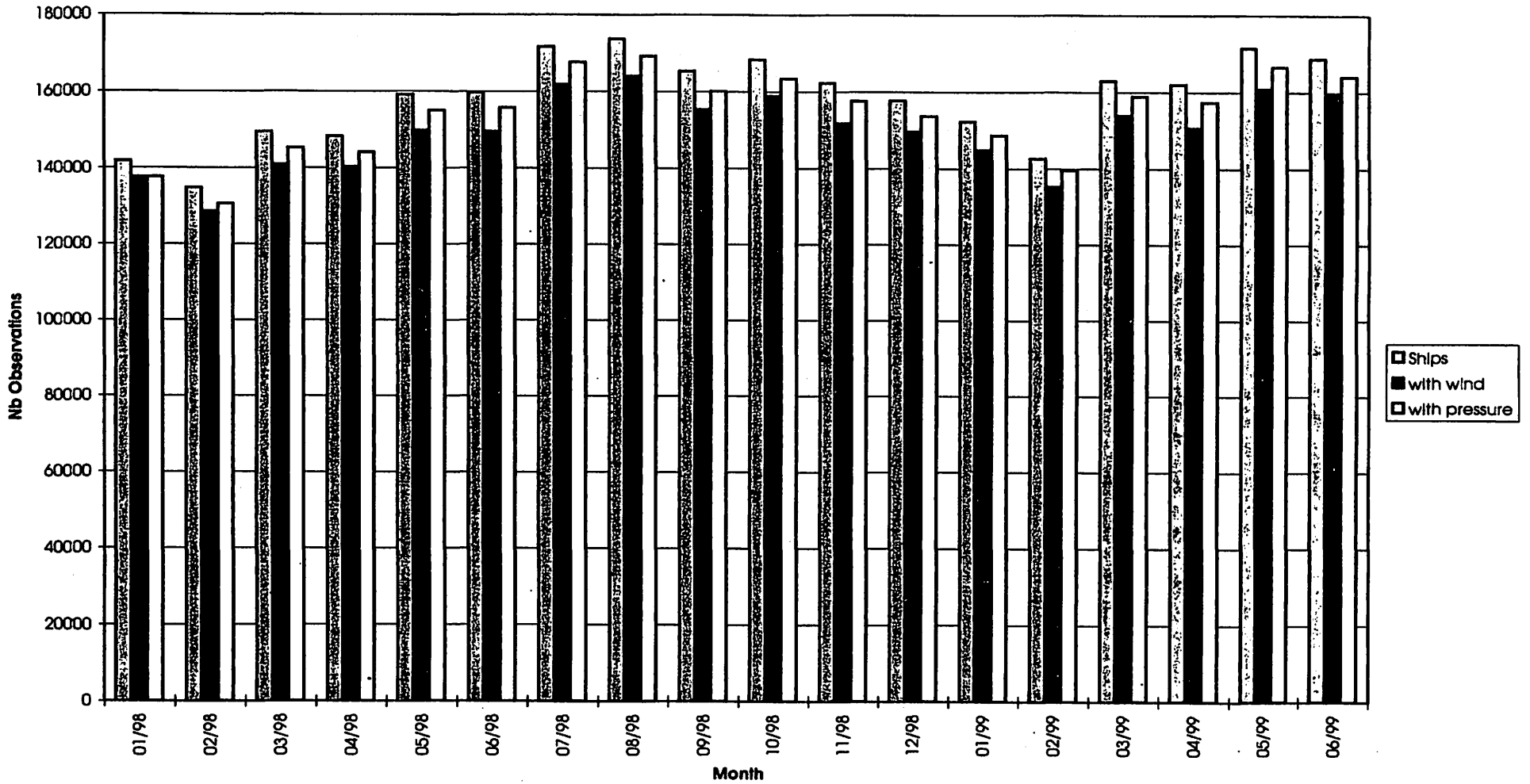


Figure 4

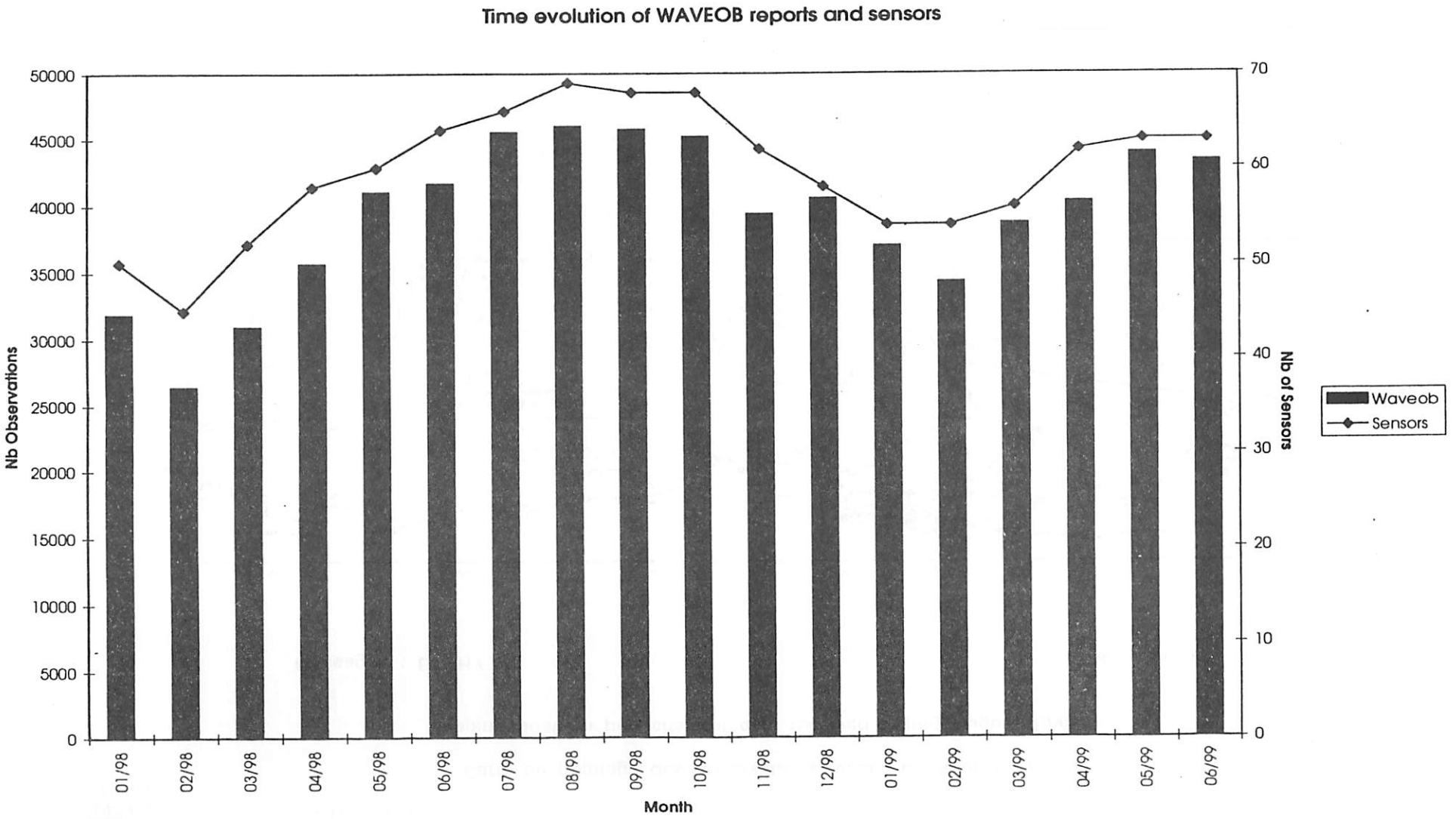

Time evolution of WAVEOB reports and sensors
Nb Observations
Nb of Sensors
Month
Waveob
Sensors
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
70
60
50
40
30
20
10
0
01/98
02/98
03/98
04/98
05/98
06/98
07/98
08/98
09/98
10/98
11/98
12/98
01/99
02/99
03/99
04/99
05/99
06/99

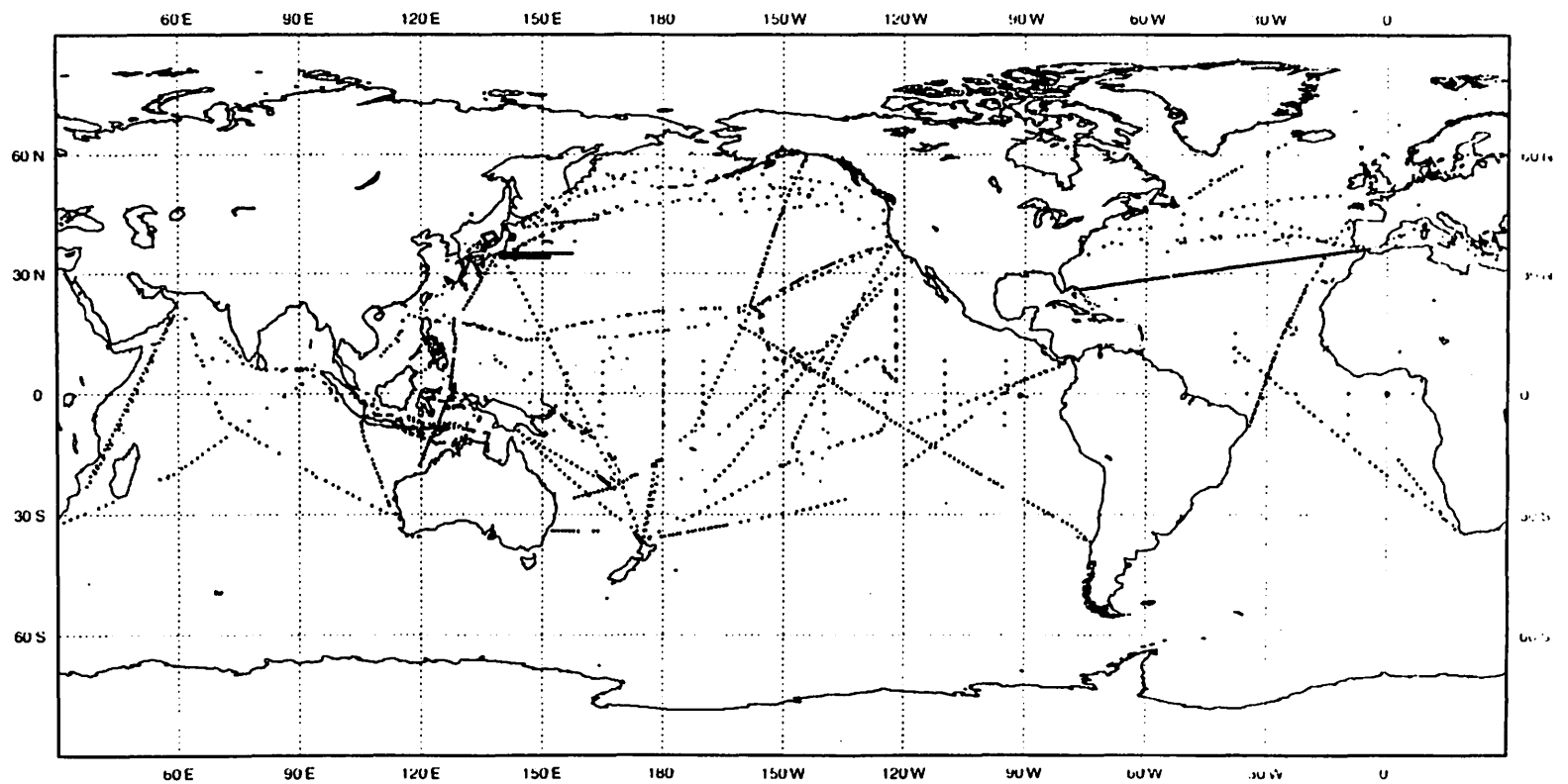
Figure 5

METEO FRANCE

Carte de pointage des observations recues en Aout 1999

Mapping position plot chart of data received during August 1999

Messages : BATHY Total : 5650



MAGICS 4.2 Solaris - mpma497 - 3 September 1999 14:53:09

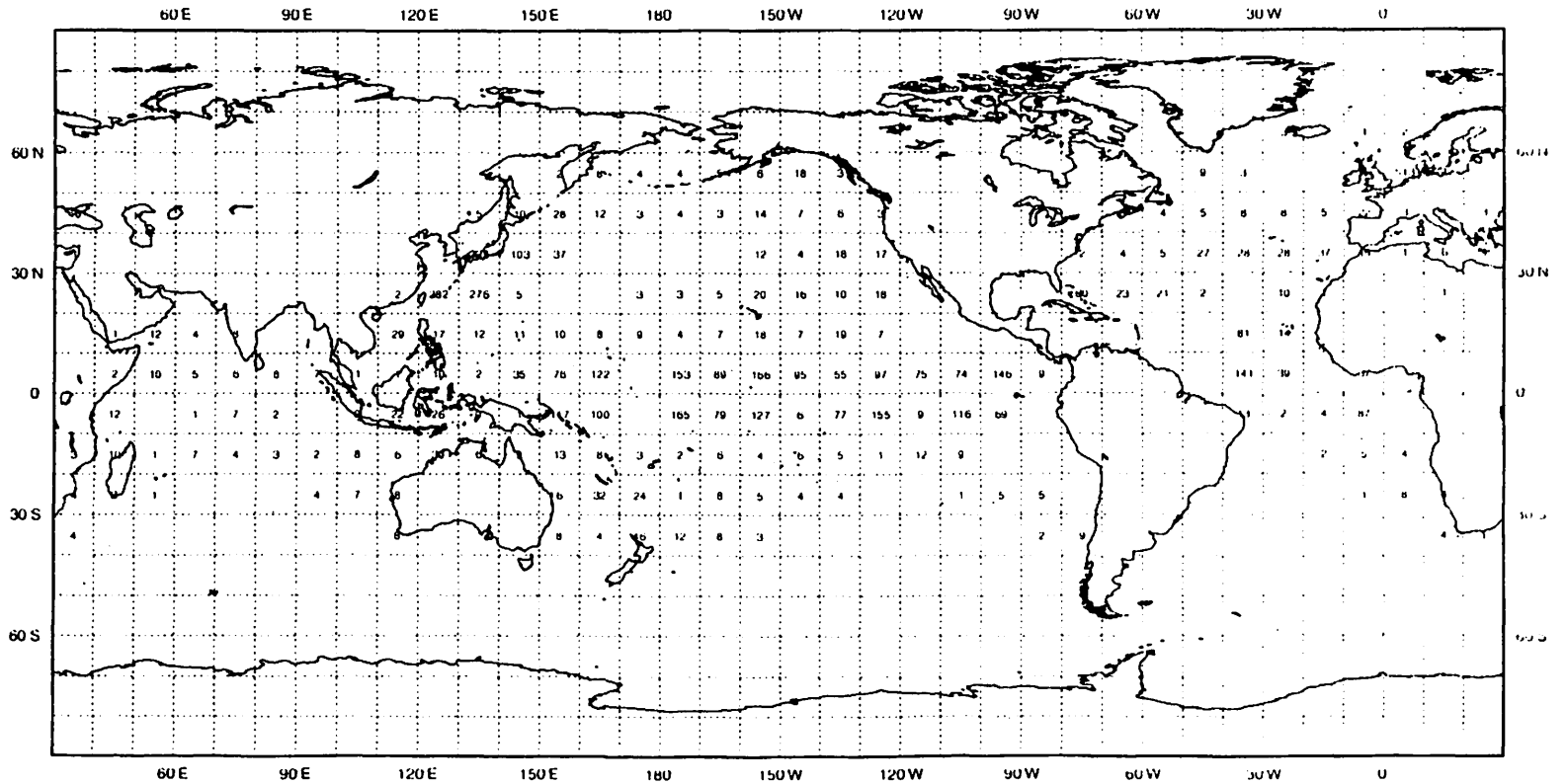
METEO FRANCE

METEO-FRANCE

Repartition par carre Marsden des observations recues en Aout 1999

Marsden square distribution chart of data received during August 1999

Messages : BATHY **Total : 5650**



MAGICS 4.2 Solaris - mpma497 - 3 September 1999 14:53:15

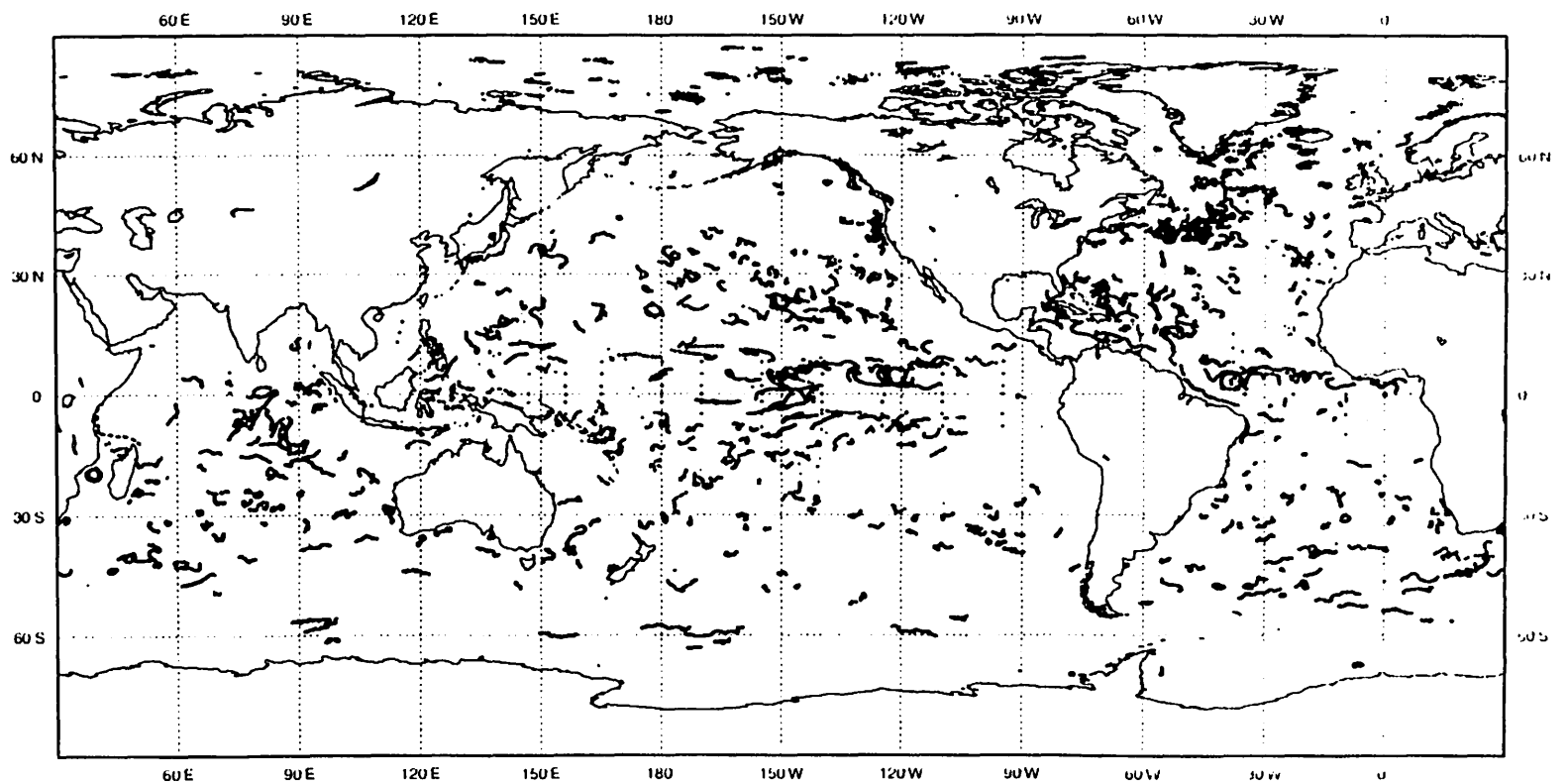
METEO FRANCE

METEO-FRANCE

Carte de pointage des observations recues en Aout 1999

Mapping position plot chart of data received during August 1999

Messages : BUOY **Total : 246901**



MAGICS 4.2 Solaris - mpma497 - 3 September 1999 14:54:37

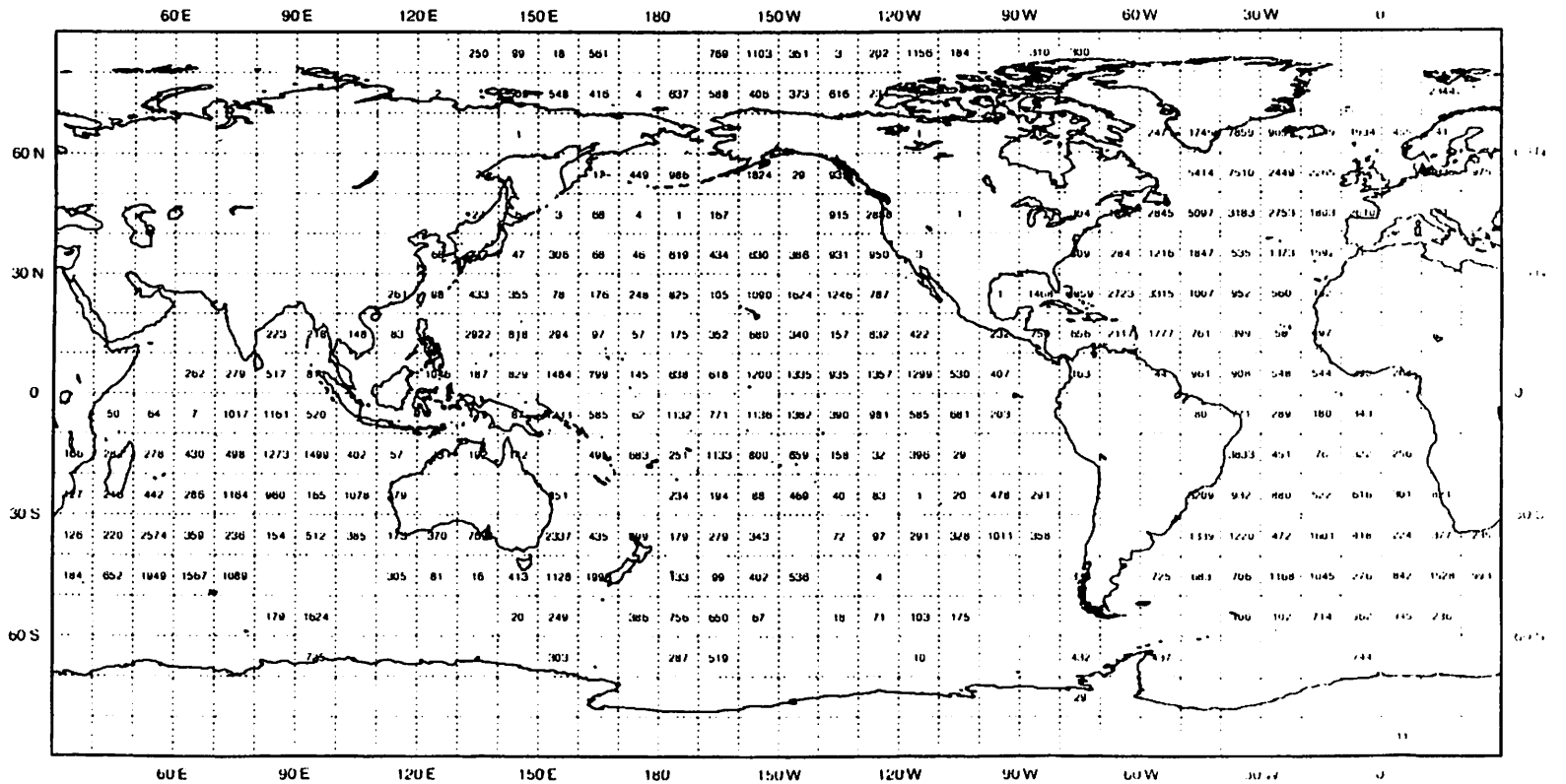
METEO FRANCE

METEO-FRANCE

Repartition par carre Marsden des observations recues en Aout 1999

Marsden square distribution chart of data received during August 1999

Messages : BUOY **Total : 246901**



MAGICS 4.2 Solaris - mpma497 - 3 September 1999 14:55:51

METEO FRANCE

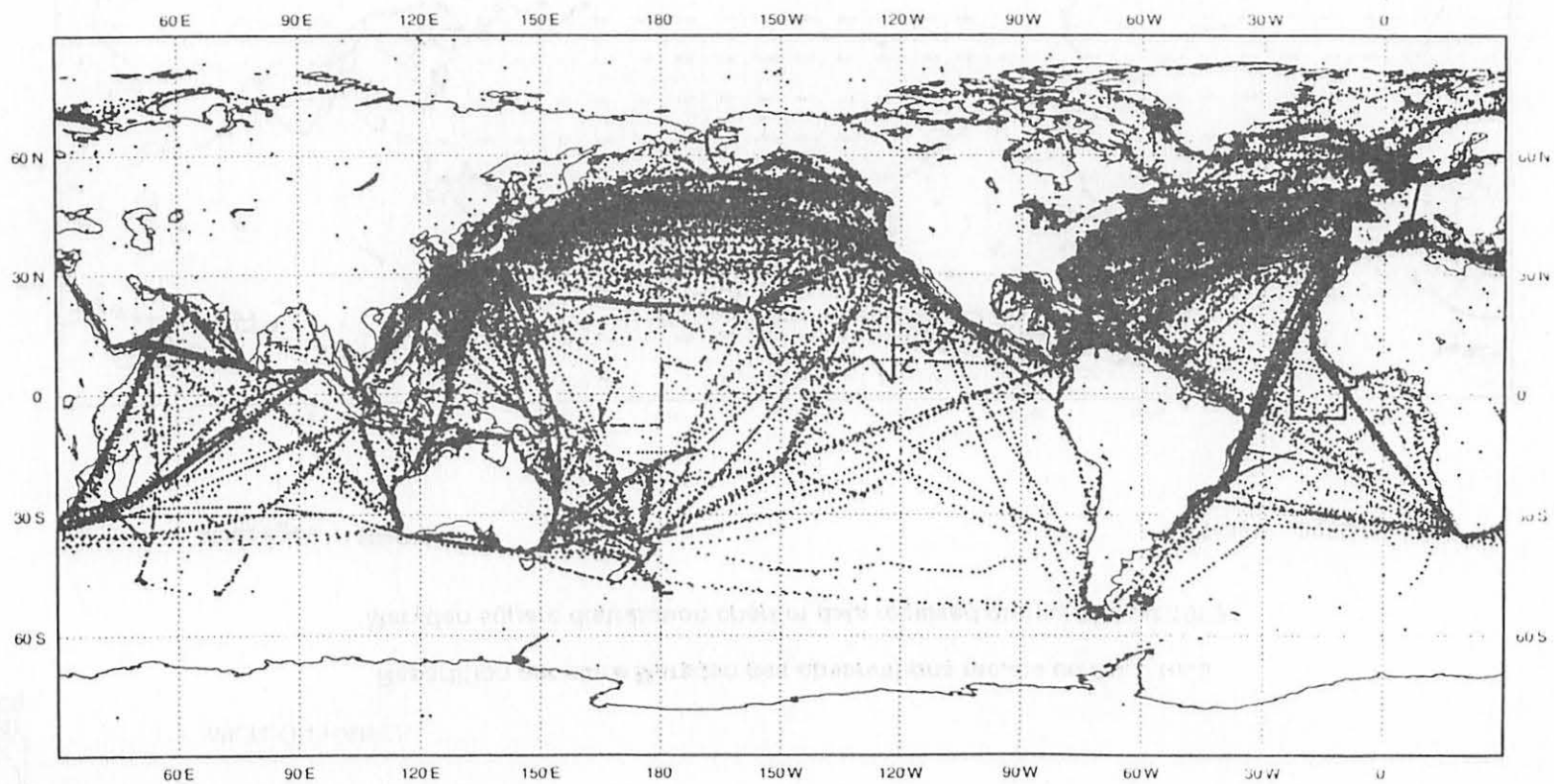
METEO FRANCE

Carte de pointage des observations recues en Aout 1999

Mapping position plot chart of data received during August 1999

Messages : SHIP

Total : 179610



MAGICS 4.2 Solaris - mpma497 - 3 September 1999 14:56:50

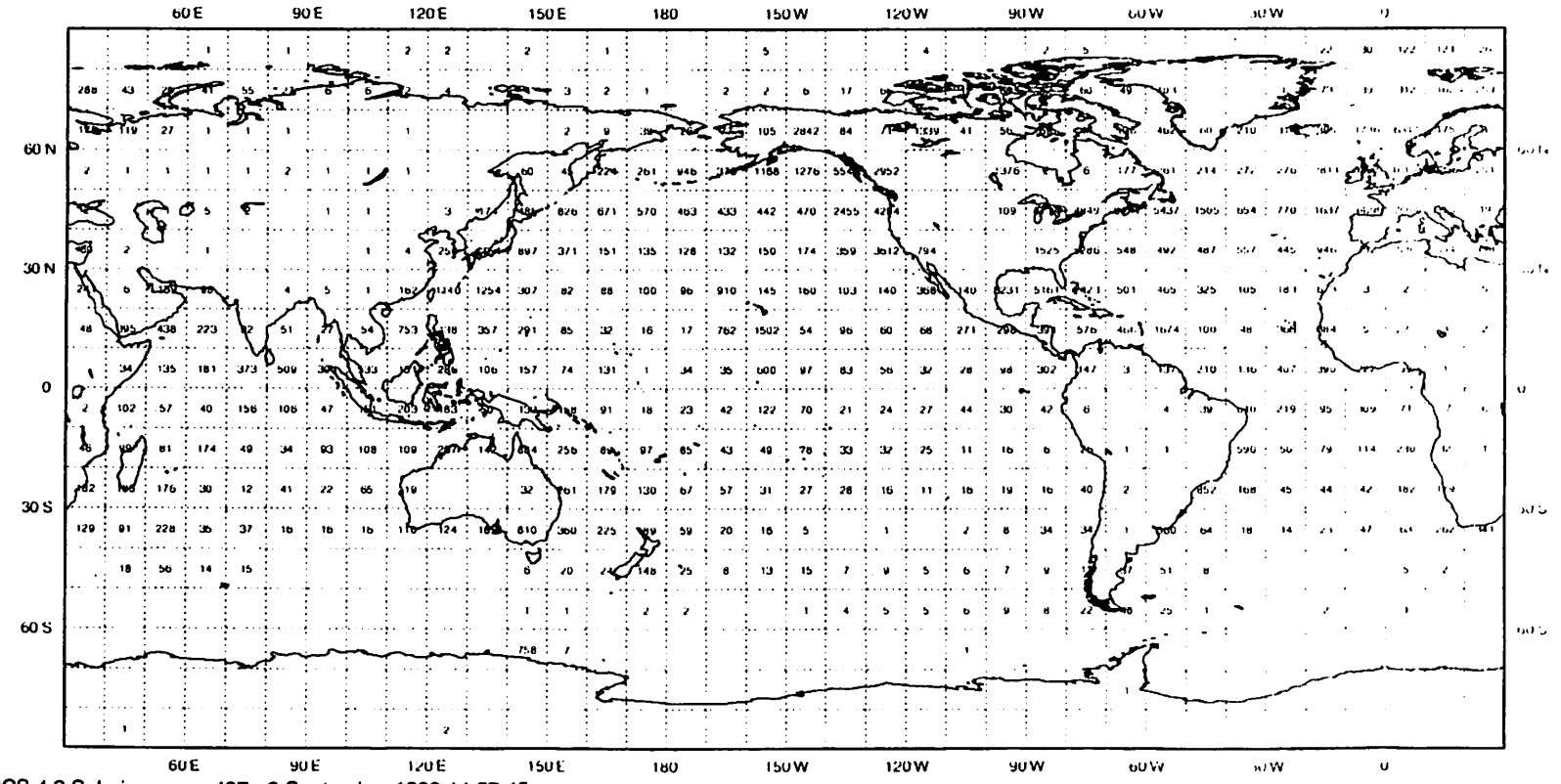
METEO FRANCE

METEO-FRANCE

Repartition par carre Marsden des observations recues en Aout 1999

Marsden square distribution chart of data received during August 1999

Messages : SHIP **Total : 175610**



MAGICS 4.2 Solaris - mpma497 - 3 September 1999 14:57:45

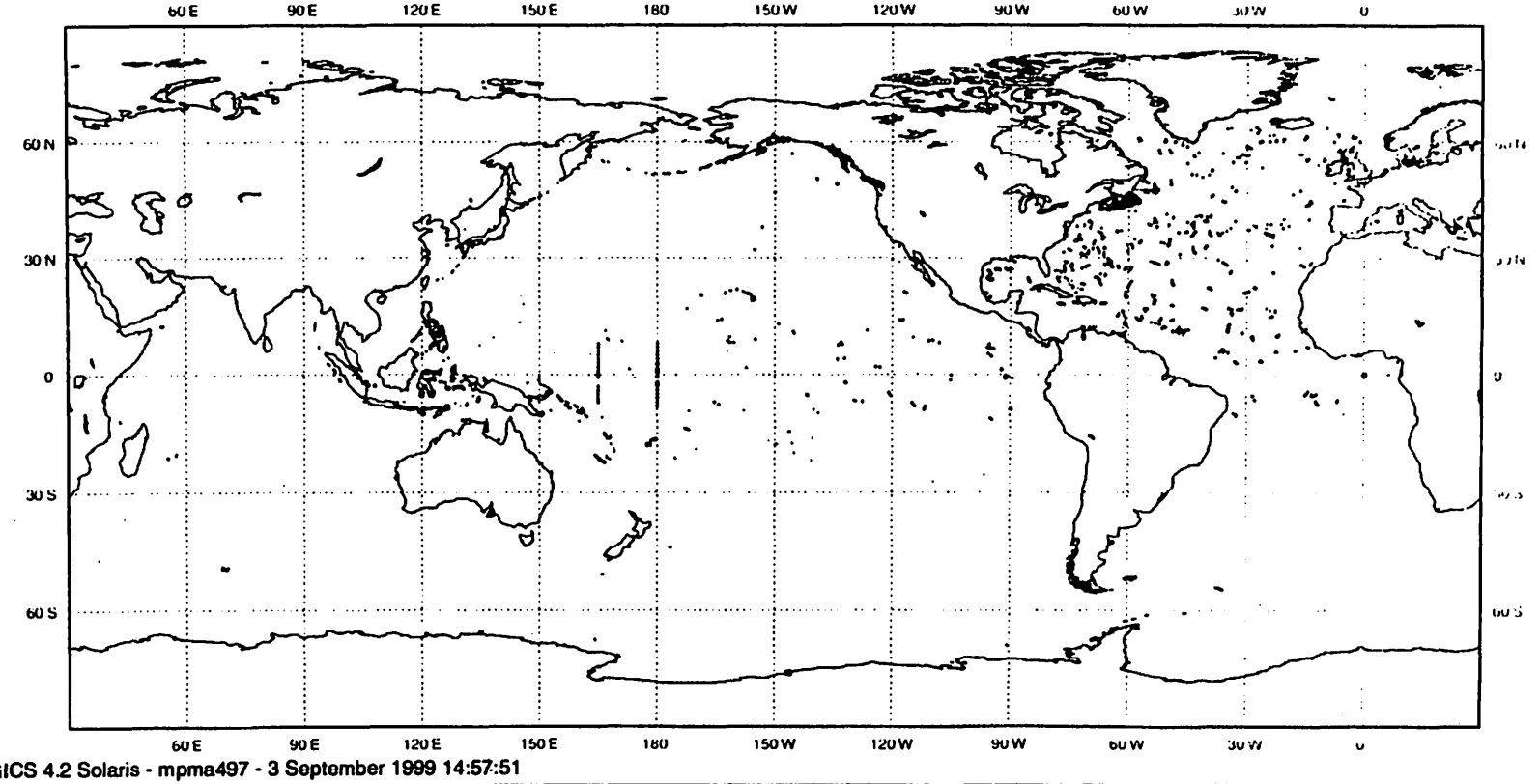
METEO FRANCE

Carte de pointage des observations recues en Aout 1999

Mapping position plot chart of data received during August 1999

Messages : TESAC

Total : 806



MAGICS 4.2 Solaris - mpma497 - 3 September 1999 14:57:51

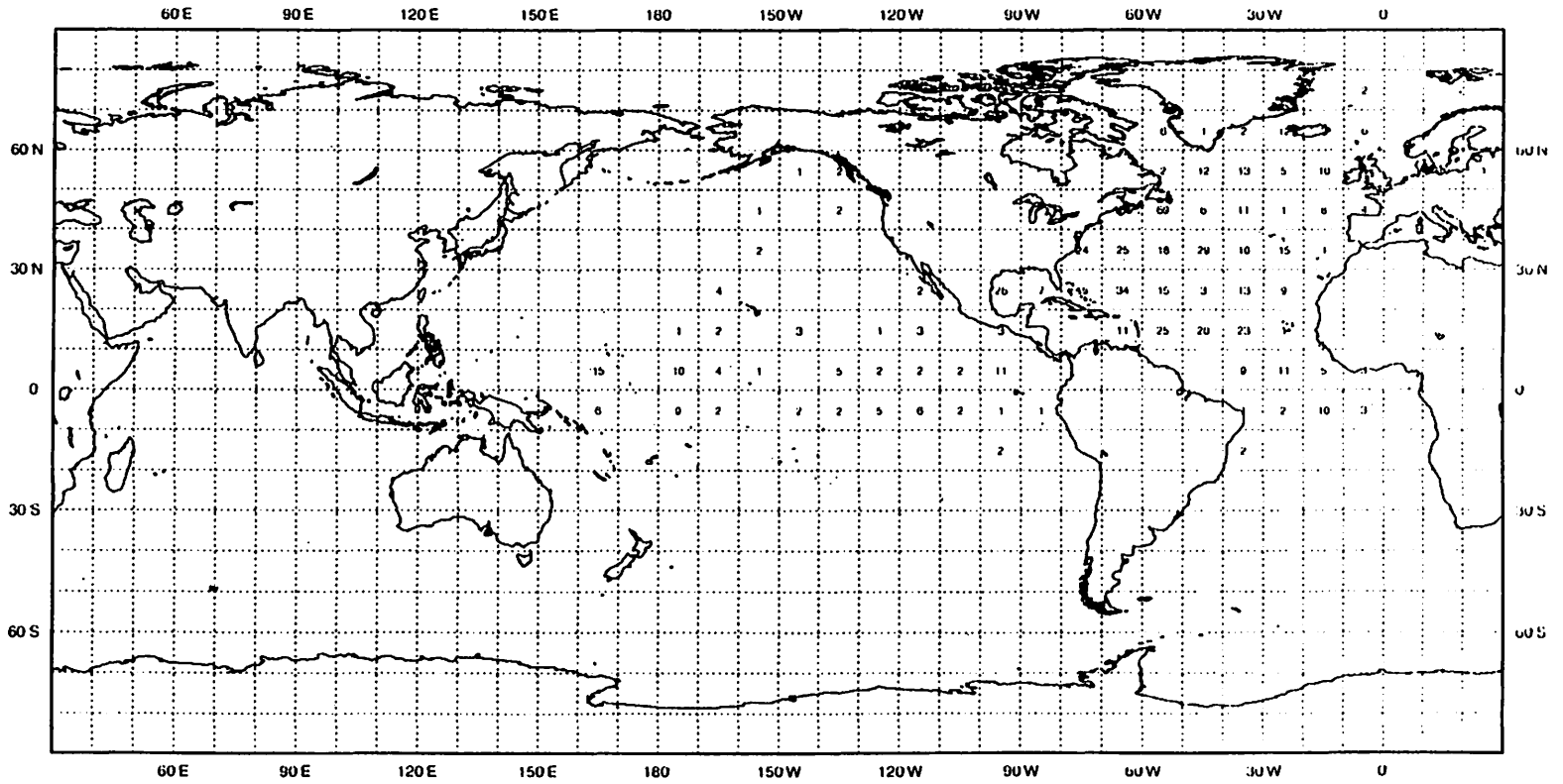
METEO FRANCE

METEO-FRANCE

Repartition par carre Marsden des observations recues en Aout 1999

Marsden square distribution chart of data received during August 1999

Messages : TESAC **Total : 806**

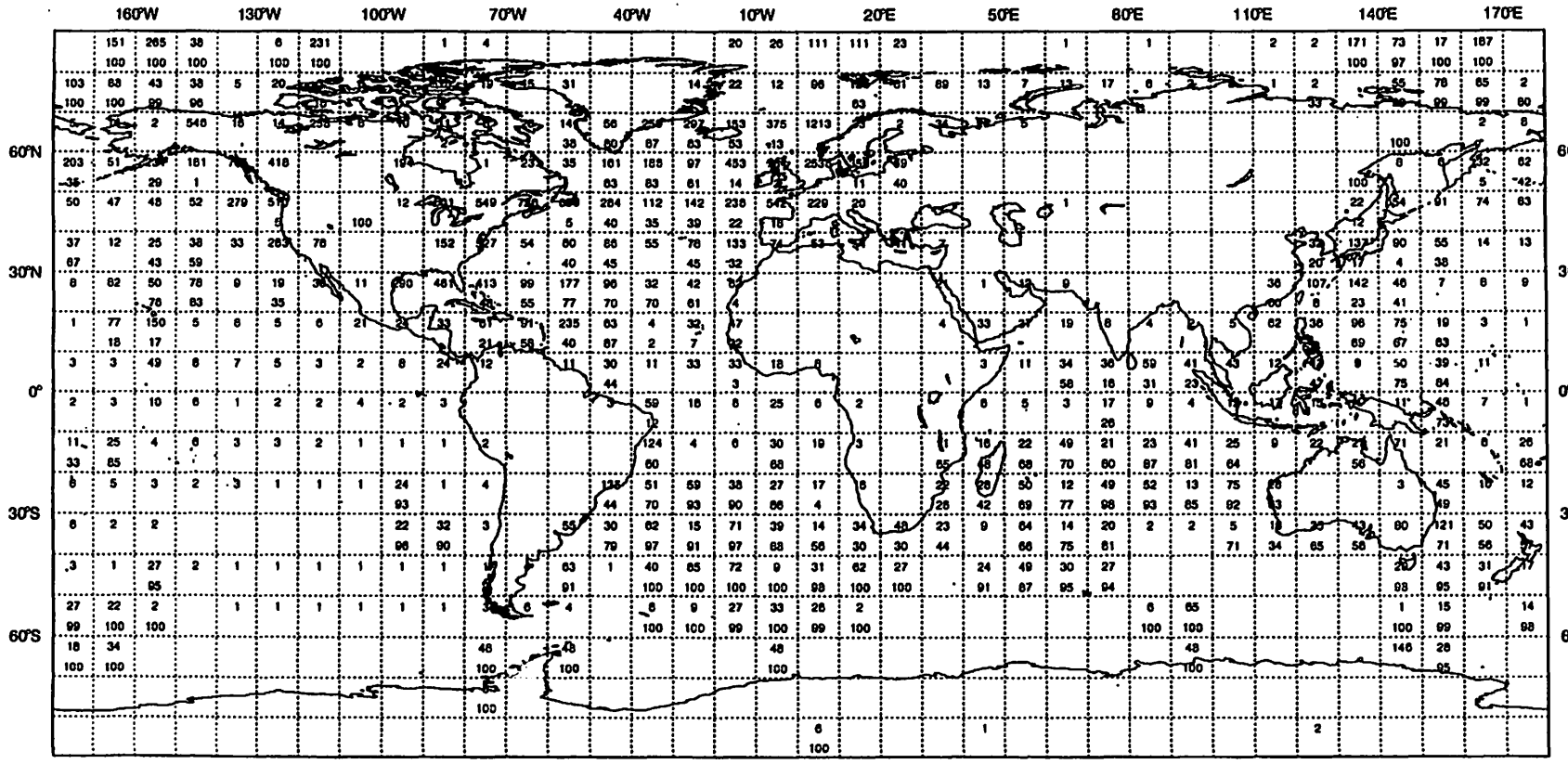


MAGICS 4.2 Solaris - mpma497 - 3 September 1999 14:57:55

METEO FRANCE

METEO - FRANCE **PRESSURE** **AUGUST 1999**

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

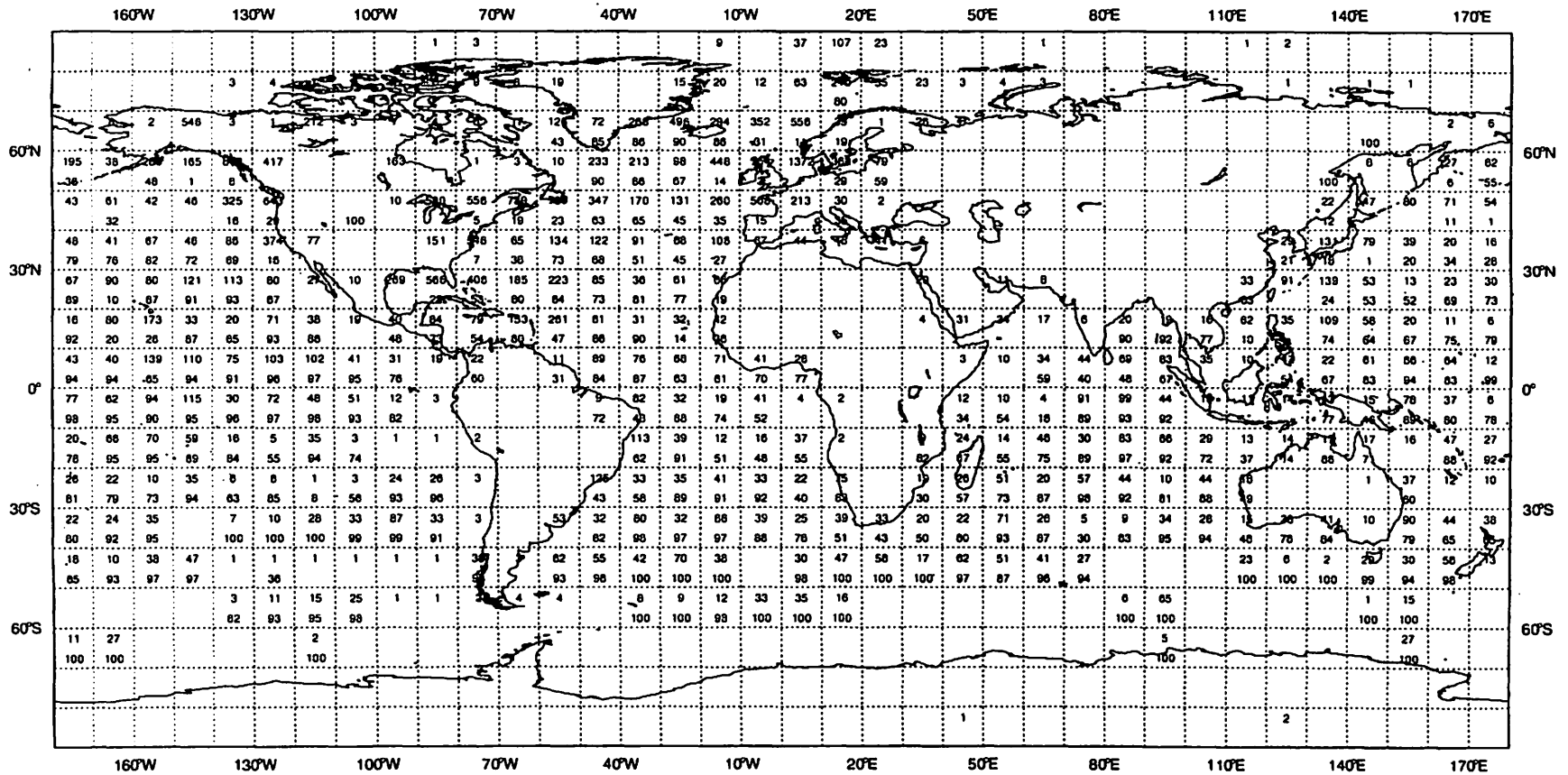


MAGICS 4.2 Solaris - mpma497 - 3 September 1999 14:44:30

METEO FRANCE

METEO-FRANCE **SEA SURFACE TEMPERATURE** **AUGUST 1999**

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

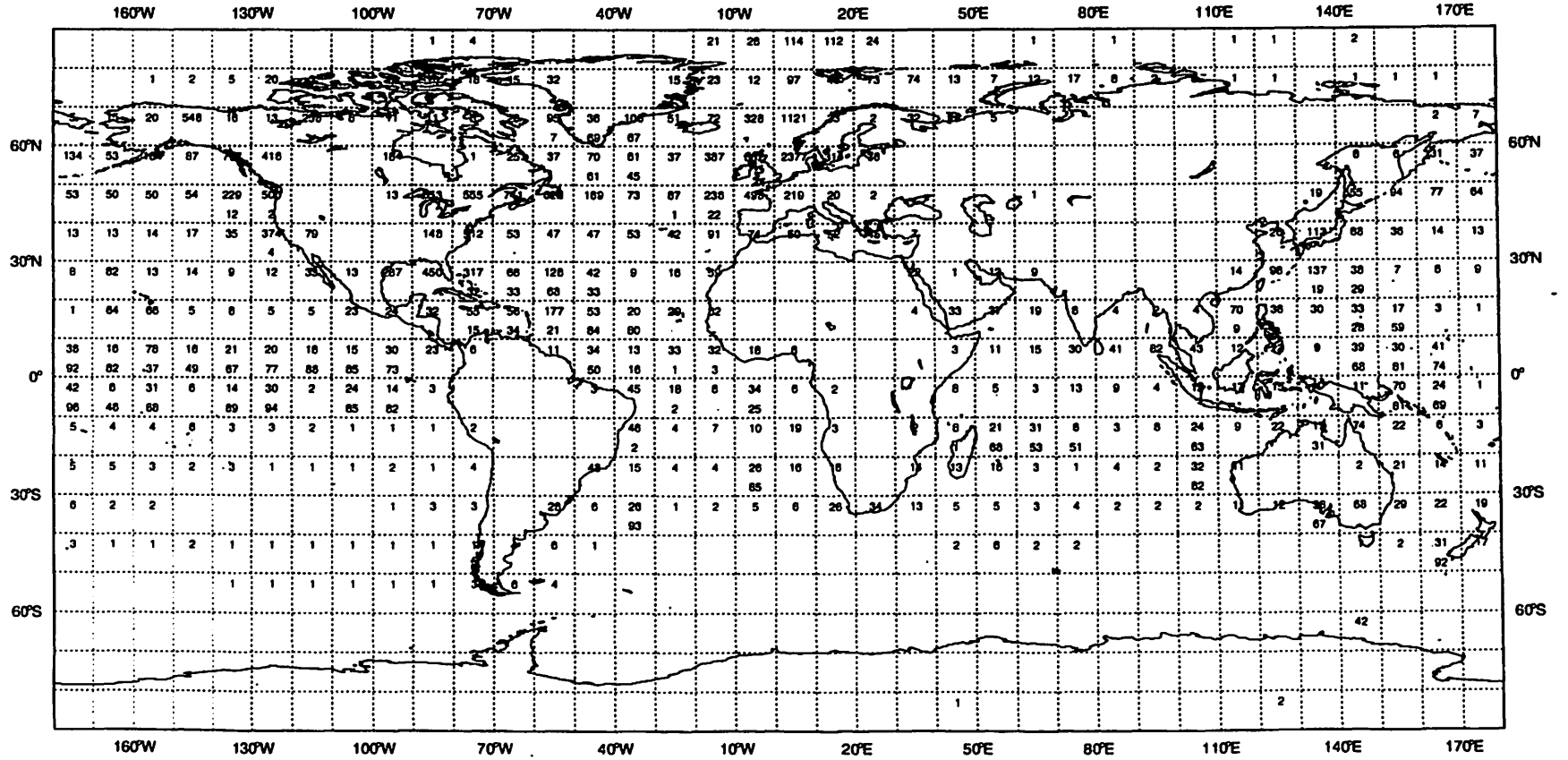


MAGICS 4.2 Solaris - mpma497 - 3 September 1999 14:44:34

METEO FRANCE

METEO - FRANCE **WIND** **AUGUST 1999**

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

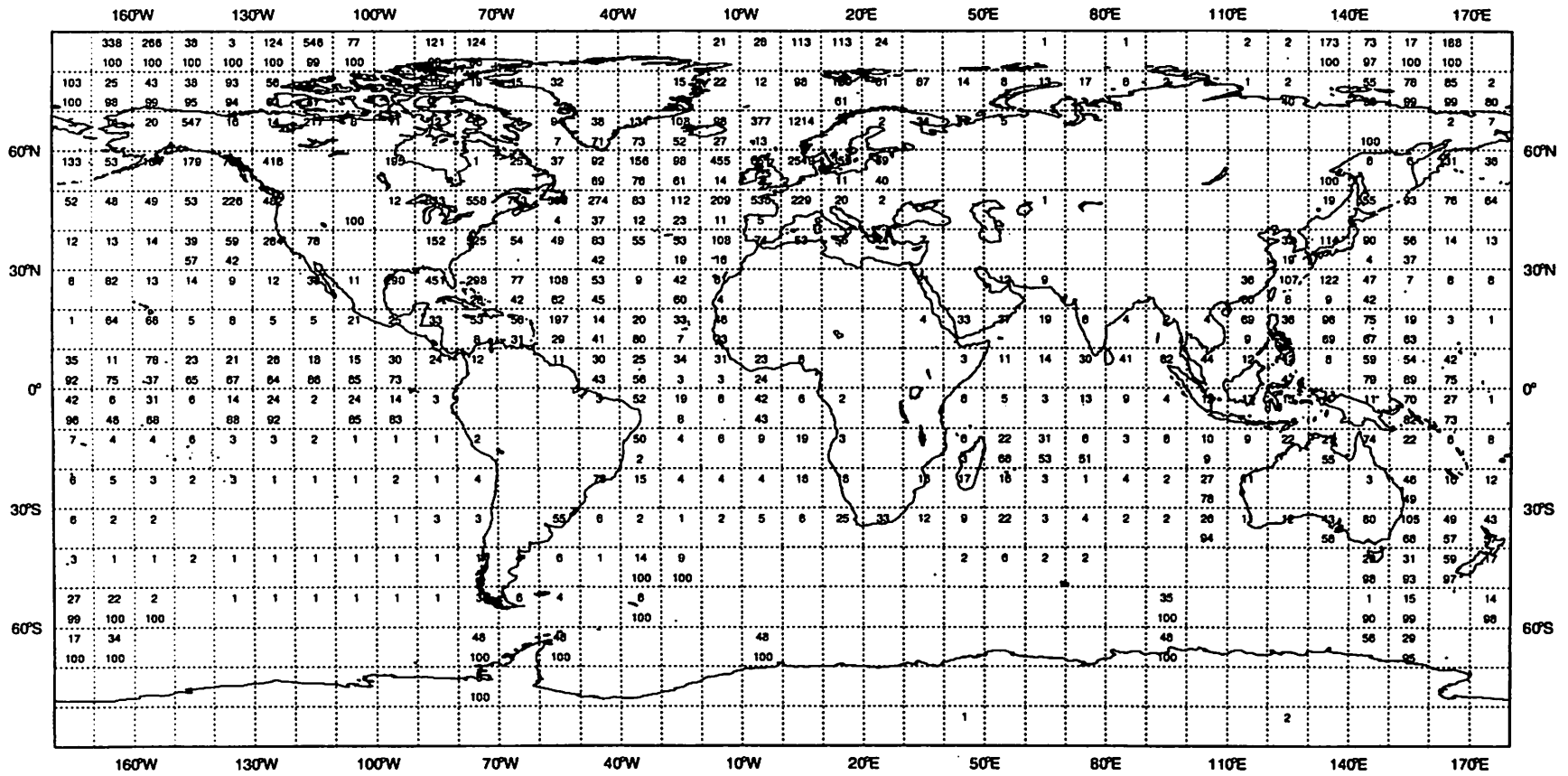


MAGICS 4.2 Solaris - mpma497 - 3 September 1999 14:44:38

METEO FRANCE

METEO - FRANCE **TEMPERATURE** **AUGUST 1999**

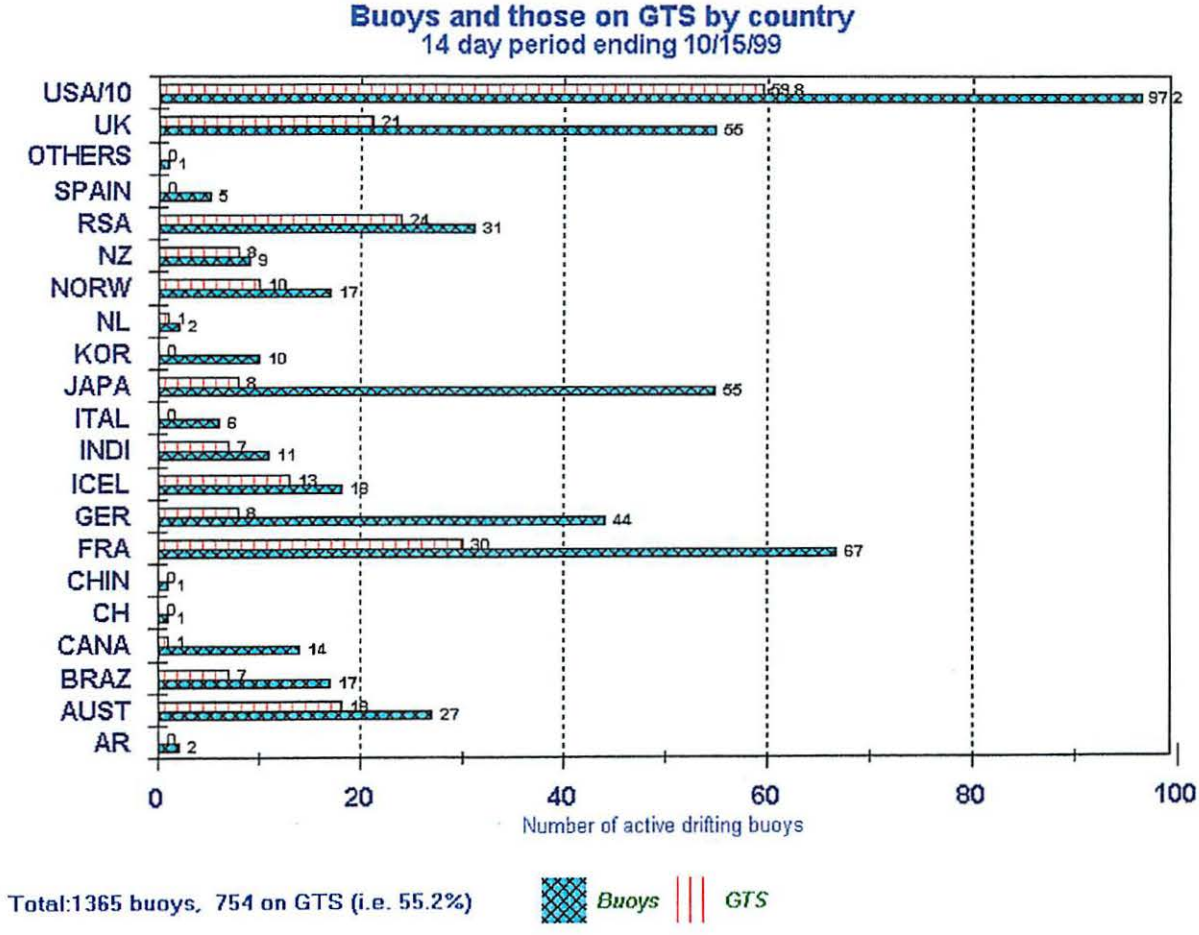
Marsden square distribution chart of mean monthly data availability index (top)
(Index 100 = 8 obs. per day per 500kM * 500kM area of SHIP and BUOY reports)
and
Percentage of BUOY reports compared to SHIP+BUOY reports (bottom)



MAGICS 4.2 Solaris - mpma497 - 3 September 1999 14:44:43

ANNEX IV

Distribution of GTS and non-GTS platforms by country

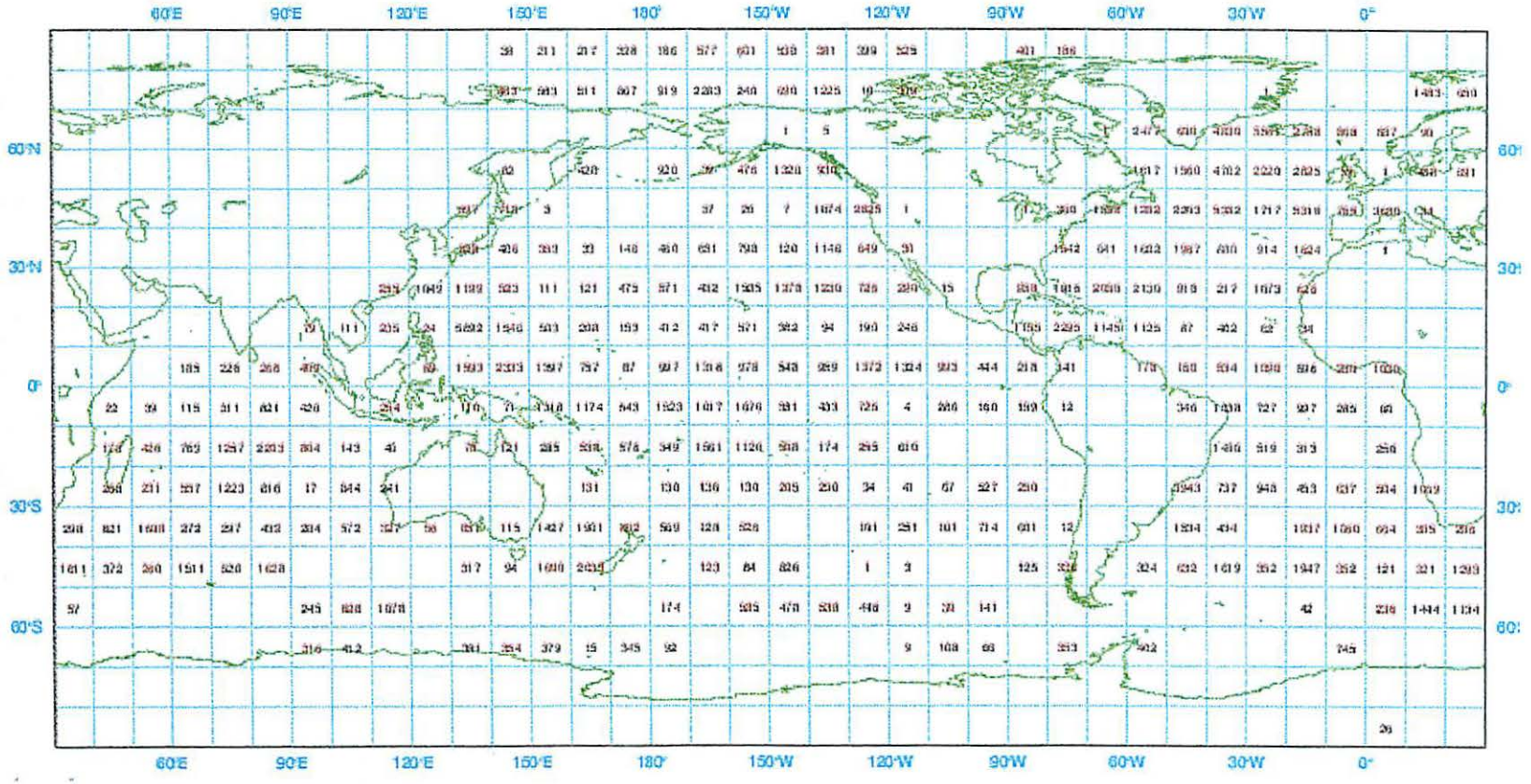


METEO-FRANCE SMISO

Repartition par carre Marsden des observations recues en Octobre 1999

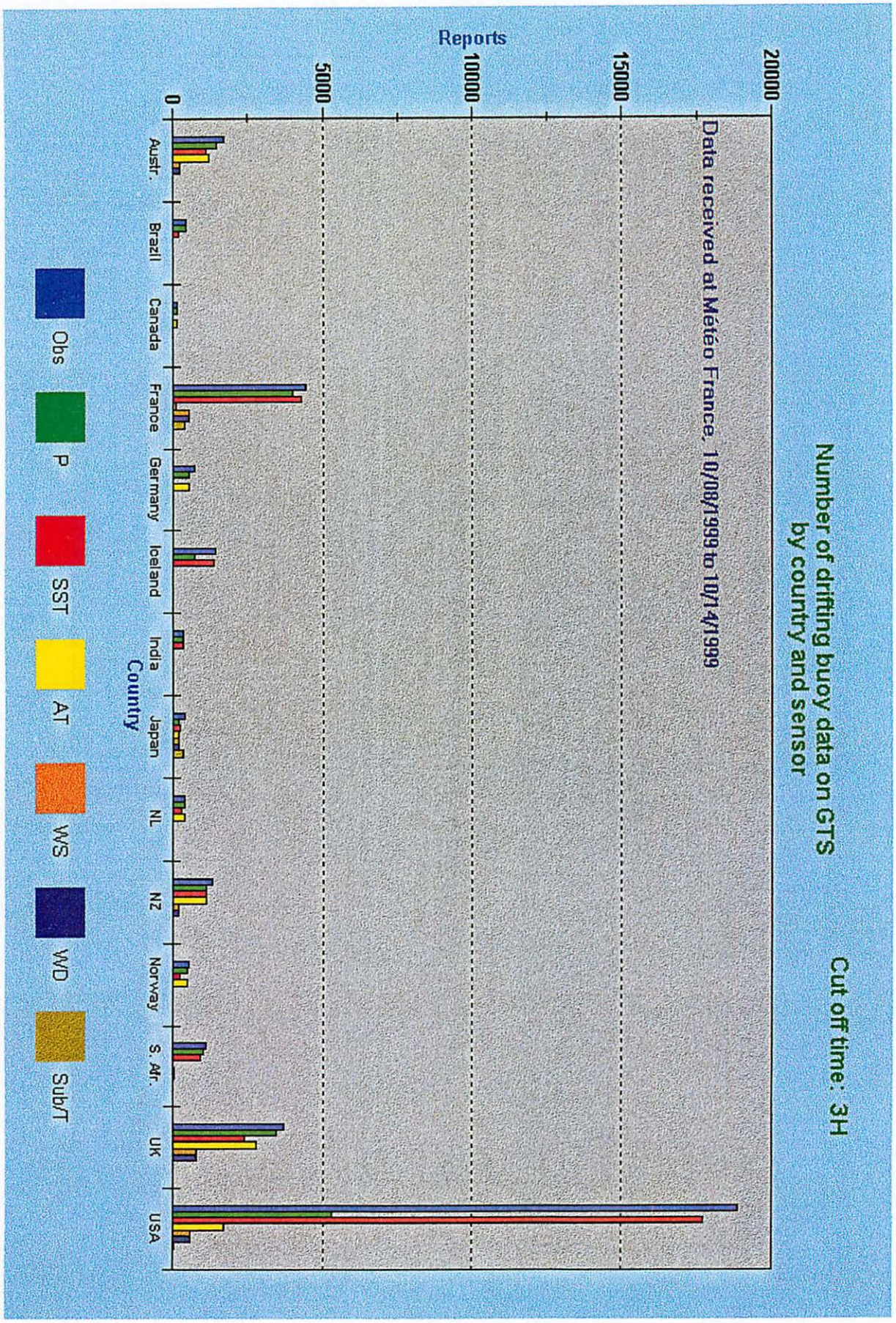
Marsden square distribution chart of data received during October 1999

Messages : BUOY **Total : 244989**



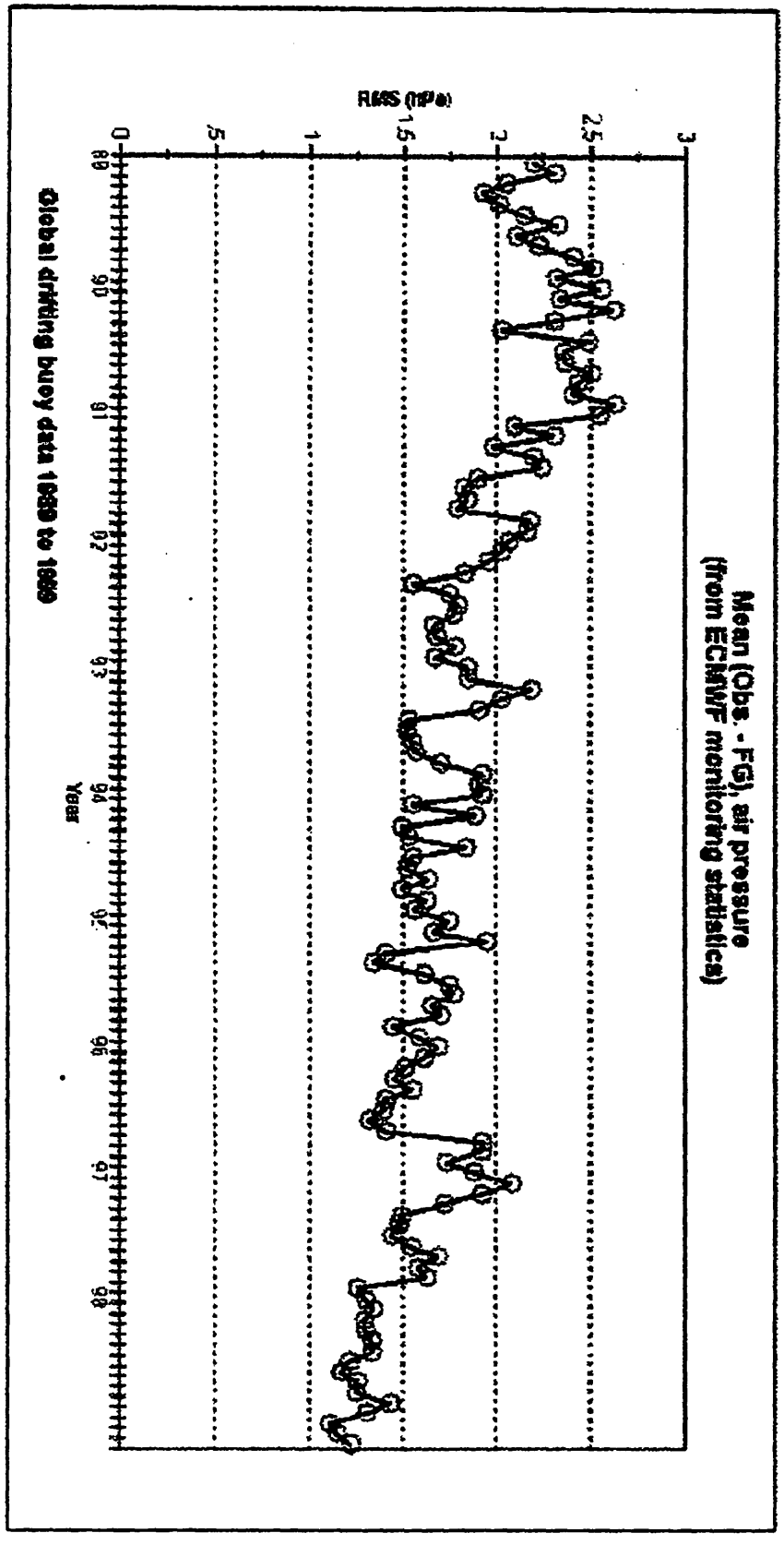
Number of BUOY reports received at Toulouse during October 1999

Distribution of GTS buoy reports by country and variable
(cut off time 3 hours)

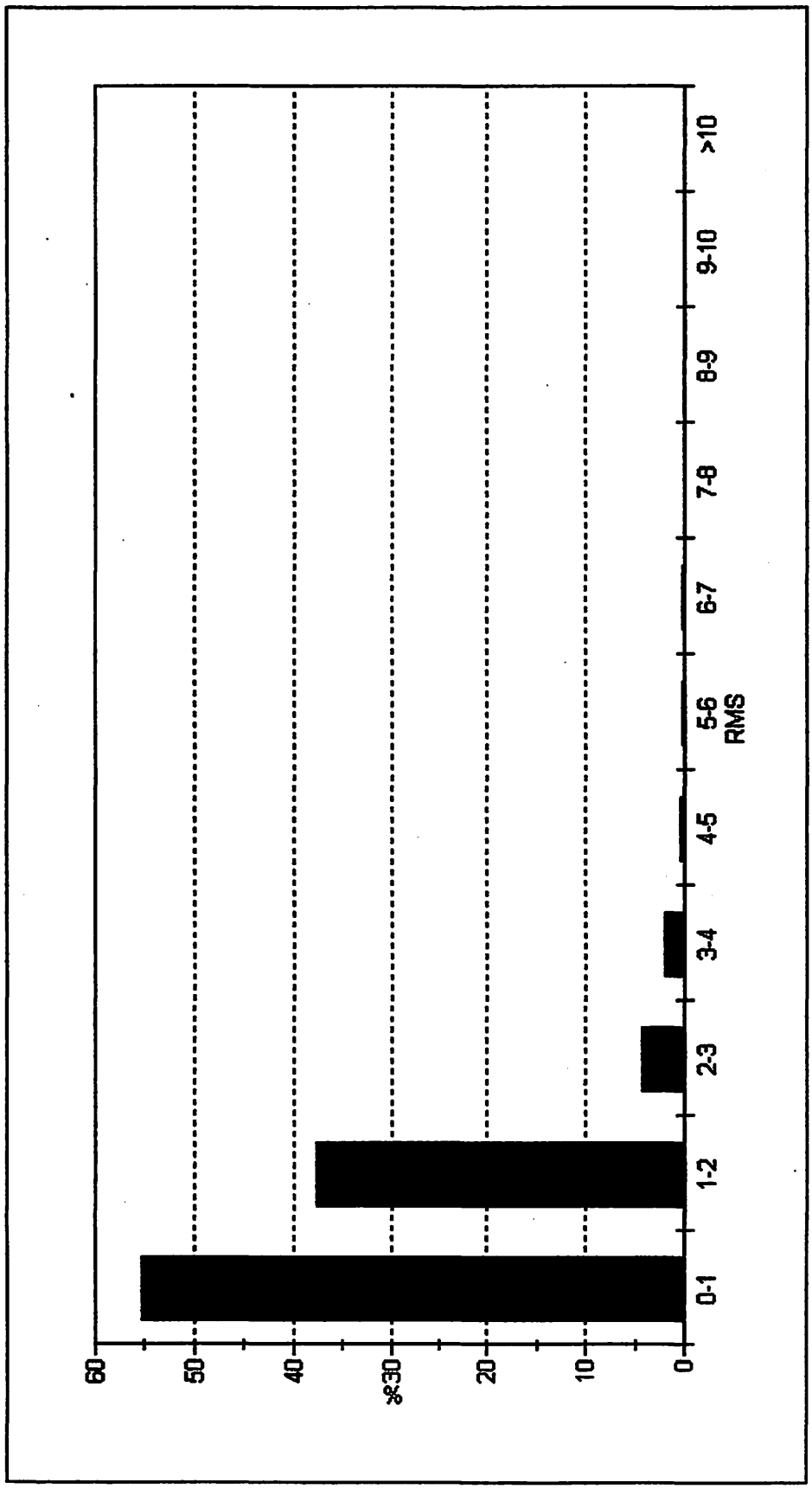


ANNEX VI

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

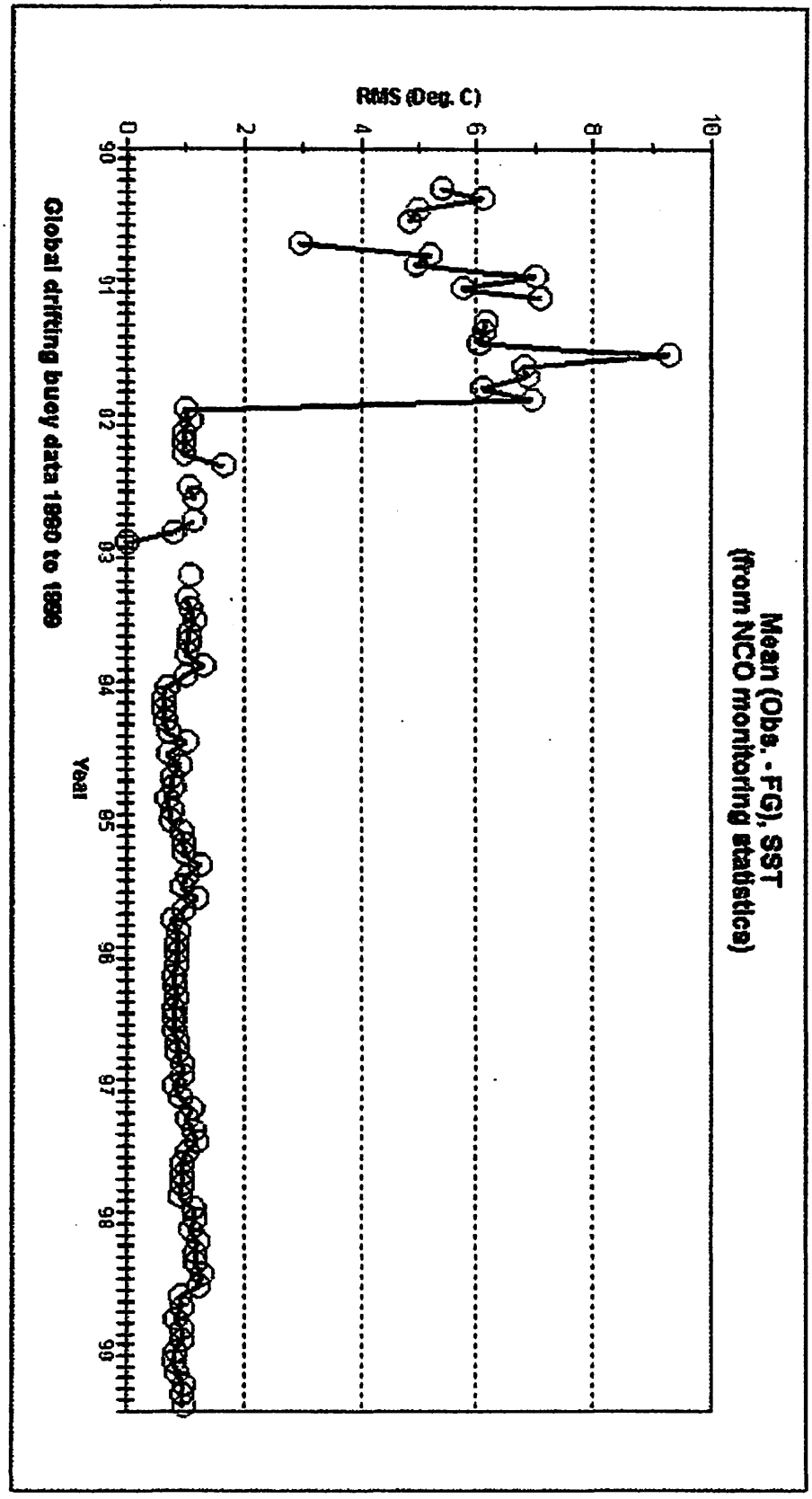


Distribution of RMS (Obs-FG) for DB air pressure data (from ECMWF statistics)

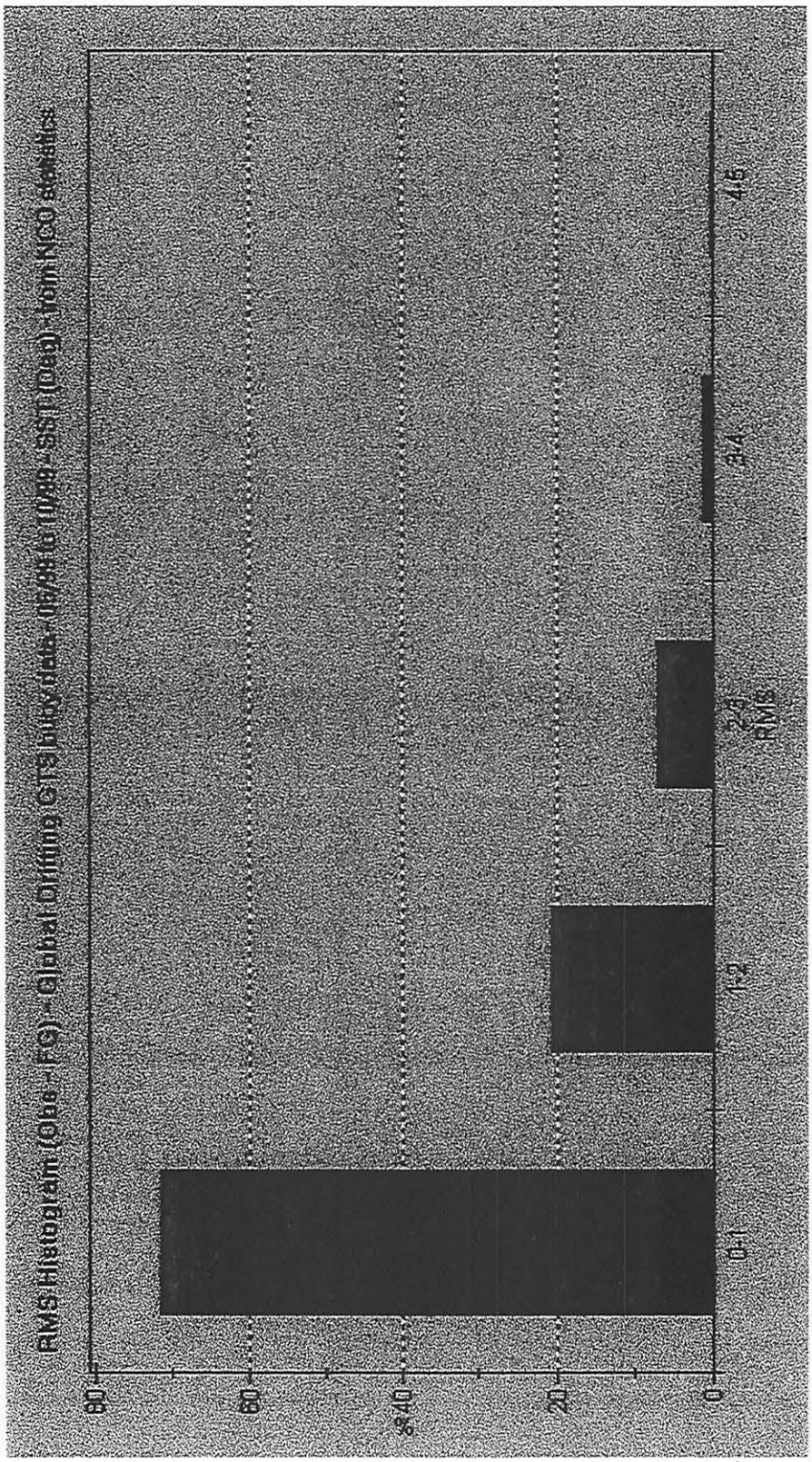


RMS Histogram (Obs - FG) - Global Drifting GTS buoy data - 06/99 to 11/99 - Air Pressure (hPa) - from ECMWF statistics

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

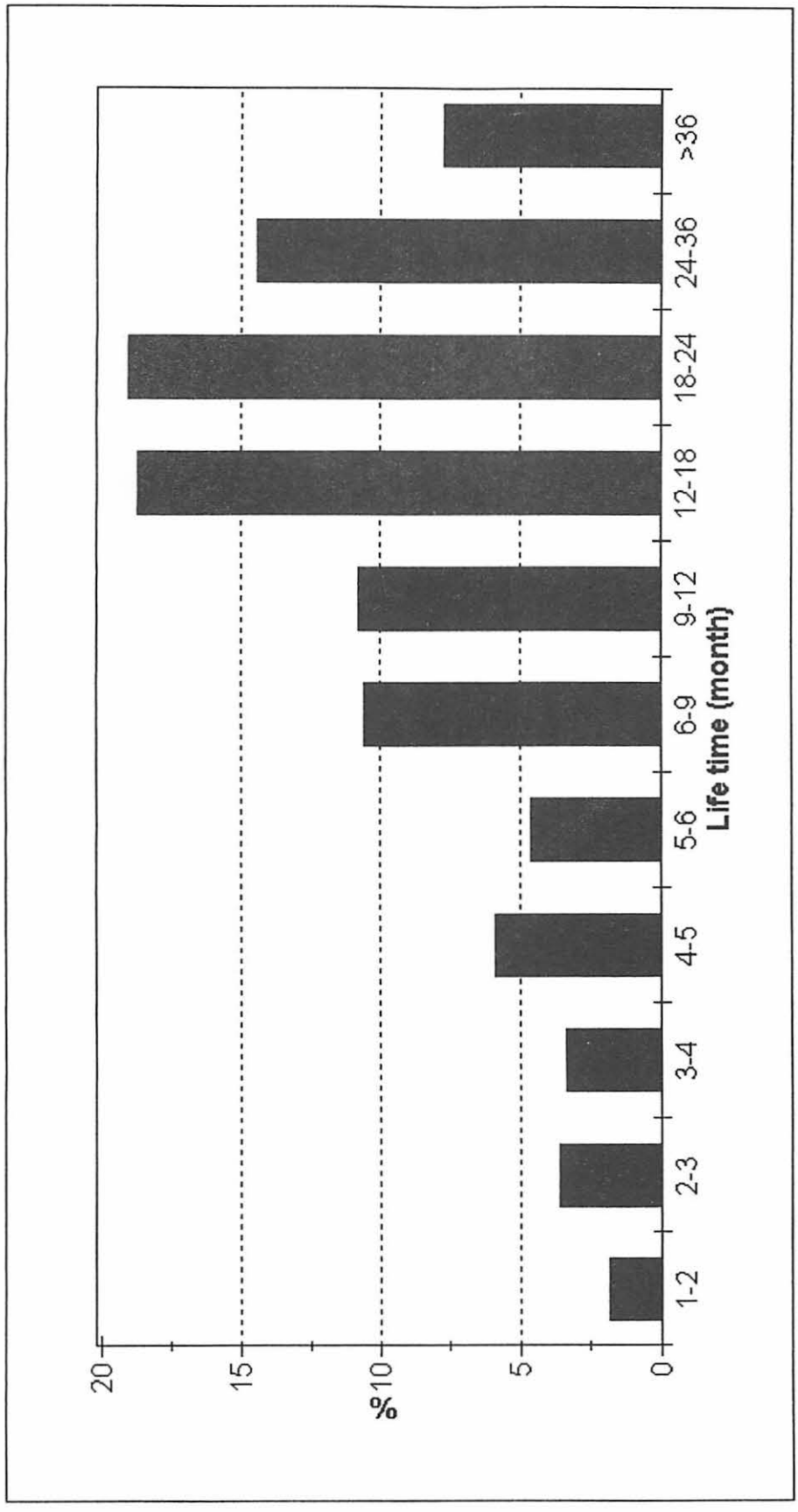


Distribution of RMS (Obs-FG) for DB SST data
(from NCO statistics)



ANNEX VII

Distribution of the life time of the air pressure sensor



Life time distribution, Global drifting buoy Air Pressure data - 10/99 (based on ECMWFstats.)

ANNEX VIII

Report by the Evaluation Sub-Group

1. During the intersessional period, a working group was established to analyze performance of Standard Velocity Program (SVP) drifters, both barometer and wind measuring. These drifters were developed to support the World Ocean Circulation Experiment (WOCE). Elizabeth Horton of the Naval Oceanographic Office (NAVOCEANO) volunteered to serve as chairman of the group. The group has reported a number of results from their analyses.

2. Marlin Scientific Manufacturing Company took results from previous deployments of SVP barometer (SVP-B) drifters and made some improvements in manufacturing procedures to include the barometer port, improved battery brackets, a newly designed power supply, and a new drogue attachment scheme. This was done to increase the reliability of the electronics engineering and mechanics of the drifters, increase the life expectancy, and decrease costs.

3. The Naval Oceanographic Office deployed a total of 70 SVP-B and WS drifters during the October 1998 to October 1999 timeframe. Thirty-seven of these drifters belonged to NAVOCEANO, and the remainder belonged to members of the DBCP. Ten of the NAVOCEANO SVP-B drifters failed on deployment; there were significant numbers of failures with the other group of drifters as well. Deployment locations are provided as attachments. As a consequence of these failures, NAVOCEANO undertook a complete re-design of the deployment package, conducted several tests and deployed large enough numbers of drifters to ensure that the new design is effective. Results since June 1999 have been good.

4. Meteo-France analyzed the data transmitted from the SVP-B and WS drifters during the year, and arrived at several important conclusions. Data collected by the SVP wind drifter was comparable to the older technology FGGE wind drifters equipped with anemometers, once corrections were made due to systematic variations in the magnetic compass readings. It takes between two weeks and two months for biases in the wind data to be identified and corrected. These compass errors are of some concern, and the problem should be further examined during the next intersessional period. Some of the SVP wind drifters deployed in the Atlantic hurricane track gave reliable data for about 400 days, which was longer than expected. This may have been due to higher sea surface temperatures, but the exact reason is undetermined at this time.

5. During the EGOS meeting in May this year, a discussion was held concerning abnormal spikes observed from MetOcean SVP-B drifters equipped with Vaisala barometers. The DBCP Technical Coordinator suggested that perhaps the Vaisala barometer has a greater hysteresis than the AIR barometer, and asked if MetOcean might check into this question. Meteo-France noted that the more time a drifter spends submerged, the more often it reports abnormal over-pressures, and provided a plot of an SVP-B drifter to illustrate the point. Scripps indicated that the barometric pressure algorithm had been thoroughly tested, and wondered whether the manufacturers were following the construction manual, as any deviation would degrade the quality of the algorithm. The SVP/SVP-B Subgroup chairman received a note from Metocean stating that Vaisala barometers are their sensors of choice, and are used unless the purchaser specifies the AIR. MetOcean experienced a software problem in early 1998, which resulted in the occasional low pressure reading, but the problem was resolved. According to MetOcean, the software calculates pressure as described in the construction manual.

6. Marlin was concerned about this issue, so made a careful study of Motorola sensors before proceeding to manufacture their own pressure sensor. Three SVP-B drifters were built for the South African Weather Bureau equipped with Marlin pressure sensors. Marlin determined that their pressure sensors might be adversely effected by low temperatures, so they have implemented a design change to eliminate the potential for a problem. Marlin points out that they build all of the components for their SVP-B drifters, getting reliable data for a low cost. A full report will be presented during the DBCP technical sessions.

7. Meteo-France and Labatoire d'Oceanographie Dynamique et de Climatologie (LODYC) did some interesting work on SVP drifters equipped with conductivity sensors (SVP-BS). They tested three Clearwater drifters off the coast of France from September 1998 until the start of 1999. The SVP-BS drifters were equipped with a Falmouth Scientific, Inc. conductivity sensor. Results were not satisfactory, probably because of a bio-fouling problem near the conductivity probe. Two of the drifters have been recovered and will be re-deployed after being refurbished and painted with a better anti-fouling paint.

8. The United Kingdom Meteorological Office at Beaufort Park has started preliminary testing of two SVP-B WS drifters; they are tethered in a Scottish loch, courtesy of Southampton Oceanography Centre. There is a moored buoy close by measuring winds, among other parameters. SOC plans to attach a hydrophone to the moored buoy system to record the spectral acoustic signal. A full report will be given later. Beaufort Park has also been working with Environment Canada monitoring an SVP-B WS drifter against data from a Canadian moored buoy. A summary of the results to date will be presented during the DBCP Technical Session.

9. A Methuselah SVP-B drifter has been identified. Drifter 22095 (WMO 33906), built by Technocean, was deployed in October 1994 in the South Atlantic (50°S-30°W). It is still reporting five years later, providing reliable air pressure data with a slight bias of 1.5hPa. After completing a 3.5-year loop in the Indian Ocean as far as 100°E, it is back in the Atlantic Ocean (16°S-13°W). This drifter is set with a 1/3-duty cycle, which at least partly explains its longevity. There are two main lessons to be learned:

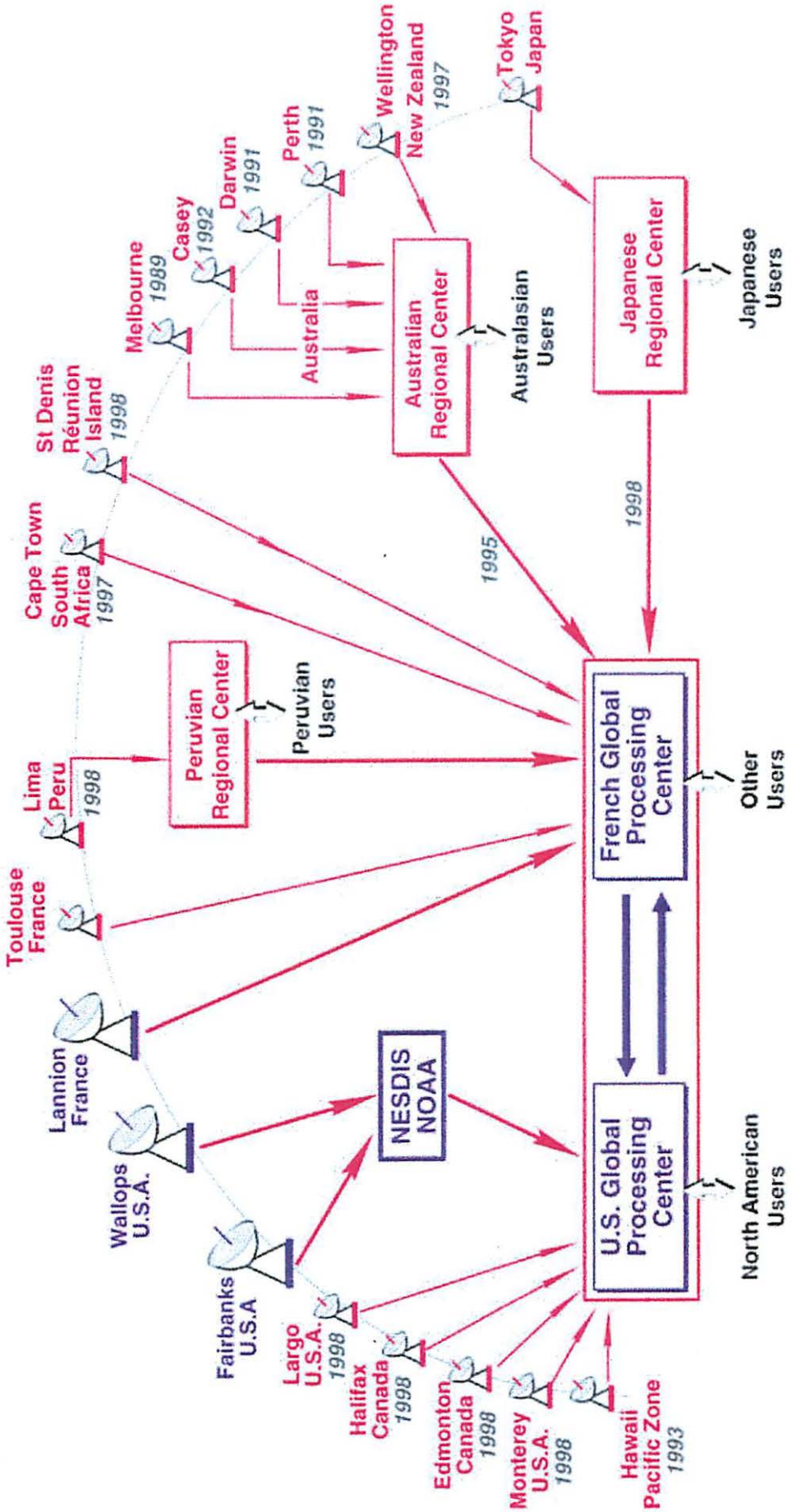
a. barometers can provide reliable measurements for five years or more;

b. the measurement principle, as described in the construction manual, works.

10. Much progress has been made over the course of the year. Some questions still remain, and work still needs to be done. The work should probably be expanded to include the standard SVP drifters, along with variants currently being tested. Participation in this worthy project is strongly encouraged. The chairman would like to thank those who have already put serious effort into the analysis of these emerging technologies.

ANNEX IX

ARGOS REGIONAL RECEIVING STATION NETWORK



ANNEX X

World Meteorological Organization

Data Buoy Co-operation Panel
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	5,456	
Travel	18,321	
Reports	12,179	
		289,012
Balance of Fund	US $	44,705
Represented by.		
Cash at Bank		55,012
Unliquidated obligations		10,307
	US $	44,705

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	-	1575
South Africa	3,000	6,000
UK	17,000	16,000
USA	68,000	83,000
TOTAL	146,552	153,520

Financial Statement by IOC
for the year 1 June 1998 to 31 May 1999
(all amounts in US $ unless otherwise specified)

BALANCE (from previous year)			**$ 30 587**
FUNDS TRANSFERRED FROM WMO (relevant to the period)			
90 000	(18.05.1998)		
15 000	(02.07.1998)		**$ 105 000**
FF 80 000	(02.07.1998)		**FF 80 000**
	TOTAL RECEIPTS		**$ 135 587**
			FF 80 000
EXPENDITURES			
Technical Co-ordinator's employment:			
	- Salary:	66 524	
	- Allowances:	20 710	
	- Relocation (yearly provision):	4 008	**$ 91 242**
Technical Co-ordinator's missions:			
	- La Jolla (22-26 June 1998)	2 778	
	- Seattle (29 July - 4 August 1998)	3 007	
	- Geneva (5-6 October 1998)	1 112	
	- Marathon/Nouméa (12-30 October 1998)	9 187	
	- Paris (30 November 1998)	590	
	- Geneva (8-9 December 1998)	1 167	
	- Piran/Trieste (10-14 January 1999)	1 660	
	- Brest (26-28 May 1999)	2 915	**$ 22 416**
Contract with CLS/Service Argos:			**FF 80 000**
	TOTAL EXPENDITURES		**$ 113 658**
			FF 80 000
BALANCE (at 1 June 1999)			**$ 21 929**

ANNEX XI

NATIONAL FOCAL POINTS FOR THE DBCP
(as of February 2000)

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