INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (OF UNESCO)

WORLD METEOROLOGICAL ORGANIZATION

DATA BUOY CO-OPERATION PANEL

Annual Report for 1995

DBCP Technical Document No. 6

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NOTE

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FOREWORD

I am pleased to present this 1995 Annual Report for the Data Buoy Co-operation Panel.

The Panel has had another successful year, with a considerable amount of work undertaken. The four action groups have operated very well, with the new South Atlantic action group proving particularly successful.

I would like to pay tribute to the retiring Chairman of the Panel, Derek Painting, of the UK Met Office. Derek has been Chairman since 1989 and was instrumental in the successful development of the Panel's activities.

I would like to thank all those who have participated in the work of the Panel and contributed to this ninth annual report.

Graeme Brough
Chairman, DBCP

SUMMARY

Introduction

The Drifting Buoy Co-operation Panel (DBCP) 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

Thirteen countries, four action groups and two data management centres submitted reports on their data buoy activities. Initial action was taken to investigate the establishment of a new action group, the International Buoy Programme for the Indian Ocean (IBPIO); a preparatory meeting in India is planned for February 1996.

2. Real-time data flow

The data from buoys available in real-time is increasing yearly, in September 1995, 631 buoys (44.2% of the total operational buoys) were reporting on the GTS. The total number of active buoys increased by 12.8% compared to the same period last year, and the number of buoys reporting via the GTS increased by 7%.

Data delivery delays to the GTS were investigated in detail by the technical coordinator. The investigation showed that 13% of buoy data are available on GTS after 1 hour; 46% after 2 hours; & 59% after 3 hours.

3. Data Quality

The transfer of the near real-time quality control system from the Omnet Bulletin Board to Internet was successful; the Panel's QC methods continue to be extremely effective in ensuring data quality is maintained at the highest level. Ten Principal Meteorological or Oceanographic Centres responsible for Quality Control of GTS buoy data (PMOC) are now participating in this system.

4. Data archival

The Marine Environmental Data Service (MEDS) in Canada acts as the RNODC for drifting buoys on behalf of the IOC and WMO. MEDS archived approximately 93,000 buoy messages per month throughout the year. The IGOSS Specialised Oceanographic Centre for Drifting Buoys (SOC) operated by Meteo France collects and archives buoy reports daily. The French SOC produces a range of products including monthly global maps of the distribution of ship and drifter reports of wind, pressure, air temperature and sea surface temperature.

5. Technical Developments

The low cost SVP barometer drifter developed by the Scripps Institution of Oceanography (SIO) has proved to be a success with continuing deployments during the past year. A report from the DBCP/SIO Workshop on the SVP barometer drifter held in May 1995 was submitted for the Panel's consideration.

The technical coordinator implemented a DBCP World Wide Web Internet server at NOAA/NOS headquarters in Washington DC.

6. Communications system status

The Argos system has continued to proved a reliable service for recovery and processing of drifting buoy real-time data.

7. Publications

The Panel produced three technical documents in the DBCP series, covering guidance on Argos data collection and location services, guidance on the Argos GTS and construction details for the SVP-B drifter.

8. Administrative matters

The Panel now has four action groups: the European Group on Ocean Stations (EGOS); the International Arctic Buoy Programme (IABP); the International Programme for Antarctic Buoys (IPAB); and the International South Atlantic Buoy Programme (ISABP). The investigation of the commencement of a fifth action group the International Buoy Programme for the Indian Ocean (IBPIO) was agreed during the Panel's sessions.

Twelve countries contributing on a voluntary basis to the financial support of the Panel in 1995 were: Australia, Canada, France, Greece, Iceland, Ireland, Netherlands, New Zealand, Norway, South Africa, United Kingdom and USA.

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

For the Panel's next financial year (1 June 1996 to 31 May 1997), a total budget of US$148,050 - is planned to be allocated as follows:

	US$
IOC salary of technical coordinator	90,000
Travel of technical coordinator	15,000
CLS/Service Argos contract	15,000
WMO Costs	300
Travel of Chairman and publications	20,000
Contingencies	7,750
	148,050

RESUME

Introduction

Le Groupe de coopération pour la mise en oeuvre des programmes de bouées dérivantes (DBCP) a été créé en 1985 en vertu de la résolution 10 du Conseil exécutif de l'OMM (EC-XXXVII) et de la résolution EC-XIX.7 du Conseil exécutif de la COI. En 1993, les organes directeurs de la COI et de l'OMM ont décidé de rebaptiser le groupe "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 nécessaire à la mise en oeuvre des programmes de bouées ancrées qui sont au service des grands programmes de la COI et de l'OMM (voir résolution XVII-6 de la COI et résolution 9 (EC-XLV) de l'OMM).

1. Programmes en cours et prévus

Treize pays, quatre groupes d'action et deux centres de gestion des données ont présenté des rapports sur leurs activités de collecte de données à partir de bouées de mesure. Il a été décidé de mettre à l'étude la mise en place d'un nouveau groupe d'action, le Programme international de bouées dans l'océan Indien (IBPIO) ; une réunion préparatoire est prévue en Inde pour février 1996.

2. Flux de données en temps réel

Le volume des données fournies par les bouées en temps réel augmente d'année en année. En septembre 1995, 631 bouées (soit 44,2 % des bouées opérationnelles) transmettaient leurs données sur le SMT. Le nombre total des bouées en service a augmenté de 12,8 % par rapport à la même période de l'année précédente, tandis que le nombre des bouées transmettant leurs données par le SMT a augmenté de 7 %.

Le coordonnateur technique a procédé à une enquête approfondie concernant les délais de communication des données au SMT. Celle-ci a révélé que ce délai était de plus d'une heure pour 13 % des données recueillies par les bouées, de plus de deux heures pour 46 % et de plus de trois heures pour 59 % d'entre elles.

3. Qualité des données

L'opération de transfert du système de contrôle de la qualité en temps quasi réel du panneau d'affichage d'Omnet sur Internet s'est bien passée ; les méthodes de contrôle de la qualité des données du Groupe permettent toujours d'assurer avec une extrême efficacité le maintien du plus haut niveau de qualité. Dix centres météorologiques ou océanographiques principaux (PMOC) responsables du contrôle de la qualité des données transmises par les bouées sur le SMT participent maintenant à ce système.

4. Archivage des données

Le Service de données sur l'environnement marin (MEDS), au Canada, fait office de CNDOR chargé des bouées dérivantes au nom de la COI et de l'OMM. Ce service a archivé mensuellement quelque 93.000 messages de bouées sur l'année. Le Centre océanographique spécialisé du SMISO pour les bouées dérivantes (SOC), qui est géré par Météo-France, reçoit et archive quotidiennement les messages de bouées. Le SOC français confectionne une série de

produits, parmi lesquels des cartes mensuelles de la répartition, à l'échelle du globe, des messages de navires et de bouées dérivantes portant sur le vent, la pression, la température de l'air et la température de la surface de la mer.

5. Réalisation technique

Le dériveur SVP à baromètre peu coûteux mis au point par la Scripps Institution of Oceanography (SIO) a donné d'excellents résultats, et les mises à l'eau se sont poursuivies l'an passé. Un rapport de l'Atelier DBCP/SIO consacré au dériveur SVP-B en mai 1995 a été soumis au Groupe.

Le coordonnateur technique a mis en place un serveur World Wide Web du DBCP sur Internet au Siège de la NOAA/NOS, à Washington D.C.

6. Etat du système de communication

Le service Argos a continué de donner satisfaction en matière de collecte et de traitement des données de bouées en temps réel.

7. Publications

Le Groupe a publié, dans la collection du DBCP, trois documents techniques - un guide des services Argos de collecte de données et de localisation, un guide du sous-système Argos pour le SMT et un manuel d'instructions pour la fabrication du dériveur SVP-B.

8. Questions administratives

Douze pays ont contribué volontairement au financement du Groupe en 1995, à savoir : l'Afrique du Sud, l'Australie, le Canada, les Etats-Unis, la France, la Grèce, l'Irlande, l'Islande, la Norvège, la Nouvelle-Zélande, les Pays-Bas et le Royaume-Uni.

Le coordonnateur technique du Groupe, M. Etienne Charpentier, est employé par l'UNESCO/COI à titre d'expert financé sur des fonds-en-dépôt, au CLS/Service Argos à Toulouse (France).

Pour le prochain exercice financier (1er juin 1996 - 31 mai 1997), un budget total de 148.050 dollars est prévu, qui devrait être réparti comme suit :

	$
Traitement COI du coordonnateur technique	90.000
Voyages du coordonnateur technique	15.000
Contrat CLS/Service Argos	15.000
Dépenses OMM	300
Voyages du président et publications	20.000
Dépenses imprévues	7.750
	148.050

РЕЗЮМЕ

Введение

Группа сотрудничества по дрейфующим буям (ДБКП) была учреждена в 1985 г. в соответствии с резолюцией 10 ВМО (ЕС-XXXVII) и резолюцией Исполнительного совета МОК ЕС-XIX.7. В 1993 г. руководящие органы МОК и ВМО решили изменить название этой Группы, которая стала называться Группой сотрудничества по буям для сбора данных (ДБКП), а также изменить в незначительной степени ее полномочия с тем, чтобы она могла оказывать необходимую поддержку международной координации программ по заякоренным буям для целей поддержки основных программ ВМО и МОК (резолюция XVII-6 Ассамблеи МОК и резолюция 9 ВМО (ЕС-XLV)).

1. Текущие и запланированные программы

Тринадцать стран, четыре группы действий и два центра по управлению данными представили отчеты о проведенной ими работе, связанной со сбором данных с помощью буев. Были приняты шаги с целью изучения возможности создания новой группы действий – Международной программы по буям в Индийском океане; на февраль 1996 г. с этой целью запланировано проведение подготовительного совещания в Индии.

2. Поток данных в реальном масштабе времени

Ежегодно увеличивается объем данных, поступающих с буев в реальном масштабе времени. К сентябрю 1995 г. 631 буй (44,2% от общего количества действующих буев) передавали данные в ГСТ. По сравнению с тем же периодом предшествующего года общее число действующих буев увеличилось на 12,8%, а число буев, передающих данные в ГСТ, увеличилось на 7%.

Техническим координатором были детально изучены причины задержек с поступлением данных в ГСТ. Это исследование показало, что 13% данных, получаемых с буев, поступает в ГСТ по истечении одного часа, 46% – по истечении двух часов и 59% – по истечении трех часов.

3. Качество данных

Успешно осуществился переход от системы контроля за качеством данных в близком к реальному масштабу времени на основе "информационного бюллетеня в рамках сети Омнет к системе контроля качества в рамках системы Интернет; используемые Группой методы оказались исключительно эффективными в плане обеспечения контроля за качеством данных на самом высоком уровне. Основные метеорологические и океанографические центры, отвечающие за контроль за качеством данных, поступающих в ГСТ с буев, принимают в настоящее время участие в работе этой системы.

4. Архивация данных

Служба данных о морской среде (МЕДС) в Канаде выступает в качестве ОНЦОД по дрейфующим буям от имени МОК и ВМО. МЕДС архивировала в месяц в течение года приблизительно 93 000 сообщений, содержащих данные, поступающие с буев. Специализированный центр океанографических данных ОГСОС по дрейфующим буям (СОЦ), который действует под эгидой метеослужбы Франции, осуществляет сбор и архивацию ежедневных сводок данных, поступающих с буев. Продукция, производимая французским СОЦ, включает, помимо прочего, в себя ежемесячные глобальные карты распространения сводок с судов и дрейфующих буев с данными по ветру, давлению, температуре воздуха и температуре поверхности моря.

5. Технические аспекты деятельности

Недорогостоящий дрейфующий буй для установки СВП-барометра (СВБ-Б), разработанный Скрипсоновским океанографическим институтом, был успешно освоен и начал устанавливаться в ходе прошедшего года. На рассмотрение Группы был представлен доклад участников семинара, организованного ДБКП и Скрипсоновским океанографическим институтом по вопросу о СВБ-барометре, который состоялся в мае 1995 г.

По решению технического координатора сервер, действующий в рамках Всемирной сети Интернет, будет установлен в штаб-квартире Национального управления по океану и атмосфере/Национальной океанической службы в Вашингтоне, ОК.

6. Положение дел с системой связи

Система АРГОС по-прежнему обеспечивала надежное обслуживание в плане получения и обработки данных с дрейфующих буев в реальном масштабе времени.

7. Публикации

В серии ДБКП Группой были опубликованы три технических документа: руководство по сбору данных в рамках Аргос и расположению точек обслуживания; руководство по ГСТ АРГОС, а также документ, посвященный конструкции дрейфующего СВБ-барометра.

8. Административные вопросы

В рамках Группы экспертов в настоящее время действуют четыре группы действий: Европейская группа по океанографическим станциям (ЕГОС); группа по программе ВМО по арктическим буям (ИАПБ); группа по Международной программе по антарктическим буям (ИПАБ); и группа по Международной программе по буям в Южной Атлантике (ИСАБП). В ходе заседаний Группы экспертов было также решено начать изучение вопроса о создании пятой группы по Международной программе по буям для Индийского океана.

Финансовая поддержка в 1995 г. Группе была оказана на добровольной основе следующими странами: Австралия, Греция, Ирландия, Исландия, Канада, Нидерланды, Новая Зеландия, Норвегия, Соединенное Королевство, США, Франция и Южная Африка.

Технический координатор Группы г-н Этьен Шарпантье по-прежнему работал в качестве эксперта в рамках целевого фонда ЮНЕСКО/МОК и находился в службе КЛС/АРГОС в Тулузе, Франция.

В следующем финансовом году (1 июня 1996 г. – 31 мая 1997 г.) предполагается, что общая сумма бюджета Группы составит 148 050 долл. в следующей разбивке:

	долл. США
Оклад технического координатора МОК	90 000
Оплата дорожных расходов технического координатора	15 000
Контракт со службой КЛС/АРГОС	15 000
Расходы по линии ВМО	300
Оплата дорожных расходов Председателя и публикации	20 000
Непредвиденные расходы	7 750
	148 050

RESUMEN

Introducción

El Panel de Cooperación sobre Boyas a la Deriva (DBCP) fue creado en 1985 por la Resolución 10 (EC-XXXVII) de la OMM y la Resolución EC-XIX.7 de la COI. En 1993, los órganos rectores de la COI y la OMM acordaron cambiar el nombre del grupo por el de Panel de Cooperación sobre Boyas de Acopio de Datos (DBCP) y modificar ligeramente su mandato, de manera que el Panel pudiera suministrar también la coordinación internacional necesaria para los programas de boyas fondeadas que sirven de apoyo a los principales programas de la OMM y la COI (Resolución XVII-6 de la COI y Resolución 9 (EC-XLV) de la OMM).

1. Programas actuales y previstos

Trece países, cuatro grupos de acción y dos centros de gestión de datos presentaron informes sobre sus actividades en materia de boyas de acopio de datos. Se tomaron las primeras disposiciones para estudiar el establecimiento de un nuevo grupo de acción, el Programa Internacional de Boyas en el Océano Indico (IBPIO). Está previsto celebrar una reunión de preparación en la India en febrero de 1996.

2. Flujo de datos en tiempo real

Siguen aumentando cada año los datos de boyas disponibles en tiempo real. En septiembre de 1995 estaban transmitiendo datos por el SMT 631 boyas (44,2% del total de boyas operacionales). El número total de boyas activas aumentó en 12,8% en comparación con el mismo periodo del año anterior, y la cantidad de boyas que estaban transmitiendo por el SMT aumentó en 7%.

El Coordinador Técnico investigó en detalle las demoras de suministro de datos al SMT. La investigación mostró que 13% de los datos de las boyas estaban disponibles en el SMT en una hora; 46% en dos horas, y 59% en tres horas.

3. Calidad de los datos

Se realizó con éxito la transferencia del sistema de control de calidad en tiempo casi real del Boletín Omnet a Internet. Los métodos de control de calidad del Panel siguen siendo sumamente eficaces en el mantenimiento de la calidad de los datos al más alto nivel. Diez centros meteorológicos u oceanográficos principales responsables del control de calidad de los datos de boyas de SMT (PMOC) están participando ahora en este sistema.

4. Archivado de datos

El Servicio de Datos sobre el Medio Marino (MEDS) del Canadá actúa como centro nacional responsable de datos oceanográficos para las boyas a la deriva en nombre de la COI y de la OMM. El MED archivó aproximadamente 93.000 mensajes de boyas por mes durante el año. El Centro Oceanográfico Especializado (SOC) de Boyas a la Deriva del IGOSS operado por Meteo France reúne y archiva diariamente informes de boyas. Entre los productos del SOC francés figuran mapas mundiales mensuales de la distribución de informes de buques y derivadores acerca del viento, la presión, la temperatura del aire y la temperatura de la superficie del mar.

5. Evolución técnica

El derivador del barómetro SVP económico desarrollado por el Instituto Oceanográfico de Scripps (SIO) dio buenos resultados en los despliegues permanentes del año pasado. Un informe del

seminario de DBCP/SIO sobre el derivador del barómetro SVP celebrado en mayo de 1995 fue sometido a la consideración del Grupo.

El coordinador técnico instaló un servidor de DBCP de la World Wide Web de Internet en la sede de la NOAA/NOS en Washington, D.C.

6. Situación del sistema de comunicaciones

El sistema Argos ha seguido suministrando servicio fiable para la recuperación y el procesamiento de datos de boyas a la deriva en tiempo real.

7. Publicaciones

El Panel produjo tres documentos técnicos de la serie de DBCP relacionados con la orientación respecto al acopio de datos de Argos y con los servicios de localización, orientación sobre el SMT Argos y detalles de fabricación para el derivador SVP-B.

8. Cuestiones administrativas

El Panel tiene ahora cuatro 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 (IPAB) y el Programa Internacional de Boyas en el Atlántico Sur (ISABP). Durante las reuniones del Panel se convino estudiar la posibilidad de iniciar un quinto grupo de acción: el Programa Internacional de Boyas en el Océano Indico (IBPIO).

Doce países hicieron contribuciones voluntarias para financiar el Panel en 1995: Australia, Canadá, Francia, Grecia, Islandia, Irlanda, Países Bajos, Nueva Zelandia, Noruega, Sudáfrica, Reino Unido y Estados Unidos de América.

El Coordinador Técnico del Panel, el Sr. Etienne Charpentier, ha seguido al servicio de la UNESCO-COI como experto con cargo al fondo fiduciario, destinado en el CLS/Servicio Argos en Tolosa, Francia.

Para el próximo ejercicio financiero del Panel (1° de junio de 1995 a 31 de mayo de 1997), está previsto un presupuesto total de 148.050 dólares estadounidenses desglosados así:

	Dólares
Sueldo del Coordinador Técnico de la COI	90.000
Viajes del Coordinador Técnico	15.000
Contrato CLS/Servicio Argos	15.000
Costos de la OMM	300
Viajes del Presidente y publicaciones	20.000
Gastos varios	7.750
	148.050

REPORT

1. CURRENT AND PLANNED PROGRAMMES

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

2. REAL-TIME DATA FLOW

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

During September 1995, data from a total of 1429 buoys were collected and processed at the Argos Global Processing Centres in Toulouse, France, and Landover, Maryland, USA, for distribution in real time and delayed mode to the respective Principal Investigators. These buoys were operated by nineteen countries. (A detailed breakdown by organizations and countries is given for the month of January 1996 in Annex IV).

Some 44% (631) of the 1429 buoys transmit there data over the GTS in real- or quasi real-time. At the same time, in 1994, the total number of buoys was 1246 and 47% of them (587) were transmitting data over the GTS. The proportion of the buoys reporting over the GTS decreased slightly as compared to last year, but their number actually increased because of the increase in the number of operational buoys. (The number and location of BUOY reports received in Toulouse during December 1995 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 to identify data sparse areas for each kind of geophysical variables. The index is indeed representative of how the requirements (such as of WWW, WCRP or goos) 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 Landover both receive real-time and delayed-mode data from the ground stations in Fairbanks, Alaska, Wallop Island, Virginia, and Lannion, France. Hardware problems on the Argos Data Decommutator (ADD) unit at the NOAA Satellite Operations Control Centre, which delayed data availability in the United States, were solved in October 1994, hence improving slightly data reception performance as compared to 1994.

Roughly 60% of Argos platforms are within the real-time coverage of Fairbanks, Wallop Island and Lannion. For these platforms, an average of 95% of the reports are made available to users within less than one hour (see Figure 1). For the other 40% of the transmitters, 80% of the data are delivered within three hours (see Figure 2).

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 an improvement in quality of air pressure data disseminated over the GTS as compared to last year, with a mean RMS difference of the data compared with ECMWF analyses of around 1.2 hPa (see Annex VI).

Such a result is likely attributable, at least in part, to the implementation of the quality control guidelines for GTS data. These guidelines were adopted by the Panel at its seventh session (Toulouse,

Figure 1 - Real-time coverage

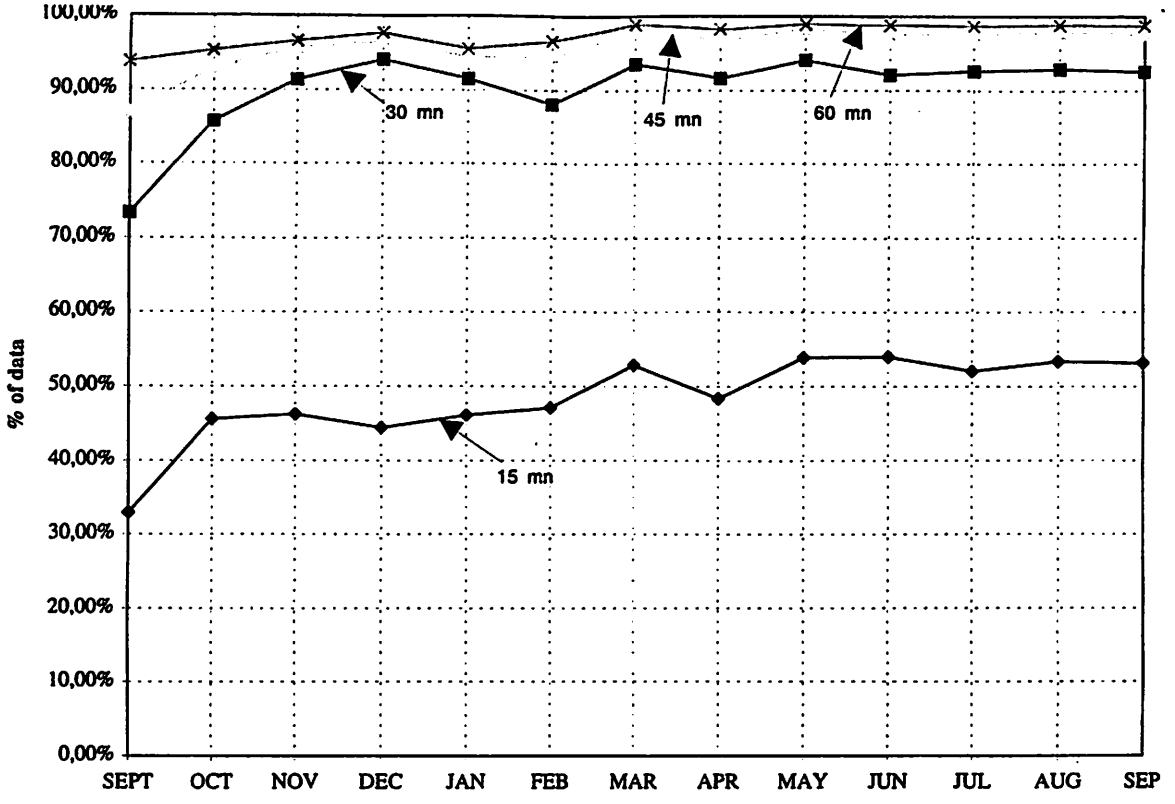
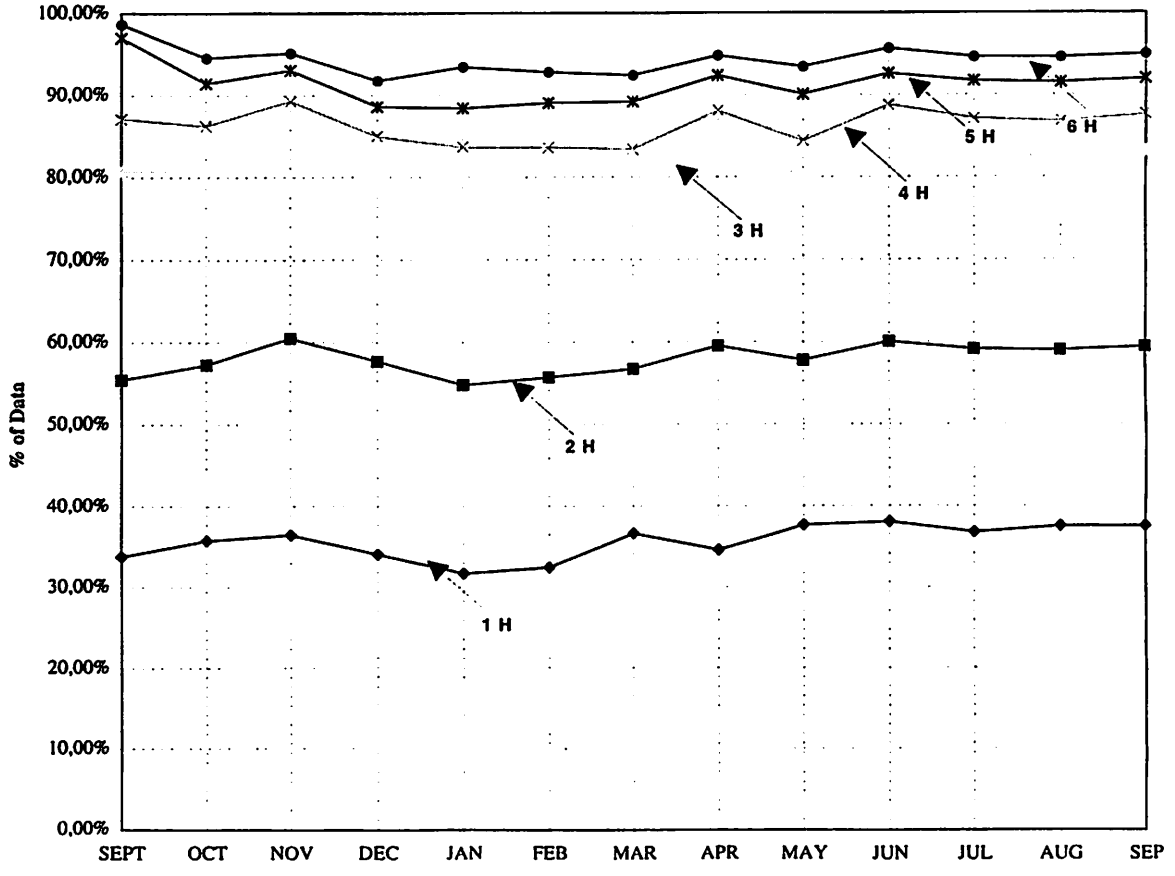


Figure 2 - Global coverage



October 1991) for implementation on a trial basis as from 1 January 1992. They were based on an electronic bulletin board maintained through Omnet, where principal meteorological or oceanographic centres responsible for GTS buoy data quality control could deposit status change proposals. At its eighth session (Paris, October 1992), the Panel reviewed and assessed the implementation of the guidelines and decided to continue operating them with no modification. At its tenth session (La Jolla, November 1994), to cope with the fact that Omnet was stopping by the end of 1994, the Panel decided to move from the Omnet bulletin board to an Internet distribution list. The quality control guidelines for GTS data, as revised by DBCP-X, are given in Annex VII.

The Panel also decided to establish a World Wide Web server dedicated to the DBCP. The server was implemented at the NOAA/NOS and is maintained with the assistance of the Technical Co-ordinator. A copy of the home page of the DBCP server is given on page 4 for information.

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, pages 1 to 10. In addition, Annex VIII contains the drifting buoy track charts prepared by MEDS for the Months of August to December 1995.

5. TECHNICAL DEVELOPMENTS

5.1 Combined meteorological/oceanographic drifting buoy

Since its third session, the Panel has been increasingly involved in efforts to persuade meteorologists and oceanographers to collaborate on combined meteorological/oceanographic drifting buoys. The Global Drifter Centre (GDC) at the Scripps Institution of Oceanogrphy (SIO), La Jolla, of the WOCE/TOGA Global Surface Velocity Programme (SVP) was responsible for the development of a low-cost Lagrangian drifter equipped with a barometer port. The Panel, through the Meteorological agencies of Australia, Canada, France and the United Kingdom, collaborated actively with the GDC in the field test of some 25 prototype "barometer" drifters (SVP-B).during the period August 1992 to October 1993.

At its ninth session (Athens, October 1993), the Panel reviewed the results of the first DBCP-SIO Workshop on SVP Barometer Drifter Evaluation (SIO, May 1993). It recognized that the design of the SVP-B, with a few modifications, could be considered as successful and commercial production began. To assist those potentially interested in manufacturing SVP-Bs, the *WOCE Surface Velocity Programme Barometer Drifter Construction Manual* was prepared jointly by the SIO and the DBCP and published, in September 1995, as No. 4 in the DBCP technical document series. A list of current SVP-B manufacturers is given in Annex IX for information.

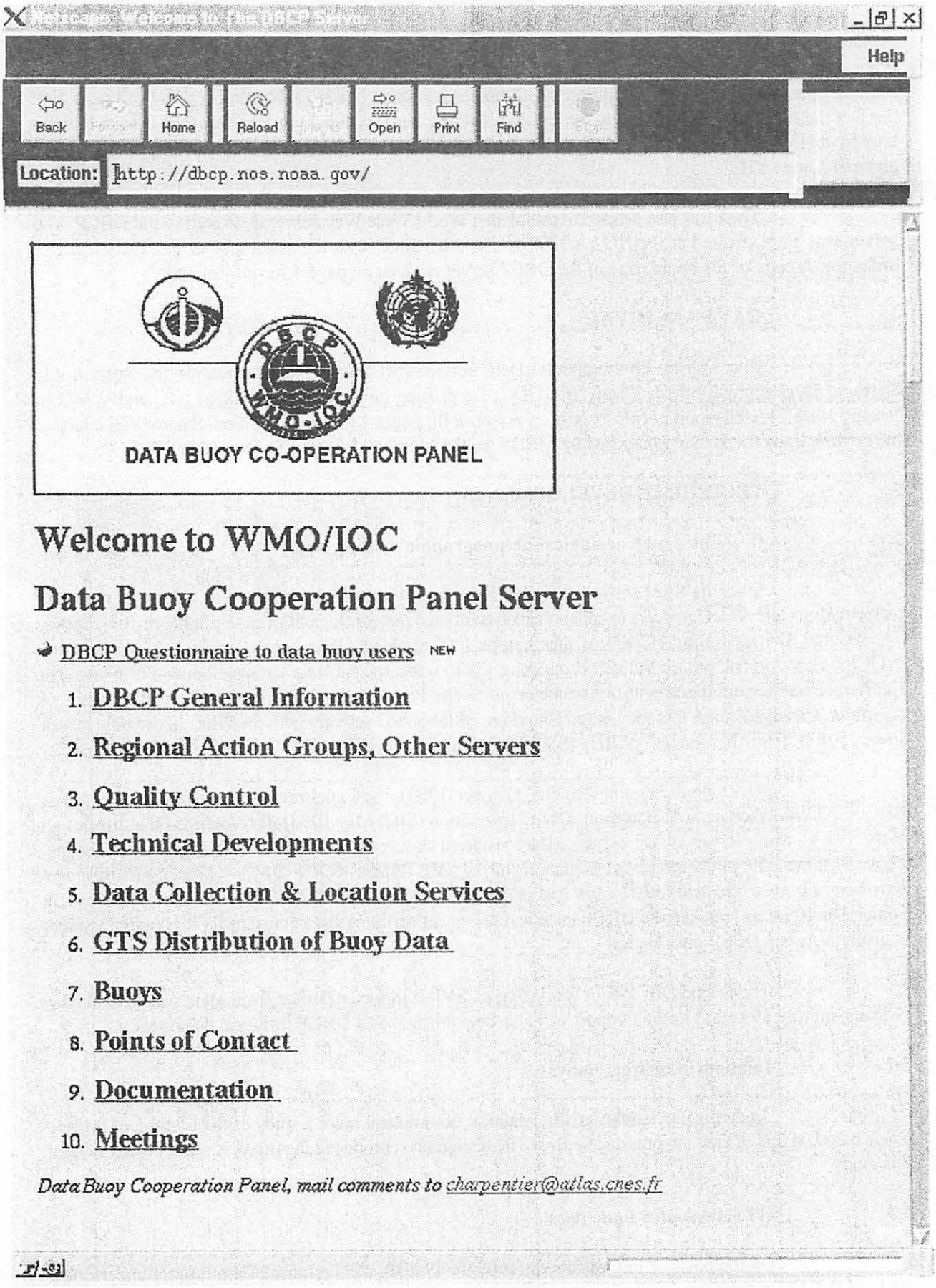
The second DBCP-SIO Workshop on SVP Barometer Drifter Evaluation was held in New Orleans, in May 1995 and its final report will also be published as a DBCP technical document.

5.2 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 X shows the results of this study.

5.3 GTS delays for buoy data

On the basis of initially a request by the ISABP, the Technical Co-ordinator undertook a study of the delays between the observation time and the time when the data is globally available onto the GTS. The results of this study are reproduced in Annex XI.



The home page of the World Wide Web DBCP server

6. COMMUNICATION SYSTEM STATUS

6.1 Argos system

6.1.1 SPACE SEGMENT

Two satellites are operational: NOAA-12 (D) and NOAA-14 (J) (which was launched on 30 December 1994). Some instruments of NOAA-9 (F) are out of order and its processing was stopped by mid-August 1995 (but see also below paragraph 6.1.2). CLS asked for NOAA-11 (H) to be converted from backup to third satellite at the same period of time, which did not prove feasible for other data priority reasons. An alternative system is being developed by CLS to determine the requied precise orbitography on a regional basis.

6.1.2 GROUND SEGMENT

The ground stations are fully operational and give complete satisfaction. Work is however underway to obtain better distribution of the NOAA-9 (F) telemetry. The Argos Operations Committee set up a working group in June 1995 to look into ways of overcoming the problem. The telecomunication link between France and the USA is working well.

The Argos Global Processing Centres in Toulouse and Landover were operational over 99.5% of the time, despite major upgrades to the Toulouse centre architecture. The architecture is now distributed, so that the various satellite-based applications operated are more independant and better optimized. This implies that it is now possible to upgrade the computers individually, e.g. those running Argos applications.

The GTS sub-sytem remains fully operational.

6.1.3 ARGOS ENHANCEMENT

CLS/Service Argos is seeking user community input to the planning process for future system development and operation. To that end, two future periods are dealt with separately: the *Second Generation Argos* (1996-2001) and the *Third Generation Argos* (beyond 2001).In summary, the enhancements described fall under the following six categories:

(i) wider frequency bandwidth;
(ii) increased on-board capacity;
(iii) increased receiver sensitivity;
(iv) more satellites processed;
(v) downlink messaging
(vi) geostationary satellite for relaying in real-time data collected.

The document *Argos Enhancement: A call for User Community Response* is available with CLS or Service Argos Inc. for more detailed information.

6.2 Directions in satellite communication systems

Space-based methods currently in use rely on geostationary earth orbiting (GEO) satellites, the Geostationary Operational Environmental Satellite (GOES) for example, and the polar or near polar orbiting satellites in low earth orbits (LEO) such as NOAA-11 and NOAA-12. The communications industry is on the verge of rapidly expanding. By the year 2000 it is very likely that there wil be several competing mobile satellite systems (MSS). The specifications of many current and planned satellite communication services are given in the accompanying table. INMARSAT A and B have been excluded from the table since their terminal/antenna weight of more than 100 kg and high energy requirements make them impractical for data buoy applications.

Mobile satellite systems fall into one of three possible orbital configurations: GEO, mid altitude earth orbiting (MEO) and LEO satellites. The altitude of GEO satellites is of the order of 35,000 km. MEO satellites are at an altitude of about 10,000 km. LEO satellite orbits are of the order of 1000 km or less. A large percentage of the recent commercial activity in MSS is focused on LEO satellites as a personal communication tool. LEO satellites can be separated into Big LEO and Little LEO categories. Big LEOs will offer voice, fax, telex, paging and data capability. Little LEOs will offer data capability only, usually on a store-and-forward basis. Since the satellite footprint is dependent on the satellite's altitude, LEO and MEO systems require larger constellations than GEO satellites to achieve global coverage and avoid data delays. Less energy is, however, required for LEO and MEO satellite transmitters due to the shorter average distance between transmitter and satellite.

Some satellite communication systems will primarily focus on centres of population. This suggests that some configurations will not be acceptable for global ocean monitoring. Several MSS currently under development will be interoperable with existing public switched telephone and cellular networks. This structure will serve as an extension and enhancement to existing networks, and may include additional charges if data are channelled to these networks. While the technical capabilities for these new MSS currently exist, delays must be expected due to government licensing, company financing, and availability of launch vehicles. It is also important to consider the infrastructure that will necessary to disseminate the data received using these MSS on to the GTS.

Depending on the needs of a particular data buoy program, some systems will offer enhanced capabilities compared with existing methods. Potential advantages from these emerging MSS include two-way communication, more timely observations, and greater data rates and volumes. Some systems may also prove to be considerably less expensive than existing channels.

Little LEOs - current status

ARGOS. Planned enhancements to the Argos system, such as increased bandwidth, **two-way** communication and improved sensitivity are fully described elsewhere.

ORBCOMM. This company was awarded the first FCC Little-LEO license in late 1994. Two satellites have been launched during 1995, using a Pegasus rocket piggy-backed on to a Lockheed L-1011 aircraft. Both satellites, which are discs about one metre in diameter prior to deployment of solar panels and antenna, suffered from initial problems, but the company reports that these have been overcome, and that it will continue with the completion of its 26-satellite network. The system will offer a store-and-forward-two-way messaging service, operating in the VHF band. The message structure time consists of packets transmitted at 2400 bps, and coverage will be global and near-continuous when the full constellation is in place. Messages are acknowledged by the system when correctly received. The platform determines its own position, if required, using downlink channel data and doppler shift, or by an onboard GPS receiver, and transmits the derived location along with the sensor data. Position accuracy without GPS is expected to be similar to that offered by Argos. A limited commercial service is planned to be available in February 1996. Global availability is forecast for 1999. Many operational details, and the costs of using the system, which will be available to users through service providers ('resellers'), are not yet known. The company maintains a World-Wide Web page at **http://www.orbcomm.net/**

GEMSAT/VITASAT. The first satellite suffered launch failure in August 1995 - no other launches have been reported.

SAFIR. This is a two-way store-and-forward communication system comprising a number of LEO satellites. One satellite has been in orbit for nearly twelve months, but no operational experience has been reported. Two types of platforms are offered: a microstation communicating at 300 bps, and a macrostation permitting transfer rates of 9600 bps. Position determination is achieved by analysis of doppler shift data at the processing centre, or by inclusion of a GPS receiver. Data transfer takes place in response to a command from the satellite. PTT costs will be similar to those for Argos, and data transfer costs will be of the order of USD15.- per kbyte for medium volume users.

EYESAT. The system comprises microsatellites weighing 12.5 kg which operate a 9600 bps transponder service, primarily for radio amateurs. Further satellites are planned.

STARSYS. This system is a two-way store-and-forward system similar to ORBCOMM, but is still believed to be at the planning stage, although it is understood that financial backing has been secured. CLS/Service Argos are involved in the development of the system.

Other systems (MEOs, big LEOs)

These include Iridium, Globalstar, ICO (formerly Inmarsat-P), Ellipso, Odyssey, Teledesic and Constellation (formerly Aries). All are aimed at the personal communications market, and none is yet flying. They may well be attractive to buoy operators, but no technical assessment has yet been performed by this author.

Further information

Useful World-Wide Web sources of information include:

Mobile Satellite Telecommunications	**http://www.wp.com/mcintosh_page_o_stuff/tcomm.html**
A tabulated overview of big LEOs	**http://www.itu.ch/special/wwwfiles/tel_satel.html**
New Space Newsletter	**http://www.isso.org**
The Satellite Encyclopedia	**http://www.u-net.com/arrowe/tse**
ORBCOMM home page	**http://www.orbcomm.net/**

The table entitled "Mobile Satellite Systems" (see page 8) is partially updated from that published in last year's DBCP Annual Report. It should be noted that it has not been possible to re-verify all of the information presented.

7. ADMINISTRATIVE MATTERS

7.1 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 establishedon 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	Deutscher Wetterdiesnt
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 Institute

EGOS maintains an operational data buoy programme in the North Atlantic. Drifiting buoys are deployed in two areas, north of 50°, referred to as EGOS North, and south of 50°, referred to as EGOS South. About 20 new deployments are made annually. As at 1 August 1995, for instance, a total of 18 drifting buoys and six moored buoyswere operational. The full report by EGOS is reproduced in Annex II.

Mobile satellite systems

System	Implementation	Orbit type	Buoy position	Message type	Terminal size	Power (watts)	Estimated unit cost	Estimated service cost	Comments
ARGOS	Operational	LEO	Doppler shift	data: 32 bytes	handheld	1	$500-900	see JTA	various enhancements, incl 2-way messaging, are scheduled
EYETEL/EYESAT	Planned 1995+	Little LEO	GPS required	data: 60 bytes	handheld	5	$500-1,500	TBD	1 satellite 1995 5 satellites 1996+
Final Analysis (FAISAT)	Planned 1996+	Little LEO	GPS required	data: 128 bytes	handheld	10	$100-500	$.25 per msg; service fee TBD	26 satellites 2000+
Globalstar	Planned 1997+	Big LEO	GPS required	voice/data: no maximum	handheld	1	$750	$.30/min; service fee TBD	48 satellites 1998+
INMARSAT-C	Operational	GEO	GPS required	data: no maximum	5.5 kg	15	$4,000	$.28 per 32 bytes	steered antenna not required
ICO/INMARSAT-P	Planned 1998+	MEO	GPS required	voice/data: no maximum	handheld	1	TBD	TBD	
Iridium	Planned 1998+	Big LEO	GPS required	voice/data: no maximum	handheld	1	$3,000	$3/min + $50/mo	66 satellites 1998+
Odyssey	Planned 1998+	MEO	GPS required	voice/data: no maximum	handheld	1	$300	$.65/min; service fee TBD	12 satellites 1998+
ORBCOMM	Pre-operational	Little LEO	Doppler shift	data: no maximum	handheld	5	$100-400	$.25 per msg + $.007/byte + $30/mo	2 satellites 1995 26 satellites 1996+ 36 satellites 1997+
Starsys	Planned 1996+	Little LEO	Doppler + ranging	data: 27 bytes multiple msgs	handheld	2	$50-200	$.15 per msg ($.45/msg+loc) + $25 reg + $6/mo	12 satellites 1998+ 24 satellites 2000+
SAFIR	Pre-operational	Little LEO	Doppler or GPS	data: no maximum	handheld	0.5 - 5	$1200-2000	$15 per kbyte + $20/mo	1 satellite 1995 1 satellite 1996+
VITASAT/ GEMSAT	Planned 1996+	Little LEO	GPS required	data: no maximum	'laptop'	10	$2,000	$1 per kilobyte + $250/year	1st satellite 1995+ 3 satellites by 1997+

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, Innstitute of Ocean Sciences, Marine Environmental Data Service
Finland	Arctic Centre of the University of Lapland
France / USA	Service Argos
Germany	Alfred-Wegener Instituta for Polar and Marine Research
Japan	Japan Marine Science and Technology Centre
Norway	Chr. Milchelsen Rearch AS, 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 Kiongdom Meteorological Office
USA	National Ice Center (representing the National Aeronautics and Space Administration, the Nationa Science Foundation, the National Oceanic and Atmospheric Administration, the Office of Naval Research and the US Coast Guard), Pacific Marine Environmental Laboratory, Polar Science Center of the Applied Physics Laboratory of the University of Washington, 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)

At its tenth session (La Jolla, November 1994), the Panel noted that the IPAB was now formally in place as a WCRP activity and that all data from IPAB buoys were to be inserted onto the GTS. Since IPAB, at its second meeting (Helsinki, June 1994), had already agreed to apply to be an action group of the Panel, and its chairman had subsequently written to the chairman of the DBCP in this regard, the Panel accepted with pleasure the application of IPAB.

The report by the IPAB is reproduced in Annex II.

7.1.4 INTERNATIONAL SOUTH ATLANTIC BUOY PROGRAMME (ISABP)

Following an initiative by the DBCP in 1993, and with the support of GCOS, the ISABP was formally established in October 1994. Eleven institutions or agencies from five countries (Argentina, Brazil, South Africa, United Kingdom, USA) have agreed to be initial participants in the programme whose technical co-ordination is undertaken by the South African Weather Bureau. At its tenth session (La Jolla, November 1994), the Panel accepted with pleasure the application tabled at the session by the chairman of the ISABP to become an action group of the Panel.

The report by the ISABP is reproduced in Annex II.

7.2 Membership

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

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

- Eighth session (Paris, October 1992): Australia, Canada, China, France, Iceland, Madagascar, Mexico, United Kingdom, USA
- Ninth session (Athens, October 1993): Australia, Canada, France, Greece, Iceland, Netherlands, United Kingdom, USA
- Tenth session (La Jolla, November 1994): Australia, Brazil, Canada, China, France, Greece, Iceland,Netherlands, South Africa, United Kingdom, USA
- Eleventh session (Pretoria, October 1995): Argentina, Australia, Brazil, France, Iceland, Netherlands, New Zealand, South Africa, Ukraine, United Kingdom, USA

7.2.2 NATIONAL FOCAL POINTS

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

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.

7.4 Finances

Overall management of the Panel's finances has continued to be undertaken by WMO during 1995, while IOC has arranged contracts for the employment of the Technical Co-ordinator as well as for his logistic support. Annex XIII contains financial statements as follows:

(a) Finalized WMO Statement of Account for the biennium 1994-1995;

(b) Finalized IOC Statement of Account for the period 1 June 1994 to 31 May 1995.

For the financial year 1996-1997, the Panel agreed the following draft budget, to which contributions will be made by twelve countries (Australia, Canada, France, Greece, Iceland, Ireland, Netherlands, New Zealand, Norway, South Africa, United Kingdom, USA):

A. Expenditures

	US$
IOC salary of technical coordinator	90,000
Travel of technical coordinator	15,000
CLS/Service Argos contract	15,000
WMO Costs	300
Travel of Chairman and publications	20,000
Contingencies	7,750
TOTAL	148,050

B. Income

Contributions	137,350
Carry-over 1995-1996	10,700
TOTAL	148,050

(**Note**: Official UN exchange rate in September 1995: USD 1 = FFR 5.05)

ANNEX I

NATIONAL REPORTS ON DATA BUOY ACTIVITIES

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

AUSTRALIA

During 1996, Australian participants will deploy about 130 platforms consuming an estimated total of 58 PTT-years. (In 1995 the total was 50 PTT-yrs.)

The Bureau of Meteorology and the Antarctic Division will be deploying a total of 16 buoys in the oceans surrounding Australia and extending down to the Antarctic shelf. There will also be a variety of ship platforms and automatic weather stations in use. The majority of other uses are mainly concerned with animal tracking such as camels, dugongs, albatrosses, seals and penguins.

The following is a list of all the agencies which are expected to be participating in 1996.

AUSTRALIAN BUREAU OF METEOROLOGY

Pupose:	To provide operational meteorological and research data		
Number and type:	1995	31	10 drifting buoys, 1 AWS, 6 ships, 14 XBTs
	1996	31	10 drifting buoys, 1 AWS, 6 ships, 14 XBTs
PTT-yrs:	1995	18	
	1996	18	

ANTARCTIC CO-OPERATIVE RESEARCH CENTRE

Purpose:	To provide operational meteorological and research data for the Antarctic region.		
Number and type:	1995	6	3 drifting buoys and 3 AWSs
	1996	6	1 drifting buoys and 3 AWSs
PTT-yrs:	1995	4.5	
	1996	2.5	

ANTARCTIC DIVISION

Pupose:	To provide operational meteorological and research data		
Number and type:	1995	29	7 drifting buoys, 12 AWS, 12 animals
	1996	35	6 drifting buoys, 12 AWS, 17 animals
PTT-yrs:	1995	15	
	1996	27	

A.C.T. ELECTRICITY AND WATER COMMISSION

Purpose:	To telemeter stream flow data .		
Number and type:	1995	1	stream level
	1996	1	stream level
PTT-yrs:	1995	0.5	
	1996	0.5	

AUSTRALIAN NATIONAL PARKS & WILDLIFE SERVICE

Purpose:	To track marine turtles.		
Number and type:	1995	2	
	1996	2	
PTT-yrs:	1995	0.4	
	1996	0.4	

AUSTRALIAN GOVERNMENT SURVEY ORGANISATION

Purpose: To track survey vessel and seismic cable end buoy.

Number and type:	1995	2
	1996	2
PTT-yrs:	1995	0.7
	1996	0.7

CSIRO DIVISION OF OCEANOGRAPHY

Purpose: To measure ocean currents.

Number and type:	1995	2
	1996	2
PTT-yrs:	1995	2
	1996	0.5

FRANKSTON COLLEGE OF TAFE

Purpose: To track albatrosses .

Number and type:	1995	2
	1996	5
PTT-yrs:	1995	1.5
	1996	3.5

JAMES COOK UNIVERSITY

Purpose: To track dugong.

Number and type:	1995	1
	1996	7
PTT-yrs:	1995	0.1
	1996	0.2

NORTHERN TERRITORY CONSERVATION COMMISSION

Purpose: To track camels and eagles.

Number and type:	1995	7
	1996	5
PTT-yrs:	1995	3.5
	1996	1.5

NORTHERN TERRITORY POWER AND WATER AUTHORITY

Purpose: To collect rainfall events.

Number and type:	1995	2
	1996	1
PTT-yrs:	1995	0.25
	1996	0 25

QUEENSLAND DEPT. OF ENVIRONMENT & HERITAGE

Purpose: To track turtles.

Number and type:	1995	3
	1996	8
PTT-yrs:	1995	1
	1996	0.5

TASMANIA UNIVERSITY DEPT. OF ZOOLOGY

Purpose: To track penguins and fur seals.

Number and type:	1995	2
	1996	4
PTT-yrs:	1995	0.8
	1996	1

WESTERN AUSTRALIA WATER AUTHORITY

Purpose: To monitor water resources.

Number and type:	1995	4
	1996	4
PTT-yrs:	1995	1
	1996	1

BRAZIL

During the period of February 1993 through January 1994, 16 drifters were deployed as part of the field research for Project COROAS. COROAS (Oceanic circulation in the western region of the South Atlantic) represents Brazil's contribution to WOCE.

The drifters were fabricated by the Oceanography Group at the National Institute for Space Research (INPE), in São José dos Campos, Brazil. Buoy design closely followed the specifications provided by Sybrandy and Niiler (1991) for the WOCE/TOGA standard, low cost drifter (LCD). In addition to providing positional data, each buoy was equipped with a thermistor to measure surface water temperatures.

Of the 16 LCDs launched thus far, 15 were deployed, 5 at a time, at about the same location (24°30'S, 44°15'W), on the shelf break off SE Brazil. The 16th LCD was launched on the north side of the Polar Front in the Antarctic Convergence Zone, on the eastern side of the Drake Passage in November 1993. This LCD was programmed to transmit until its batteries were discharged. The first group of 5 LCDs was deployed during 17 February 1993, the second group during mid June 1993 and the third group during mid January 1994. For reasons of economy, the first group of LCDs was programmed to stop transmitting after 12 months, the second group after 9 months and the third group after 6 months. After the drifters had been in operation for several months, authorization was given for the subsequent data to be transmitted on the GTS .

At the present time two LCDs are still in operation. The LCD launched in the Polar Front headed in an easterly direction while gradually moving equatorward. After more than 660 days, this drifter is still transmitting useful temperature data and is presently south of Madagascar Is. From the sea switch data, however, it appears that the drifter's holey sock drogue was lost several months ago. For unknown reasons, one of the drifters launched in February of 1993, began to transmit again, after having been off the air for some months. This buoy is presently SE of Capetown and is headed into the southern part of the Indian Ocean.

PLANS FOR 1996

During 1996 Brazil expects to participate in the ISABP by launching from DHN (Directorate of Hydrography and Navigation) ships at least two buoys per month with INPE (National Space Research Institute) technology in latitudes of the South Atlantic. Location and dates of deployment are yet to be resolved.

This achievement represents our first step into a modest program of acquisition and processing of meteorological and oceanographic data from a new source. It is hoped that the results will motivate an increase in the program development in the years to come.

The raw data collected thereby are meant to be available to the international community through the GTS with the long purpose of obtainig access to the information released from drifters deployed by other countries in South Atlantic areas of national interest. GTS data will be accessed by means of DBCP coordination until we are fully included in the system.

To the extent that budgetary conditions permit, two atlas type buoys designed and fabricated in Brazil will be deployed off the SE coast of Brazil. As these buoys become operational, their data will also become available to the international community.

Brazil also intends to offer logistical support for the deployment of foreign drifters in areas of national interest.

CANADA

YEAR: 1995

CURRENT PROGRAMMES

A. Agency or program: Environment Canada - Pacific and Yukon Region

Number and type of buoys:	
a) Deployed during year:	1 standard Metocean drifting buoy 5 Metocean air deployable CMOD
b) Operational:	3 moored 6-metre NOMAD buoys 13 moored 3-metre Discus buoys 7 Metocean drifting buoys
c) Reporting on GTS at 31 August:	all reporting on GTS
Purpose of programme:	operational
Main deployment areas:	Northeast Pacific Ocean

B. Agency or programme: Environment Canada - Prairie and Northern Region

Number and Type of Buoys	
a) Deployed during year:	1 3-metre buoy Great Slave Lake 1 WD drifter buoy South Basin of Lake Winnipeg 1 Hexoid buoy North Basin of Lake Winnipeg 2 CALIB drifting buoys west of Canadian Arctic Islands
b) Operational:	all operational except one CALIB
c) Reporting on GTS at 31 August:	all operational buoys are reporting on GTS
Purpose of programme:	operational and research
Main deployment areas:	Canadian Arctic and Lake Winnipeg

Note:
1. Buoys deployed in lakes are deployed only during the open water season.
2. As part of its Arctic Ocean Buoy Program and in cooperation with other International Arctic Buoy Programme Participants, Canada was involved with deployment of 6 buoys in all: two Canadian buoys deployed by Canadians, three American buoys deployed by Canadians and one Canadian buoy deployed by Americans.

C. Agency or programme: Environment Canada - Ontario Region

Number and type of buoys:	
a) deployed during year:	5 3-meter buoys 1 12-meter buoy
b) operational at 31 August:	all operational
c) reporting on GTS at 31 August:	all reporting on GTS
Purpose of programme:	operational and one more 12-metre developmental
Main deployment areas:	Great Lakes

D. Agency or programme: Environment Canada - Quebec Region

Number and type of buoys:	
a) deployed during year:	1 moored 3-meter discus buoys
b) operational at 31 August:	1
c) reporting on GTS at 31 August:	1
Purpose of programme:	operational
Main deployment areas:	Gulf of St Lawrence

E. Agency or programme: Environment Canada - Atlantic Region

Number and type of buoys:	
a) deployed during year:	one
b) operational at 31 August:	six
c) reporting on GTS at 31 August:	six
Purpose of programme:	operational
Main deployment areas:	Canada's East Coast

PLANNED PROGRAMS

A. Agency or program: Environment Canada - Pacific and Yukon Region

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

Purpose of programme:

a) operational:	5 standard Metocean drifting buoys 3 Metocean air deployable CMOD
b) developmental:	1 3-metre Nomad with next generation electronic payload 1 new 3-metre solar powered buoy
c) met/ocean research:	nil
Main deployment area:	Northeast Pacific Ocean

B. Agency or programme: Environment Canada - Prairie and Northern Region

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

Purpose of programme:

a) operational:	seasonal deployment of 1 buoy in Great Slave Lake seasonal deployment of 2 buoys in Lake Winnipeg 1 CALIB during winter on ice west of Canadian Arctic Islands 1 inhouse buoy March 1996 on ice in Canadian Beaufort 1 or 2 buoys April 1996 west of Mould Bay or Isachsen
Main deployment areas:	Canadian Arctic and Lake Winnipeg

C. Agency or programme: Environment Canada - Ontario Region

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

Purpose of programme:

a) operational:	1 12-meter buoy in October 1995
b) developmental:	the 12-metre buoy are an ongoing development program
c) met/ocean research:	12-metre buoy will operate three research experiments including - toxic chemical air-lake exchange (organochlorine flux) - climate studies (CO2 fluxes) - trophic layer exchanges

Main deployment areas: Great Lakes

D. Agency or programme: Environment Canada - Atlantic Region

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

Purpose of programme:

a) operational:	one
b) developmental:	nil
c) met/ocean research:	nil
Main deployment areas:	Grand Banks

TECHNICAL DEVELOPMENTS

Environment Canada - Pacific and Yukon Region

a) Buoy design:

Solar powered buoy in year of ocean operation. Second solar buoy to be deployed July/95.

b) Instrumentation:

Global Positioning Systems installed on 11 buoys.
Dual scalar/vector wind speed processors on 11 buoys.
Smart Argos/GPS beacon on test unit will only transmit via Argos when GPS senses an off station condition.
Severe Wave Study completed July 1995.

Environment Canada - Prairie and Northern Region

a) Buoy design

Continue to try buoy components and inhouse 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 Ocean environment and will have a power system that will last 2 or 3 years.

c) Others

Local Users Terminal: Dependent on the orbit of the polar orbiting NOAA series satellites with respect to Edmonton, data is received from data buoys on the Arctic pack. Data from some of these buoys are processed and input to GTS directly from Edmonton.

Environment Canada - Ontario Region

a) Buoy design and Instrumentation:

Historically no ships are available for winter studies on the Great Lakes. The 12 metre buoy has specifically been refurbished with the goal of providing a platform for both operational meteorology and research. We have focused our initiative on achieving 4 months unattended operation to cover the period when ships are not available. In addition to being insulated, diesel powered generators, sufficient to run heaters and commonly available AC based instrumentation have been installed. A second phase of the upgrade involves the installation of a redundant data communications, a server with a network capable of handling the communications security, monitoring of the integral aspects of the buoy, and any number of scientific computers at node points.

The buoy is now capable of supporting a wide compliment of instrumentation, for truly interdisciplinary studies. In the future it is hoped to achieve a true ecological monitoring capability by implementing a remote underwater platform, connected to the buoy by an umbilical cord, positioned using technology developed for off-shore rigs, capable of conducting experiments according to shore-station commands from the scientists.

Environment Canada - Atlantic Region

b) Instrumentation:

four buoys have gps positioning capabilities

PUBLICATIONS

Monthly Moored Buoy Status Report
Monthly Drifting buoy Status Report and Drift Track Map
Annual Pacific and Yukon Region Moored Buoy Inspection Reports

SPECIAL COMMENTS

a) Quality of buoy data: Good

b) Communication: Some local DRGS problems in receiving GOES data. Reception has improved with launch of GOES 8.

c) Buoy Lifetimes: Moored buoys - over 3 years between battery changes. Expect 3 - 4 years with current configuration.

d) Other: Drifting Buoys - Over 2 years
46636 - 22 months
46681 - 58 months
46682 - 48 months
46701 - 22 months

Country: **FRANCE**

Year: **1 September 1994 - 31 August 1995**

CURRENT PROGRAMMES

A. MÉTÉO-FRANCE

Number and type of buoys:

(a) 11 drifting buoys (most of them drogued) and 3 moored buoys were deployed in last 12 months:
- 1 Marisonde B (air pressure + barometric tendancy + SST),
- 5 Marisonde's G (as B + wind),
- 1 Marisonde BT (as B + subsurface temperature) and
- 4 SVP barometer drifters;
- 1 offshore moored buoy[1],
- 2 directional Waverider's (French West Indies).

(b) 7 buoys[2] were operational at 31 August;

(c) 7 buoys[2] were reporting on GTS at 31 August.

Purposes of programme:

(a) to provide oceanographical and meteorological observations in real time to Weather Forecast Centres (SIMBAD network, French West Indies...);

(c) to improve present materials (tests of new buoys, new sensors (compasses and barometers)). To validate wind and bathythermal measurements.

Main deployment area:

North Atlantic (Off France, Spain and Portugal - West Indies).

B. LODYC /METEO-FRANCE (CONFLUENCE - FEMSAS campaigns)

Number and type of buoys:

(a) 5 Marisonde GT buoys (air pressure, SST, wind speed, wind direction, sea temperature down to 150 metres depth (10 levels)) were deployed in June.

(b) 4 buoys were operational at 31 August;

(c) 4 buoys were reporting on GTS at 31 August.

Purpose of programme:

Met/ocean research - The FEMSAS campaign is studying the confluence of Brazil and Malvinas currents.

Deployment area:

South Atlantic (East of Argentina).

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[1] In cooperation with the UK Meteorological Office.

[2] Including the UK/French moored buoy.

C. **STNMTE** (Service Technique de la Navigation Maritime et des Transmissions)

Number and type of buoys:

(a) STNMTE operates a Network of 8 omnidirectional wave moored buoys (DATAWELL) and 2 directional ones (SEATEX WAVESCAN and DATAWELL).

(b) 5 buoys were operational at 31 August (4 omnidirectional + 1 directional);

(c) none was reporting on GTS.

Purpose of programme:

(a) Operational - to maintain a long duration wave measurement network along the French coasts and centralize the French wave data.

Main deployment area:

French coasts.

PLANNED PROGRAMMES (next 12 months)

A. **MÉTÉO-FRANCE**

Number and type of buoys:

About 15 buoys will be deployed in next 12 months:

- 8 CEIS Marisonde's and/or SVP-Barometer drifters for operational purposes in SIMBAD network;
- 4 to 6 CEIS Marisonde's in the Indian Ocean;
- 2 or 3 buoys for technical tests;

Purposes of programme:

(a) to provide oceanographical and meteorological observations in real time to Weather Forecast Centres (SIMBAD project...);

(c) to test and validate new equipments.

Main deployment areas:

North Atlantic (Off Europe) and Indian Ocean

B. **STNMTE**

Number and type of buoys:

The WAVESCAN buoy and 3 omnidirectional DATAWELL buoys will be re-deployed.

Purpose of programme:

Operational - to maintain a long duration wave measurement network along the French coasts.

Main deployment area:

French coasts.

TECHNICAL DEVELOPMENTS

(b) Instrumentation

(i) Meteo-France continues to participate to the evaluation of SVP pressure drifters developed by the Global Drifter Center (GDC) in San Diego. The prototype Argos n° 01356, re-deployed off France in September 93 was picked-up by a ship by the end of October 94. It provided reliable pressure data during 13 months! Five buoys (Argos 14422-14426) were ordered to Technocean and delivered in France in August 94. Three of them were deployed in September 94; another one in march 95; the last one was sent twice to Technocean because it didn't pass the tests. The 4 drifters deployed at sea presented location problems. One of them ceased to be located, even in class « 0 », 2 months after deployment. For two others, pressure data came erratic less than 4 months after deployment. Only one drifter (Argos 14423), gave good results during 5 months before being recovered for expertise. Although being not correctly located when at sea, it was re-deployed by the end of June 95 and it is still in operation at the end of August. Seven drifters were ordered to Metocean and 3 to Technocean. There will be available at the end of 1995.

(ii) Air temperature measurements continue to be evaluated on Marisonde G buoys.

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

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

STNMTE - Catalogue des fiches synthétiques de mesure de houle.

SPECIAL COMMENTS

(a) Buoy QC

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).

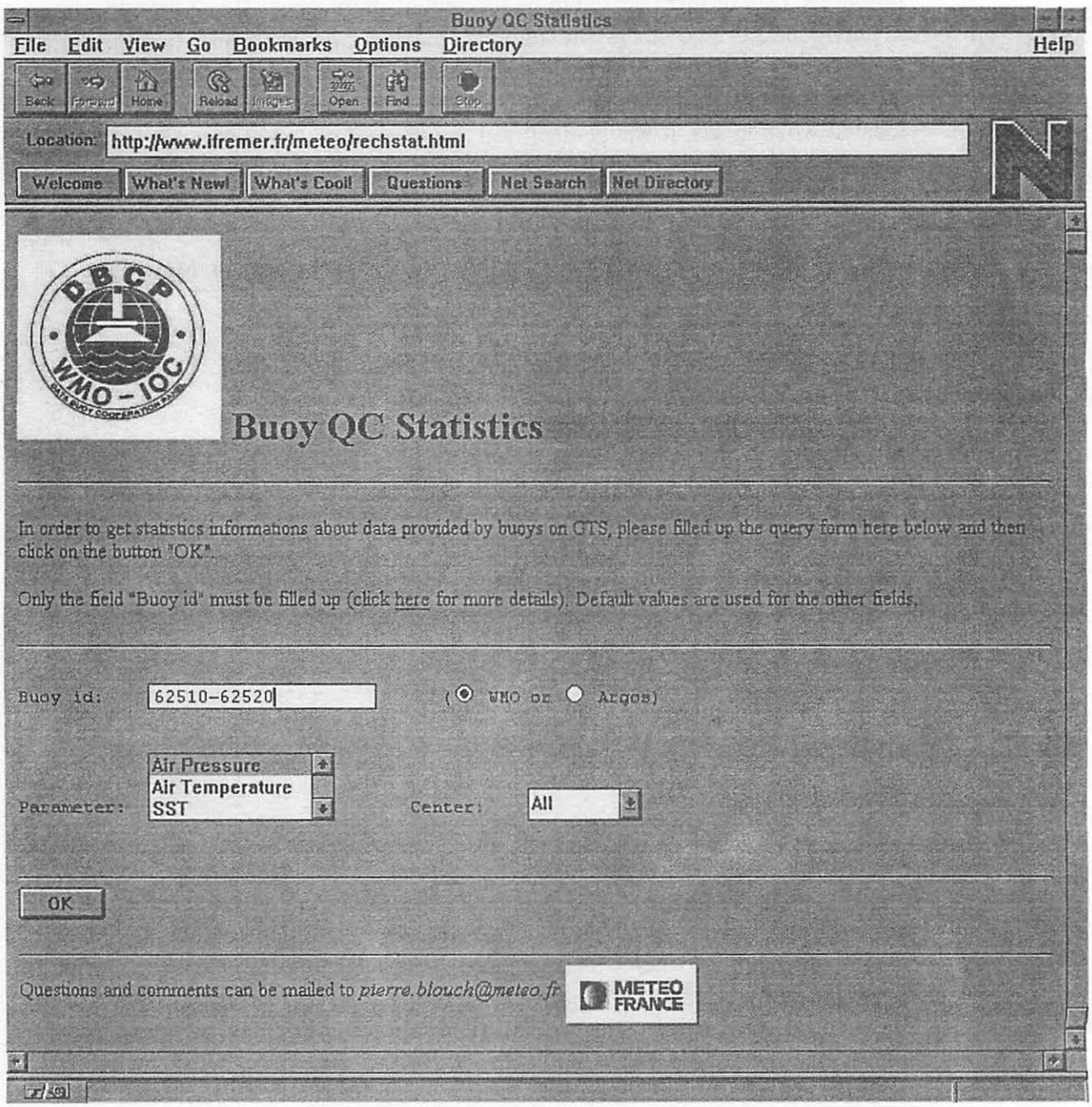
Statistics on comparisons with analysis fields are set up for each buoy and each LUT (when several are used for transmitting the data of a buoy). Monthly statistics are sent to the *buoy-qc@vedur.is* mailing list too.

French monthly statistics and those provided by other centres are available on Internet through anonymous ftp in the */pub/ifremer/meteo/qc-stats* directory of

host *ftp.ifremer.fr*. They are also available on the World Wide Web thanks to an application software which allow to get those of a particular buoy or a list of buoys. The http address is *http://www.ifremer.fr/meteo/rechstat.html*.

(d) Other

Meteo-France plans to fund 10 barometers to be added to the SVP drifters which will be deployed for WOCE in the Indian Ocean.



FINLAND

A. FINNISH INSTITUTE OF MARINE RESEARCH

- Program no 815: Finnarp 89; meteorological observations for air-sea interaction studies
  Platforms: 1995; testing , 2
  1996; drifting-buoy, 4

  Estimated PTT-years: 1995 ; 0,05
  1996 ; 2,0

- Program no 1001: Ocean current research in the Gulf of Finland (1995),
  in the Weddell Sea (Antarctic 1996)
  Platforms : 1995 : drifting-buoy 3
  1996 : drifting-buoy 2

  Estimated PTT - years: 1995 ; 0,15
  1996 ; 1,5

B. FINNISH METEOROLOGICAL INSTITUTE

- Program no 740: Finnarp weather program; meteorological observations
  Platforms: 1995: fixed station 1
  1996: fixed station 1

  Estimated PTT - years: 1995 ; 0,5
  1996 ; 0,5

C. MINISTRY OF ENVIRONMENT

- Program no 1377: Fjell goose migration
  Platforms: 1995: animals 2
  1996: animals 1

  Estimated PTT - years: 1995 ; 0,35
  1996 ; 0,05

ICELAND

Marine Research Institute

Ongoing and planned drifter programmes in Icelandic Waters.

In respect to near-surface circulation in Icelandic Waters and in adjacent seas two problems seem to be outstanding. First, the question about drift of larvae from spawning fields off the southcoast of Iceland into the nursery and feeding grounds off the northcoast of Iceland. Secondly, from an oceanographic point of view, another crucial problem is the continuity of the North Atlantic Drift into Icelandic waters. The present knowledge is mainly based on water mass analysis, as well as on drift bottle experiments and on direct current measurements at relatively few locations. One may also believe in some general features of the circulation system, but as often, still more and more questions arise when new knowledge is gained. In this respect it seems to be uncertain how or where the North Atlantic Drift reaches Icelandic waters as well as how the different circulation branches of slope currents, shelf currents and near-shore currents continue around Iceland, these circulation branches being of vital importance both from climatological and biological point of view.

As seen from the Atlantic drifter tracks of the North Atlantic drifters (Fig. 1) there seems to be an open area south of Iceland, indeed all the way from Greenland to the Faroes and even all the way into the North Sea. In general these uncovered areas even seem to cope with many of the main productive areas or fishing areas of these northern waters.

In conection with these unsolved problems a promising co-operation was established in November 1994 between Scripps Institution of Oceanography (prof. Peter Niiler) and the Marine Research Institute, Reykjavík (Svend-Aage Malmberg) in respect to a drifter program in Icelandic Waters. The program includes 10 locations (Fig. 2) for deployment of satellite tracked drifters south and west of Iceland during 4 seasons annually for a 3 years period, i. e. 40 drifters per year for 3 years or totally 120 drifters. Costs are devided equally berween SIO and MRI, R.

The program started in spring 1995 and the second phase was carried out in August 1995. Until now the work has been successful. The next deployment will be made in November 1995.

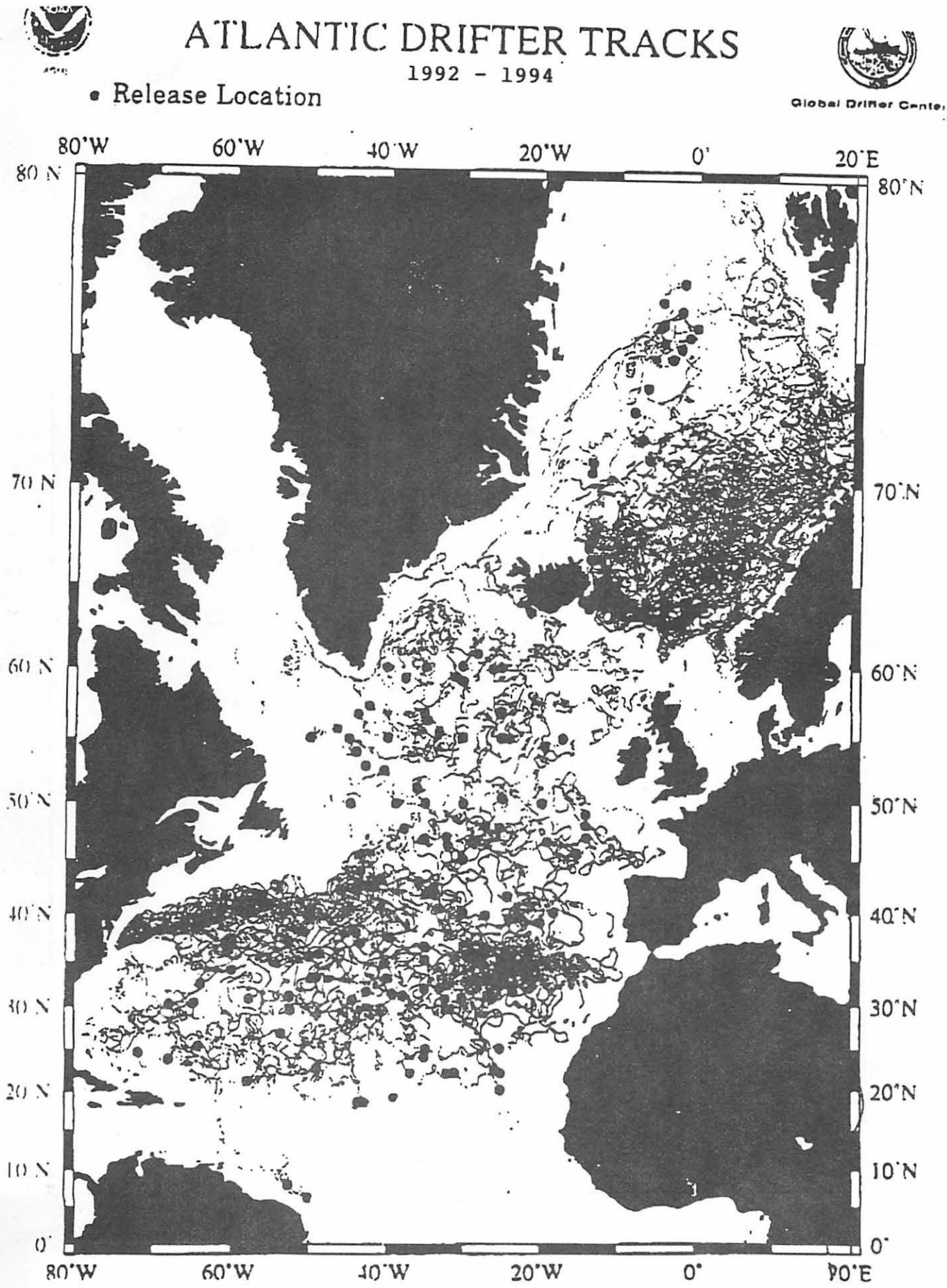

ATLANTIC DRIFTER TRACKS
1992 - 1994
• Release Location
Global Drifter Center
80°W
60°W
40°W
20°W
0°
20°E
80°N
70°N
60°N
50°N
40°N
30°N
20°N
10°N
0°

Figure 1

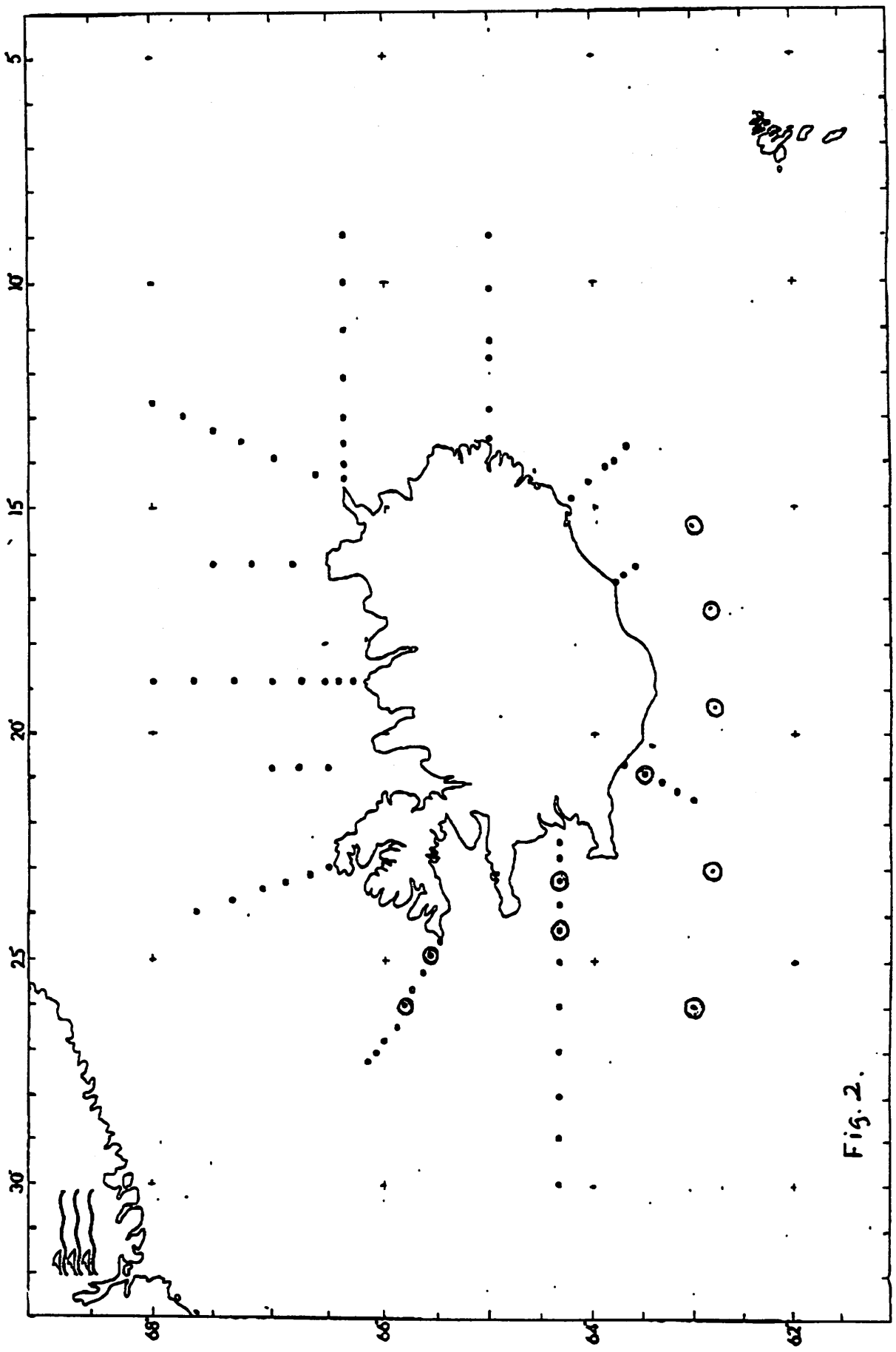


Fig. 2.

Meteorological Office

CURRENT PROGRAMMES

Tvo Icelandic institutions are currently using data buoys for operational and research purposes:

The Icelandic Meteorological Office participates in the European Group on Ocean Stations - EGOS, the first Action Group of DBPC. A majority of EGOS drifting buoys are deployed from Icelandic ships sailing from Iceland to USA. A predeployment test is given to these buoys in Reykjavik with special emphasis on the pressure sensor and the satellite communication. During the first 9 months of 1995 thirteen meteorological EGOS buoys have been deployed from Icelandic ships. One PTT-year is provided for use for refurbished EGOS buoys.

Considerable near-real-time quality control of buoys in the EGOS Programme is carried out by the Icelandic Meteorological Office, including comparison of the data received via the three LUTs used in the Programme. Errors and malfunctioning of EGOS buoys are reported to the Technical Secretary of EGOS for further action.

The Icelandic Meteorological Office operates on its computers an automatic Internet mail distribution list: "Buoy-qc@vedur.is" for distribution of information and comments on buoy data quality. Monthly statistics on data quality are also distributed to subscribers. To put your name on the distribution list you send an e-mail to the Internet address "Buoy-qc-request@vedur.is" with the text "Subscribe". To get further information you send the text "Help" to the above address.

The Marine Research Institute in Reykjavik has in the first nine months of 1995 in co-operation with Scripps Institution of Oceanography deployed 20 surface velocity drifters in Icelandic Waters. The program includes 10 locations for seasonal deployment of 40 drifters per year over a period of three years, or totally 120 drifters. A report has been sent to DBCP via IOC.

Country: JAPAN

Year: 1995

CURRENT PROGRAMMES

A. Maritime Safety Agency

Number and type of buoys:
(a) deployed during year:
17 surface drifters with holey sock drogues and SST sensors

(b) operational at 31 August: 12

(c) reporting on GTS at 31 August: None

Purpose of programme: ocean research (circulation)

Main deployment areas:
North Pacific, Indian and Antarctic Oceans

B. Japan Meteorological Agency

Number and type of buoys:
(a) deployed during year:
3 surface drifters with holey sock drogues, SST sensors and crystal barometers
3 moored buoys with 13 maritime meteorological and oceanographic sensors

(b) operational at 31 August: 3 surface drifters
: 3 moored buoys

(c) reporting on GTS at 31 August: 3 surface drifters
: 3 moored buoys

Purpose of programme:
drifters: met/ocean research and development of a crystal barometer
moorings: met/ocean research and the quickest announcement of warnings

Main deployment areas:
drifters: North Pacific Ocean
moorings: seas around Japan

C: Japan Marine and Science Technology Center

Number and type of buoys:
(a) deployed during year:
1 moored buoy (cooperation with University of Alaska, USA)

(b) operational at 31 August: 2 surface drifters
: 1 moored buoy

(c) reporting on GTS at 31 August: None

Purpose of programme:
met/ocean research (transport processes of water, heat and substances among ocean, sea ice and atmosphere)

Main deployment areas: Arctic Ocean

D: Japan Fisheries Agency

Number and type of buoys:
(a) deployed during year:
1 surface drifter with upwelling underwater radiance, downwelling air irradiance, and SST, but without drogue

(b) operational at 31 August: None

(c) reporting on GTS at 31 August: None

Purpose of programme:
ocean research (upwelling underwater irradiance for ocean color)

Main deployment areas:
Antarctic Ocean

E: University of Tokyo

Number and type of buoys:
(a) deployed during year:
5 compact surface drifters with drogues

(b) operational at 31 August: None

(c) reporting on GTS at 31 August: None

Purpose of programme:
ocean research (material transport process)

Main deployment areas: Kuroshio and Kuroshio Extension

PLANNED PROGRAMMES

A. Maritime Safety Agency

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

Purpose of programme: ocean research (circulation)

Main deployment areas:
North Pacific, Indian and Antarctic Oceans

B. Japan Meteorological Agency

Number and type of buoys for deployment in next 12 months:
3 surface drifters and 3 moored buoys

Purpose of programme:
drifters: met/ocean research and development of a crystal barometer
moorings: met/ocean research and the quickest announcement of warnings

Main deployment areas:
drifters: North Pacific Ocean
moorings: seas around Japan

C. Japan Marine Science and Technology Center

Number and type of buoys for deployment in next 12 months:
1 surface drifter and 1 moored buoy

Purpose of programme:
met/ocean research (transport processes of water, heat and substances among ocean, sea ice and atmosphere)

Main deployment areas: Arctic Ocean

D. Japan Marine Science and Technology Center

Number and type of buoys for deployment in next 12 months:
6 moored ADCP buoys

Purpose of programme:
ocean research (New Guinea Coastal Undercurrent and Equatorial Undercurrent)

Main deployment areas: equatorial Pacific between 138E and 156E

E. Japan Fisheries Agency

Number and type of buoys for deployment in next 12 months:
2 surface drifters with upwelling underwater radiance, downwelling air irradiance, and SST, but without drogues

Purpose of programme:
ocean research (upwelling underwater irradiance for ocean color)

Main deployment areas: western North Pacific

F. University of Tokyo

Number and type of buoys for deployment in next 12 months:
6 compact surface drifters with drogues

Purpose of programme:
ocean research (material transport process)

Main deployment areas:
subtropical and subarctic western North Pacific

G: Tokai University

Number and type of buoys for deployment in next 12 months:
2 to 3 surface drifters with holey sock drogues

Purpose of programme:
ocean research (gathering mechanism of drifting wastes)

Main deployment areas: North Pacific

TECHNICAL DEVELOPMENTS

A. Japan Meteorological Agency
Instrumentation: Development of a crystal barometer

B. Japan Marine Science and Technology Center
Instrumentation:
Development of real-time transmission system for surface temperature and salinity data from a surface moored buoy

Country: THE NETHERLANDS

Year: 1995

CURRENT PROGRAMMES

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

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

Purpose of programme: 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: none
(b) operational at 31 August: four
(c) reporting on GTS at 31 August: four

Purpose of programme: Oceanographic research (Dutch WARP under WOCE)

Main deployment areas: North Atlantic

PLANNED PROGRAMMES

A. **Agency or programme:** KNMI

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

Purpose of programme: Operational meteorology and oceanography

Main deployment areas: North Atlantic

B. **Agency or programme:** NIOZ

Number and type of buoys planned for deployment in next 12 months: up to six drifters

Purpose of programme: Oceanographic research

Main deployment areas: North Atlantic

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

Statistics of buoys in EGOS programme are taken up in the quarterly reports (United Kingdom Metorological Office) and the monthly statistics (Météo-France)

SPECIAL COMMENTS (if any)

(a)	Quality of buoy data:	See statistics under **Publications** above;
(b)	Communications:	All buoys are tracked by the Argos system;
(c)	Buoy lifetimes:	See relevant EGOS technical document;
(d)	Others:	DUTCH-WARP is a contribution to WOCE repeat section AR-7 (East). In addition, it is planned to study the hydrography in the Iceland Basin in order to investigate the deep circulation in the various branches of the North Atlantic Current.

NEW ZEALAND

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

Purpose of programme: **Drifting Buoy Data for Weather Forecasting**

Number and types of platforms: (a) deployed current year: **4 WSD buoys**
(b) planned next year: **4 or 5 buoys**

Estimated number of PTT-years (a) current year: **7 years**
(b) next year: **7 years**

B. Agency or Programme: **Department of Conservation**

Purpose of programme: **New Zealand Sea Lion tracking**

Number and types of platforms: (a) deployed current year: **4 PTTs 40 days each**
(b) planned next year: **7 PTTs on 4 weeks each**

Estimated number of PTT-years (a) current year: **0.33 years**
(b) next year: **approx 0.5 years**

C. Agency or Programme: **National Institute of Water and Atmosphere**

Purpose of programme: **Moored Met buoy**

Number and types of platforms: (a) deployed current year: **1**
(b) planned next year: **1**

Estimated number of PTT-years (a) current year: **0.7 years**
(b) next year: **unknown**

D. Agency or Programme: **NIWA Christchurch**

Purpose of programme: **Foraging habits of Buller's Mollymawks**

Number and types of platforms: (a) deployed current year: **6 PTTs on 30 days each**
(b) planned next year: **unknown**

Estimated number of PTT-years (a) current year: **0.5 years**
(b) next year: **approx 1.8 years**

Special Comments

Dependent on funding a couple of other scientific organizations have indicated that they plan to use the ARGOS system for the first time in 1996. These will be new JTA customers and they will be tracking albatross and petrel birds.

NORWAY

Agency or programme: Chr. Michelsen Research
Purpose of programme: Program 0655 SOBA (Data collection and positioning. Drifting buoys).

Estimated number of PTT-years: a) current year: 3
b) next year:3
Special comments: Two types 1) drifting buoys for real-time acquisition of meteorological data and 2) capsules on the Arctic ice for observation of icedrift and meteorological data.

Purpose of programme: 9655 Nordic WOCE
Number and types of platforms: a) deployed current year:
b) planned next year:
Estimated number of PTT-years: a) current year:
b) next year:-

Agency or programme: Norwegian Meteorological Institute
Purpose of programme: Program 154 NOROBS meteorology
Program 198 MONI/SEANOR meteorology
Program 314 ARNO meteorology
Program 428 SOBA NW meteorology
Program 9154 AURORA meteorology
Number and types of platforms: a) deployed current year:
b) planned next year:

Estimated number of PTT-years: a) current year: 5.3
b) next year: 5.5

Agency or programme: Norwegian Polar Institute
Purpose of programme: 9660 Extension pgm 660 (Polar bears) (Animal tracking)
Number and types of platforms: a) deployed current year:15
b) planned next year:+10
Estimated number of PTT-years: a) current year:4
b) next year: 3

Purpose of programme: 660 Seals.(Animal tracking)

Number and types of platforms: a) deployed current year:0
b) planned next year: 10
Estimated number of PTT-years: a) current year:4
b) next year: 4

Purpose of programme:1339 Activity and distribution of terrestial mammals. (Animal tracking)
Number and types of platforms: a) deployed current year:8
b) planned next year: +6
Estimated number of PTT-years: a) current year:2
b) next year: 2.5

Purpose of programme:1359 Seabird ecology in the Svalbard Region (Animal tracking)
Number and types of platforms: a) deployed current year:5
b) planned next year:7
Estimated number of PTT-years: a) current year: 0.5
b) next year:0.8

Purpose of programme: xxx Polar seagulls (Animal tracking)
Number and types of platforms: a) deployed current year:0
b) planned next year:5
Estimated number of PTT-years: a) current year:0
b) next year: 0.7

Purpose of programme: 29 Ice drift experiment (ICEX)
Number and types of platforms: a) deployed current year:6
b) planned next year:+3
Estimated number of PTT-years: a) current year:4
b) next year:4

Agency or programme: Marine Research Institute
Purpose of programme: 0209 Fish and larvae drifters
Number and types of platforms: a) deployed current year:
b) planned next year:
Estimated number of PTT-years: a) current year:2
b) next year: 2

Agency or programme: Defence Research Establishment
Purpose of programme: 926 Icenoice
Number and types of platforms: a) deployed current year:0
b) planned next year: 0
Estimated number of PTT-years: a) current year:0
b) next year: 0

Agency or programme: SINTEF NHL
Purpose of programme: 702 NORID (transfer of data or position from measurement platforms)
Number and types of platforms: a) deployed current year:
b) planned next year:
Estimated number of PTT-years: a) current year:0.5
b) next year: 0.5

Agency or programme: Norwegian Institute of Nature Research
Purpose of programme: 1166 Satellite tracking of south polar skua
Purpose of programme:1454 Lesser white fronted goose project
Purpose of programme:1456 Brown bear tracking
Number and types of platforms: a) deployed current year:
b) planned next year:
Estimated number of PTT-years: a) current year: 2
b) next year: 0.5 (??)

Agency or programme: University of Tromsø
Purpose of programme: 768 Harp seal positioning
Number and types of platforms: a) deployed current year:5 loc. 8 loc./data coll.
b) planned next year:3 loc., 10 loc./data coll.
Estimated number of PTT-years: a) current year: 2.5
b) next year: 2.0

REPUBLIC OF KOREA

A: Agency of programme:

Agency: Korea Ocean Research and Development Institute

Purpose of programme: To measure surface current of the East China Sea

Numbers and types of platforms:
(a) deployed current year: 10 / satellite-tracked drifters
(b) planned next year : 10 / satellite-tracked drifters

Estimated number of PTT-years:
(a) current year: 5.5 PTT-years
(b) next year : 5 PTT-years

Special comments (if any)
(a) Korea Meteorological Office, and Korea Ocean Research and Development Institute are planning to deploy two moored buoys.

South Africa

Agency: South African Weather Bureau

Purpose of programme:

A network of drifters is maintained is the oceans surrounding South Africa. Data from the drifters are used primarily for Maritime Weather Forecasting purposes, although data is achived as well.

Activities in 1994/95

This year the SAWB deployed thirty four drifters, mainly in the Atlantic ocean. In October '94, twenty five SVP-B drifters were deployed, seven on behalf of NDBC. One Cmod drifter was deployed on this voyage. In January two SVP-B drifters were deployed, and two drogued Toga drifters on behalf of NDBC. In May four SVP-B drifters were deployed in the Indian ocean on behalf of AOML. All the SVP-B drifters owned by the SAWB were manufactured by Metocean . Data from all these drifters are disseminated onto the GTS.

In January 1995 two automatic weather stations were installed on the South Sandwich Islands. These stations are fixed on 10m stainless steel masts. Both report via Argos, where the data disseminated onto the GTS in Synop code.

Planned for 1995/96

Twenty SVP-B drifters will be deployed in the Atlantic ocean as the SAWB contribution to the ISABP. Another fixed station will be installed either during December 1995 or October 1996 on Tristan da Cunha for a period of three to four years. The possiblilty of moored buoys to be placed on Vema Seamount is being investigated.

Summary: Program 0243
Number and types of platforms:

(a) Deployed current year:

Drifters: 20 SVP-B (SAWB)
11 SVP-B (7 NDBC, 4 AOML)
2 Cmod (SAWB)

Fixed Stations: 2 (SAWB)

(b) Planned next year:

Drifters: 20 SVP-B

Fixed Stations: 1

Estimated number of PTT-years:

(a) Current year: 22
(b) Next year: 22

Country: Sweden

Year: 1995

A. Agency or programme:

Purpose of programme: Hydro - meteorological stations

Numbers and types of platforms: (a) deployed current year: 1 hydro-met

(b) planned next year: 3 hydro-met

Estimated number of PTT-years (a) current year: 1

(b) next year: 1

B. Agency or programme:

(as above, repeat as often as necessary)

Special comments (if any)

DRIFTING FLOATS " LOBAN"
RESEARCH of CURRENTS in the BLACK SEA

Country: Ukraine

Organization: Marine Hydrophysical Institute of Ukrainian National Academy of Sciences

Current program:

Projects "Black Sea " and "Supervision in Black Sea"

The purpose of the program:

Research of dynamics and heat transfer in the surface layer of the Black Sea.

Tasks:

1. Study of the seasonal and interseasonal variability Black Sea rim current.
2. Study of the mesoscale motion in surface waters.
3. Research of the river water diffusion in the northwestern part of the Black Sea.
4. Research of the features of cooling and heating of surface waters during the autumn and spring periods.
5. Improvement of the methods of calibration of sattellite remote supervision, using LOBAN drifting floats.

Number and type of the buoys:

- drifting buoys LOBAN have been used in the experiments . The data were transmitted and buoys located by means of the Doppler system space communication COSPAS/SARSAT. The research format of the message was used for excluding the signal perception as an emergency signal.
- Drag Area Ratio of the buoy was 5.6 (4529, taking into account water and air density).
- Buoys were equipped with quartz temperature sensors of water and air.
- The buoy's weight is 88 kg. The height of the buoy was 235 ci, with the hight of an aerial being considered. The diameter of buoy's cylindrical case is 30.4 ñi.
- Life time of the buoy was 150-180 days.

Time and place of the experiments

The experiments were carried out from 1987 to 1995. The buoys were launched both in the west and east parts of the Black Sea. The experiments were conducted annually during 1987-88 and 1992-95.

Real life time of buoys:

The real life time of buoys did not exceed 100 days. About 70 % of the buoys were thrown out on a coast, the other 30 % were picked up by ships. The limited life time of the buoy in the Black Sea is the negative factor of drifter application on a limited marine surface. At the same time, they are a unique instrument for regular information reception from the extensive parts of the Black Sea.

Main scientific results:

1. Features of seasonal and interseasonal variability of the Black Sea rim current were investigated.
2. Mesoscale motion of surface waters was studied. The occurrence mesoscale motion of different polarity in the surface waters of western Black Sea in spring and autumn was verified.
3. Features of the river water diffusion (Dniepr, Dniestr, Pivdennyi Buh) in the surface layer were investigated.
4. The methods of calibration of the remote supervision were applied for the purpose of temperature fields restoration.

Main practical results:

1. Efficiency of the drifter application for the study of the Black Sea and other enclosed and half-enclosed sea surfaces was confirmed despite the limited buoy life time.
2. Drifter technology has displayed its efficiency at an essential decrease of costs in comparison with the ship or air-borne methods of researche.
3. The further development of the drifter experiments in the Black Sea requires the coordination and the acceptance of international programs, when it is possible to use the buoy repeatedly, when the buoy is located dangerously close to shore.
4. The program of the study of the Black Sea, using drifters, should be defined as a separate segment of project adopted by IOC .

The prospect of further drifter deployment in the Black Sea:

- The experiments, which were executed in 1995, were the last when the LOBAN drifters were used. In the future programs WOCE/SVP drifters should be applied, which were developed in the institute. Also, WOCE/SVP-B drifters should be employed, the development of which should be completed in 1996.
- Diving drifters are supposed to be used for the study of the upper boundary of the hydrogen sulfide layer . The development of the diving drifters should be also completed in 1996.

Country: United Arab Emirates

Year: 1995

A. Agency or Programme: National Avian Research Center
Purpose of programme: Houbara bustards and Saker falcons in Arabia

Numbers and type of platforms: a) deployed current year: 20
b) planned next year: 15

Estimated number of PTT-years: a) current year: 2.5
b) next year: 2.5

United Kingdom

CURRENT PROGRAMMES

Institute: **Meteorological Office**

Programme: EGOS

Number & type of buoys:

a) deployed during year: 20 drifters + 10 moored

b) operational at 31 August: 15 drifters + 10 moored

c) reporting on GTS at 31 August: 15 drifters + 10 moored

Purpose of programme: Operational meteorology and oceanography

Main deployment areas: North Atlantic 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: 3

c) reporting on GTS at 31 August: 3

Purpose of programme: Operational meteorology and oceanography, climate research

Main deployment areas: Arctic Ocean

Institute: **Meteorological Office**

Programme: Low cost drifter evaluation

Number & type of buoys:

a) deployed during year: 2 SVP-B barometer drifters

b) operational at 31 August: 2

c) reporting on GTS at 31 August: 2

Purpose of programme: Evaluation: during the next year it is planned that these buoys will become operational

Main deployment areas: Central north Atlantic

Institute: **Southampton Oceanography Centre**

Programme:

Number & type of buoys:

a) deployed during year: 1 waverider, 1 met buoy

b) operational at 31 August: 0

c) reporting on GTS at 31 August: 0

Purpose of programme: Met/ocean research

Main deployment areas: Bristol Channel, North Sea

Institute: **Plymouth Marine Laboratory**

Programme:

Number & type of buoys:

a) deployed during year: 7 drogued drifters, 2 ALACE floats

b) operational at 31 August:

c) reporting on GTS at 31 August:

Purpose of programme: Oceanographic research

Main deployment areas: North Atlantic

Institute: **Proudman Oceanographic Laboratory**

Programme: LOIS

Number & type of buoys:

a) deployed during year: 1

b) operational at 31 August: 1

c) reporting on GTS at 31 August: 1

Purpose of programme: Met/ocean research

Main deployment areas: Shelf edge west of Scotland

Institute: **Dunstaffnage Marine Laboratory**

Programme: LOIS

Number & type of buoys:

a) deployed during year: 7 SVP-type drifters

b) operational at 31 August: 6

c) reporting on GTS at 31 August: 3

Purpose of programme: Met/ocean research

Main deployment areas: Shelf edge west of Scotland

Institute: **Ministry of Agriculture, Fisheries and Food**

Programme:

Number & type of buoys:

a) deployed during year: 9 IDB drogued drifters

b) operational at 31 August: 0

c) reporting on GTS at 31 August: 0

Purpose of programme: Shelf oceanography

Main deployment areas: Western Irish Sea and North Channel

Institute: **University College of North Wales**

Programme: Seasonal gyres in shelf seas

Number & type of buoys:

a) deployed during year: 29 drogued drifters

b) operational at 31 August: 0

c) reporting on GTS at 31 August: 0

Purpose of programme: Shelf oceanography

Main deployment areas: Irish Sea

PLANNED PROGRAMMES

Institute: **Meteorological Office**

Programme: EGOS

Number & type of buoys planned
for deployment in next 12 months: Up to 20 drifters (including 5 SVP-B drifters) and 13 moored buoys (4 at inshore locations and 9 in remote open-ocean areas). One of the 9 includes a buoy off Brittany, France, which is a joint Météo France - UK Meteorological Office venture.

Purpose of programme: Operational met/ocean

Main deployment areas: NE Atlantic, seas around the British Isles, the North Sea

Institute: **Meteorological Office**

Programme: IABP

Number & type of buoys planned
for deployment in next 12 months: 1 ice drifter

Purpose of programme: Operational met/ocean and climate research

Main deployment areas: Arctic Ocean

Institute: **Meteorological Office**

Programme: ISABP

Number & type of buoys planned
for deployment in next 12 months: 1 'wsd' drifter

Purpose of programme: Operational met/ocean

Main deployment areas: South Atlantic

Institute: **Southampton Oceanography Centre**

Programme:

Number & type of buoys planned
for deployment in next 12 months: 1 waverider, 1 met buoy

Purpose of programme: Met/ocean research

Main deployment areas: North Sea

Institute: **Plymouth Marine Laboratory**

Programme:

Number & type of buoys planned
for deployment in next 12 months: 4 drogued drifters, 6 ALACE floats

Purpose of programme: Oceanographic research

Main deployment areas: North Atlantic

Institute: **Proudman Oceanographic Laboratory**

Programme: LOIS

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

Purpose of programme: Met/ocean research

Main deployment areas: Shelf edge west of Scotland

Institute: **Dunstaffnage Marine Laboratory**

Programme: LOIS

Number & type of buoys planned
for deployment in next 12 months: 30 enhanced SVP drifters, including DGPS variants

Purpose of programme: Met/ocean research

Main deployment areas: Shelf edge west of Scotland

Institute: **Ministry of Agriculture, Fisheries and Food**

Programme:

Number & type of buoys planned
for deployment in next 12 months: 9 drogued drifters

Purpose of programme: Shelf oceanography

Main deployment areas: North Channel and North Sea

Institute: **University College of North Wales**

Programme: Seasonal gyres in shelf seas

Number & type of buoys planned
for deployment in next 12 months: approx 10 drogued drifters

Purpose of programme: Shelf oceanography

Main deployment areas: Irish Sea, shelf west of Scotland, North Sea

TECHNICAL DEVELOPMENTS

Addition of GPS and DGPS capabilities to SVP-style drifters to improve track resolution in time and space, and to allow intelligent scheduling of transmissions using known position and time (Dunstaffnage Marine Laboratory).

United States of America

CURRENT PROGRAMS

A. Agency or programme: NOAA/AOML Global Drifter Programme, Argos programme 0129
Number and type of buoys: (a) deployed during year: 0
(b) operational at 31 August: 11
(c) reporting on GTS at 31 August: 0
Purpose of programme: Provide real-time data sets of SST ,Pa, and surface velocity
Main deployment areas: Tropical and mid-latitude Pacific, North Atlantic

B. Agency or programme: NOAA/Scripps Global Drifter Programme, Argos programme 1325,1425
Number and type of buoys: (a) deployed during year: 235
(b) operational at 31 August: 457
(c) reporting on GTS at 31 August: 161
Purpose of programme: Provide real-time data sets of SST, Pa, and surface velocity
Main deployment areas: Tropical and mid-latitude Pacific, North Atlantic

C. Agency or programme: NOAA/Consortium Global Drifter Programme, Argos programme 1325
Number and type of buoys: (a) deployed during year: 73 SVP-B
(b) operational at 31 August: 41 (was 55 on 8/30)
(c) reporting on GTS at 31 August: 41 (request to remove 14 on 8/30)
Purpose of programme: Provide real-time data sets of SST, Pa, and surface velocity
Main deployment areas: Southern Ocean

E. Agency or programme: NOAA/RSMAS Global Drifter Programme, Argos programme 1326
Number and type of buoys: (a) deployed during year: 83
(b) operational at 31 August: 63
(c) reporting on GTS at 31 August: 29
Purpose of programme: Provide real-time data sets of SST, and surface velocity
Main deployment areas: Indian Ocean

PLANNED PROGRAMS

A. Agency or programme: NOAA/Scripps Global Drifter Program, Argos program 1325
Number and type of buoys planned for deployment in next 12 months: 245 SVP
Purpose of programme: Provide real-time data sets of SST, Pa, and surface velocity
Main deployment areas: Tropical and mid-latitude Pacific, North Atlantic

B. Agency or programme: NOAA/Consortium Global Drifter Program, Argos program 1325
Number and type of buoys planned for deployment in next 12 months: 110 SVP-B
Purpose of programme: Provide real-time data sets of SST, Pa, and surface velocity
Main deployment areas: Southern Ocean

C. Agency or programme: NOAA/NWS/Scripps Global Drifter Program, Argos program 1325
Number and type of buoys planned for deployment in next 12 months: 40 SVP-B
Purpose of programme: Provide real-time data sets of SST, Pa, and surface velocity
Main deployment areas: NE Pacific/US West Coast

D. Agency or programme: NOAA/RSMAS Global Drifter Program, Argos program 1326
Number and type of buoys planned for deployment in next 12 months: 60 SVP
Purpose of programme: Provide real-time data sets of SST and surface velocity
Main deployment areas: Indian Ocean

TECHNICAL DEVELOPMENTS

Experimental drifters with a) different wire tether diameters, and b) pre-formed drogue spreaders recently deployed.

PUBLICATIONS

Report of the 2nd DBCP/SIO Workshop on SVP Barometer Drifter Evaluation, May 9-10, 1995, New Orleans, La, USA. Editor, Mark Bushnell. 67pp. (1995)

SPECIAL COMMENTS

(a) Quality of buoy data:
- SVP-B drifters exhibit large percentage of Class 0 fixes
- SVP-B Pa de-spiking algorithm working well
- SVP-B Pa data transmission 8 times redundant
- SST diurnal cycle coupled w/ 1/3 duty cycle reducing SST data set to unacceptably low levels

(b) Communications
- NOAA/AOML centers

(c) Buoy lifetimes
- Statistics for all SVP drifters expiring in 1994 (days)

n=195	mean	median	SD
drogue	375	366	267
transmitter	505	513	331

(d) Other:
- Two Indian Ocean SVP drifters recovered in Sri Lanka

THE INDIAN DRIFTING BUOY PROGRAMME

A Drifting Buoy Programme for north Indian Ocean was launched by National Institute of Oceanography, Goa in 1991 with the support of the Department of Ocean Development, Govt. of India. It forms an important component of the Sea-truth Collection effort for National Ocean Remote Sensing Programme aimed at developing Marine Satellite Information Service (MARSIS) for the Indian seas. During the last 5 years, more than 30 drifters were deployed by the Indian Research Vessels, Gaveshani and Sagar Kanya in Arabian Sea, Bay of Bengal and equatorial Indian Ocean and the data on surface meteorological and oceanographic parameters were acquired through ARGOS System. Besides WOCE drifters with SST sensor, a few multiparameter TOGA drifters with sensors for atmospheric pressure, air temperature and winds were also used. Since July 1995, the data from these drifters are being disseminated on GTS. Fig. 1 shows the trajectories of the drifters for the period August 1991 - December 1992 and Fig. 2 for the period August 1993 - November 1995. A few prototype drifters developed indigenously at NIO, were also deployed and their performance is being evaluated. The drifters worked for periods ranging from 6 months to 1½ years. The India Meteorological Department and the National Center for Medium Range Weather Forecasting, New Delhi have acknowledged that the availability of the data from these drifters in real time on GTS, is useful for their weather forecasting activities.

It is planned to deploy atleast 10 drifters (with SST and pressure sensors) per year during 1996 and 1997. With the anticipated launching of dedicated remote sensing satellites for ocean applications (OCEANSAT series) by India from 1998 onwards the seatruth collection effort is expected to be strengthened and thereby the drifting buoy programme too.

Programme Coordinator:

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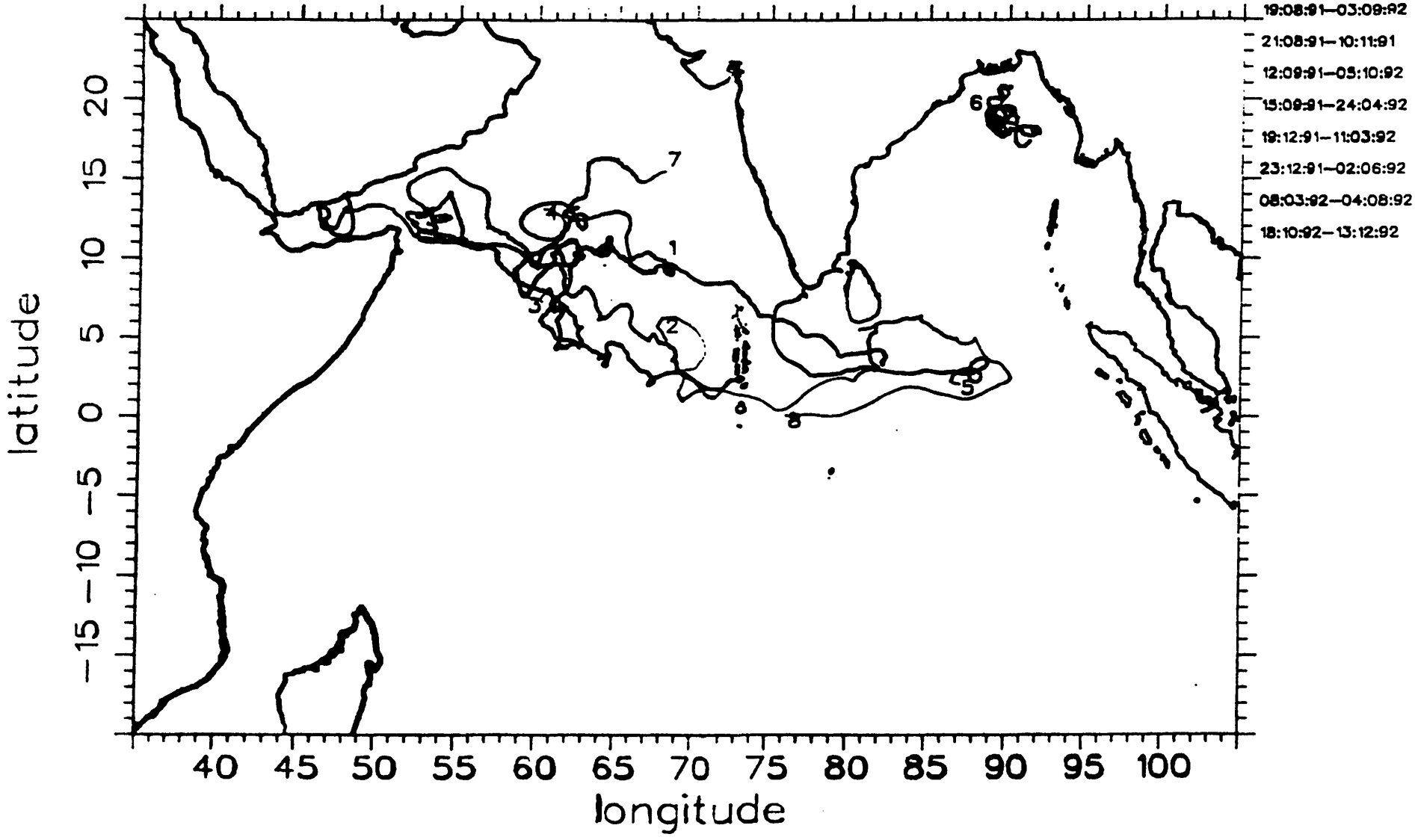
Trajectories of drifting buoys during August 91 to Dec. 92
19:08:91–03:09:92
21:08:91–10:11:91
12:09:91–05:10:92
15:09:91–24:04:92
19:12:91–11:03:92
23:12:91–02:06:92
08:03:92–04:08:92
18:10:92–13:12:92
latitude
20
15
10
5
0
−5
−10
−15
40
45
50
55
60
65
70
75
80
85
90
95
100
longitude

Fig. 1

Trajectories of drifting buoys during August 93 to November 95

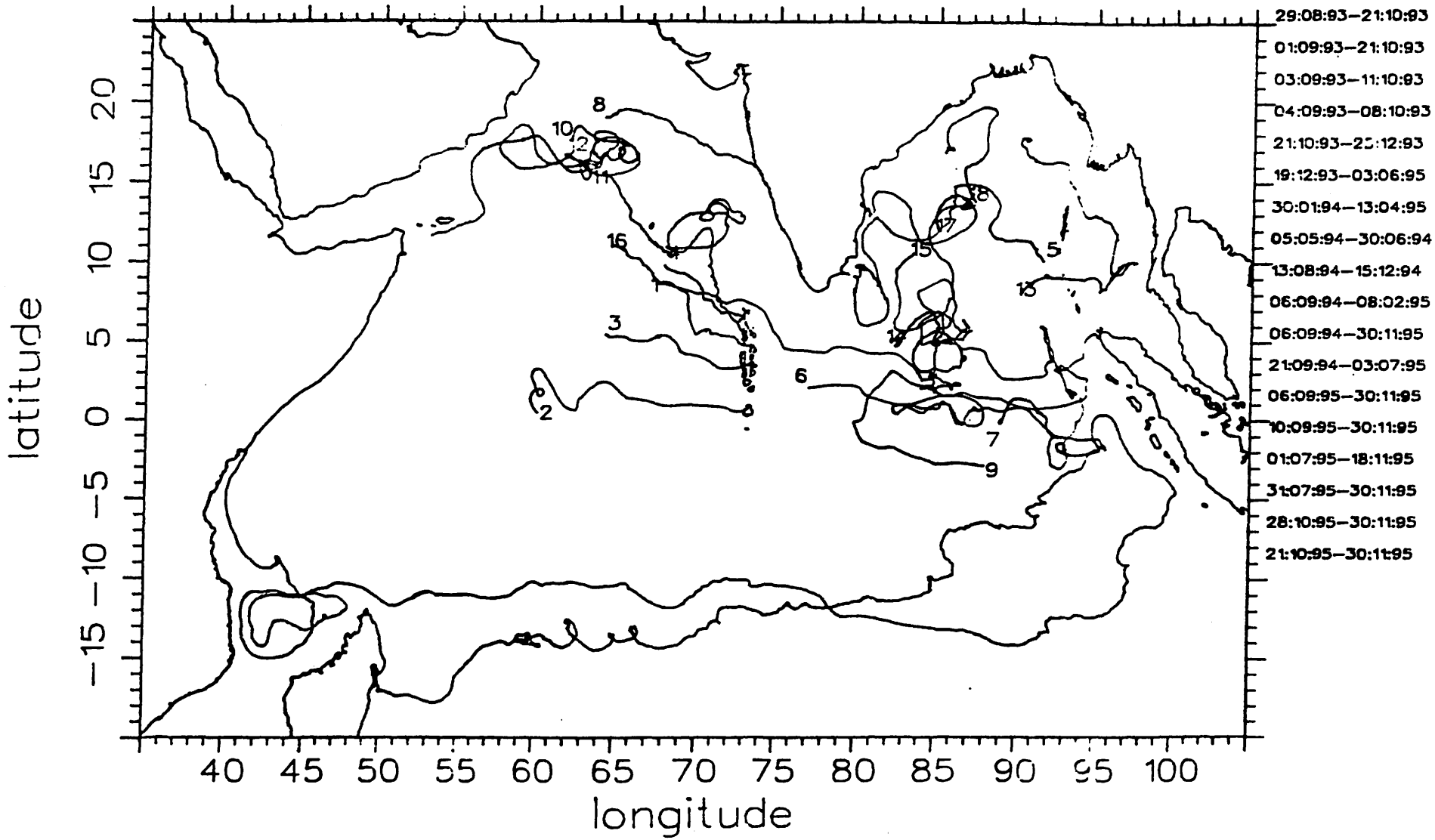

Fig. 2

ANNEX II

REPORTS FROM THE DBCP ACTION GROUPS

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

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

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

(a) provision of good quality and timely data to users;

(b) insertion of real-time (or near real-time) data into the GTS;

(c) exchange of information on data buoy activities and development and transfer of appropriate technology.

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

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

5. On its part the DBCP shall support the activities of its adopted action groups and especially through the assistance of the officers of the DBCP, its technical 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 four action groups, the reports of which follow:

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).

REPORT BY THE EUROPEAN GROUP ON OCEAN STATIONS

1. INTRODUCTION

The European Group on Ocean Stations (EGOS) was established on December 1, 1988 with the objective:

> To co-operate in the implementation and maintenance of marine stations in the European and adjacent waters for providing meteorological and oceanographic data on a near real-time basis.

The Project and the form of co-operation are described in the Summary of Arrangements and Rules of Procedure which are deposited with the Secretariats of the WMO and IOC.

The Project is based on voluntary contributions and the activities are co-ordinated through the Technical Secretariat at Christian Michelsen Research A/S (CMR) in Bergen, Norway.

Information on the EGOS activities and the progress of the operational buoy programme are circulated to the members and the co-operative parties in the Technical document series issued by the Technical Secretariat. EGOS is formally an Action Group of DBCP.

In 1995, eight nations are participating in the EGOS Project.

The Annual report on EGOS for the year 1994 was issued as EGOS Technical Document No. 118 and circulated to the EGOS members and to the following co-organisations:

- Data Buoy Co-operation Panel (DBCP)
- International Arctic Buoy Programme (IABP)
- Intergovernmental Oceanographic Commission (IOC)
- World Meteorological Organization (WMO)
- International South Atlantic Buoy Programme (ISABP)

Reports on the status of the drifting buoy programme are issued on a regular monthly basis.

Meetings:
The annual meeting of the Management Committe of EGOS was held at the WMO Headquarters in Geneva, 6-7 December 1994. This was combined with a meeting in the EGOS Technical Subgroup. The semi-annual meetings were held at CMR in Bergen, June 7-8 1995.

2. EGOS OPERATIONAL PROGRAMME

Drifting buoys are deployed in two areas; one north of 50°N, which is referred to as EGOS North, and the other south of 50°N, which is referred to as EGOS South.

Deployment of drifting buoys are carried out on a voluntary basis by ships of opportunity. In EGOS North, buoys are deployed along two shipping routes:
1. Iceland to North America
2. Denmark to West Greenland.

Other routes may be found and used.

In EGOS South buoys are deployed by ships sailing from the United Kingdom to the Caribbean.

As at Aug 1, 1995 a total of 18 drifting buoys are operating in the EGOS programme, 13 in the EGOS North and 5 in the EGOS South. See Figures 1 and 2.

The EGOS members have committed themselves to provide about 20 new buoys per year to the programme. In addition are some undamaged recovered buoys which are refurbished and then redeployed. The number of deployments and the number of operational buoys is quite variable. During late 1993 and early 1994 a large number of buoys were lost and deleted from the programme. This was gradually compensated for by new deployments, but nevertheless the number of buoys were reduced from 20 to 10 during that winter season, see Figure 2. The winter of 1994-1995 had a minimum of 15 drifting buoys operating (Fig. 2).

In addition to the drifting buoys the UK Met. Office operates 5 moored buoy stations K1-K5, west of the British Isles, and the RACH buoy on Rosemary bank. The UK Met. Office also operates the ODAS 451 station west on the Faroes on a basis of a contract with CMR and with deployment by a ship from the Faroes Coast Guard (Vaktar og Bjargingartænastan).

3. PROGRAMME CO-ORDINATION

The EGOS programmes are co-ordinated through the Technical Secretariat working in close co-operation with the participating members. This work includes:

- Monitoring of the operational programmes on a quasi real-time basis (Iceland)
- Data quality control (Iceland, UK and the DBCP Technical Co-ordinator)
- New deployments of buoys (Iceland Norway and UK)
- Buoy recovery, repatriation, refurbishment, and redeployment
- Reporting.

Information on the status of the buoy network and the individual buoys are collected by the Technical Secretary who is responsible for the further distribution of information and relevant instructions to the deployment centres and to the LUT operators. When a buoy is deployed and the data quality confirmed, the Technical Secretary will immediately furnish the buoy with an appropriate WMO Id. No. and send identical data formats to the LUT operators with a request to disseminate the data via the GTS. Information on a new deployment is sent immediately to the EGOS members and co-operative parties via telefax or e-mail. Information on the status and the recent developments of the buoy network is circulated to the members and the co-operating parties in the EGOS Monthly report on Drifting Buoys.

4. DATA RECOVERY AND DATA DISSEMINATION

The data transmission is mainly based on the Argos system and the buoy data are received by the following three Local Users Terminals (LUTs) and further disseminated via the GTS:

- Oslo ENMI
- Søndre Strømfjord BGSF
- Toulouse LFPW

The geographical distribution and location of these three LUTs ensures optimal data reception from the EGOS buoys which are distributed over the North Atlantic Ocean.

It has previously been clearly demonstrated by the Meteorological Service in Iceland, that when the data received from all LUTs are utilised, the data recovery rate increases by some 50 - 100%. This is demonstrated in Tables 2-5 for recent (April 1995) data.

The average time lag (delay) for data reception, i. e. the time between observation and reception at the users location, is usually 20 - 50 minutes both for buoys in EGOS North and EGOS South. A cut-off time of about 90 minutes is generally applied at weather forecasting centres, see Tables 6-9.

The number of observations received within each hour during a day, varies considerably due to the variation in satellite overpasses. These conditions are however improved by taking advantage of data reception from all three LUTs, see Figures 3 and 4.

Due to the geographical distance between the LUTs in Oslo (ENMI) and Søndre Strømfjord (BGSF) and the buoys operating in the EGOS South, only buoys operating in the EGOS North can fully benefit from the service of all three LUTs.

5. DATA QUALITY AND DATA QUALITY CONTROL

Data quality and quality control of the operational data which are disseminated via the GTS are given high priority in the EGOS programme.

- Gross error control is carried out automatically and data which are obviously wrong are eliminated from the data message at the LUTs.

- A quasi real-time quality control is carried out at the Icelandic Meteorological Service. When a buoy is reporting wrong data, the Technical Secretary is immediately notified and then instructs the LUT operators to suppress the wrong data from the GTS messages. Data received from each of the three LUTs are

compared at the Meteorological Service in Iceland. This control reveals possible errors in the positions calculated at the respective LUTs.

- Buoys reporting dubious will be "flagged" and the data are monitored with particular attention, and checked with the Data Control service at the UK Meteorological Office, before it is finally decided to whether delete the data from the GTS or to keep it.

- Data quality control is also carried out at the UK Meteorological Office, Central Forecast Branch in Bracknell. Data received in Bracknell via the GTS are analysed and the statistics on the weekly and the monthly average air pressure and sea surface temperatures bias for each buoy is calculated.

- Statistics on the air pressure data quality is also provided by the DBCP Technical Co-ordinator. This analysis includes distribution of RMS (Obs - First Guess) for accepted buoy air pressure data over a 6 month period.

The results of the data quality control and programme modifications are included in the EGOS Monthly Report on Drifting Buoys. Reports on dubious data are also received via the DBCP Buoy Quality Control Bulletin Board and the bulletin board VEDUR.IS.

6. OPERATIONAL LIFE-TIME OF DRIFTING BUOYS

The operational life-time, defined as the number of days during which the buoy provides useful air pressure data, is thus an essential parameter. There are several reasons why a buoy stops being operational, and the operational life-time may thus depend on factors such as the technical quality of the buoy, the battery capacity, but also the drift pattern which the buoy follows. Statistics on the average operational life-time for the EGOS buoys (buoys that have ceased to operate) are worked out on a semi-annual basis:

- In 1991, full year 165 days
- In 1992, full year 312 days
- In 1993, full year 200 days
- In 1994, full year 186 days
- In 1995, 1st half: 248 days

During the season December 1, 1994 to June 1 1995 a total of 18 buoys ceased being operational, and 14 new buoys were deployed. Most of the buoys which fail are never recovered and it is therefore difficult to detect the reason for failure. 7 buoys drifted ashore, and were therefore removed from the programme.

It should be mentioned that the usefulness of the data also depends on the area in which the buoy operates. Data from the most data sparse area are from an operational point of view more valuable and useful than data from an area with better coverage. However, the data sparse areas are in general less accessible and less favourable to the buoys. It may thus be shown clearly that buoys of the same design will on average serve much longer in EGOS South than in EGOS North. The usefulness of the data relative to the operational area is not taken into account in connection with the evaluation of the cost effectiveness.

The EGOS drifting buoys are considered as expendable although some buoys are recovered. Reuse of these buoys are an exception rather than normal; a few buoys, or parts of the buoys, are accepted for reuse after their technical status have been carefully examined.

7. OTHER EGOS ACTIONS

7.1 Technical developments

The experience from introducing a GPS navigation system in the drifting buoys will be furter evaluated. A new byou will probably be furnished with a GPS receiver in 1995 for testing purposes.

Testing of new barometers is continued with the view of finding less costly but reliable and satisfactory pressure transducers.

New options for deployments are being evaluated, including parachute air drops. Test drops applying regular EGOS drifting buoys will be perfomed during 1995.

7.2 The EGOS buoy data log

The EGOS Technical Secretariat has established and maintains a log on the behaviour and legend of the EGOS buoys. This log is updated whenever *thee is* some changes to the status of a buoy. The log also includes basic technical information about the buoys, such as sensor type ang height of anemometers.

This log also includes a list of the Argos Id. Nos. in use, or Id. Nos. which have been used but the buoys have ceased operating. The Technical Secretariat maintains, in the same way a list on WMO Nos. which are available for use in the EGOS programme.

8. CO-OPERATION WITH OTHER ORGANISATIONS

EGOS is an action group of DBCP and maintains a close co-operation with this organisation. In addition EGOS co-operates with a number of other organisations working in the same or related fields. EGOS presents reports at these meetings through their members or officially nominated representatives.

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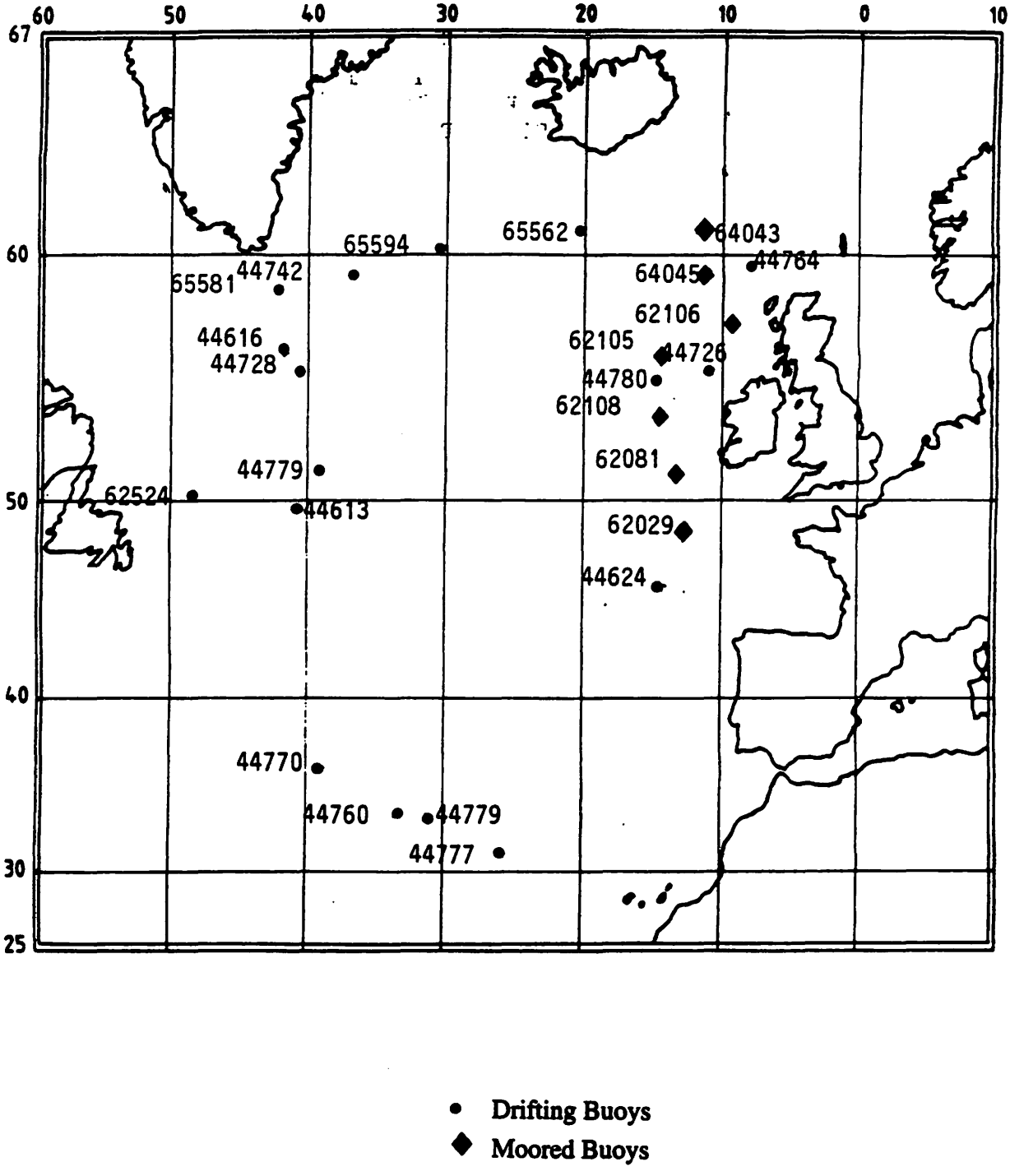


Figure 1: EGOS buoy positions as at Aug. 1, 1995.

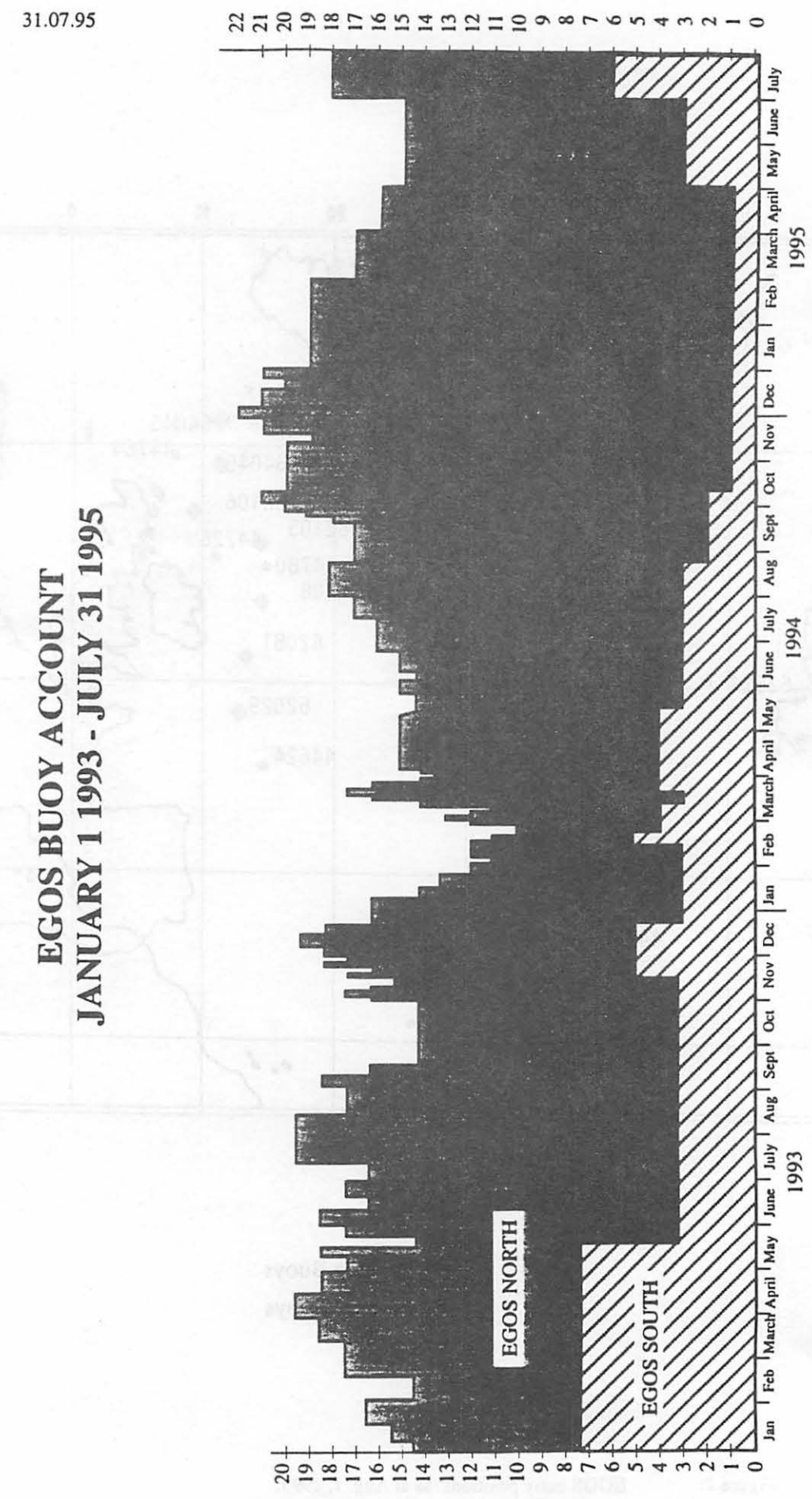
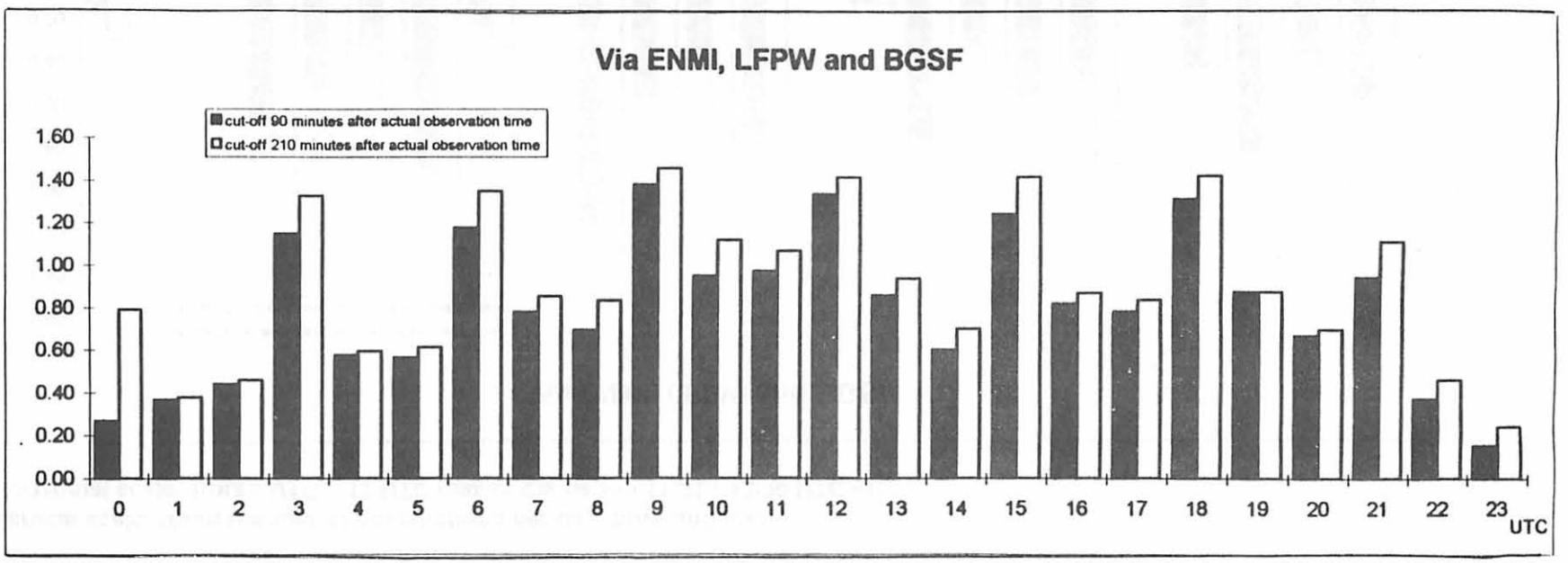


Figure 2: EGOS buoy account for the period Jan. 1993 - July 1995.

Diurnal Variation in EGOS-North Buoy Reception
Reykjavik, April 1995

Mean number of observations from 18 N-Atlantic EGOS-North buoys, observed during each hour of the day and being received via GTS in Reykjavik within 90 minutes (black columns) and 210 minutes (white columns) from actual time of observation.

Vertical scale: Mean number of observations per day, hour and buoy
Horizontal scale: Hours UTC. 12 UTC means the period 11:31 - 12:30 UTC etc.



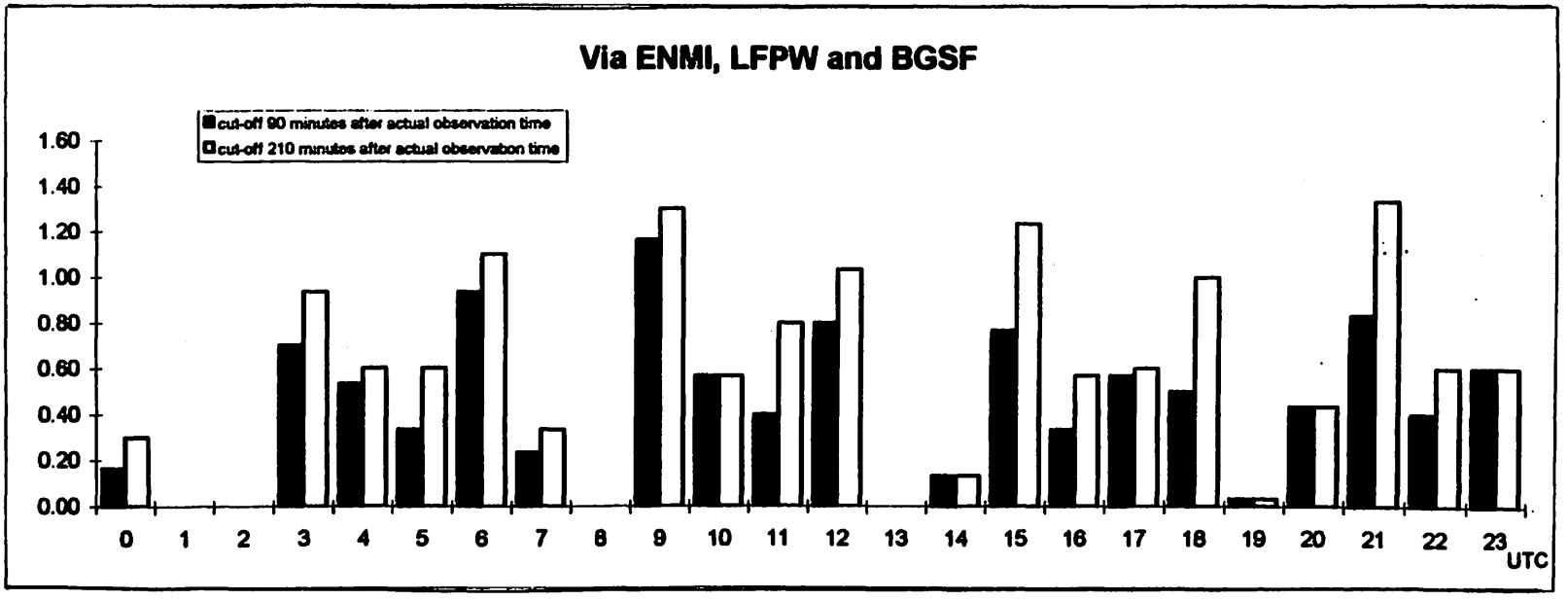
When the same observation has been received more than once or two or more observations made within 15 minutes have been received, only the first received has been included.

Figure 3: Diurnal variation in EGOS-North buoy reception.

Diurnal Variation in EGOS-South Buoy Reception
Reykjavik, April 1995

Mean number of observations from 1 N-Atlantic EGOS-South buoy , observed during each hour of the day and being received via GTS in Reykjavik within 90 minutes (black columns) and 210 minutes (white columns) from actual time of observation.

Vertical scale: Mean number of observations per day, hour and buoy
Horizontal scale: Hours UTC. 12 UTC means the period 11:31 - 12:30 UTC etc.



When the same observation has been received more than once or two or more observations made within 15 minutes have been received, only the first received has been included.

Figure 4: Diurnal variation in EGOS-South buoy reception.

Table 1: EGOS buoy status as at Aug. 1st, 1995.

WMO Id. No.	ARGOS Id. No.	Buoy type	Owner	Report	SENSORS PP	TW	dp	dd	ff	TA	LUT GTS	Position 01.08.95 (213)		Remarks	Comments
44780	1250	MO	UK	BOT	OK	OK	OK	-	-	-	OTS	54,1 °N	13,6 °W	213	
65594	1252	MO	UK	BOT	OK	OK				OK	OTS	60,0 °N	30,7 °W	"	
44779	1253	MO	UK	BOT	OK	OK				OK	OTS	51,2 °N	38,5 °W	"	
65562	1298	C/S	D	BOT	OK	OK	OK	-	-	OK	OTS	61,8 °N	20,1 °W	"	
65581	1299	C/S	D	BOT	OK	OK	OK	-	-	OK	OTS	58,1 °N	42,6 °W	"	
44760	2947	MO	UK	BOT	OK	OK	OK			OK	OTS	34,0 °N	33,9 °W	"	
44742	2953	MO	UK	BOT	OK	OK	OK	OK	OK	OK	OTS	58,9 °N	37,2 °W	"	
44728	3024	MO	UK	BOT	OK	OK	OK	-	-	OK	OTS	56,2 °N	41,6 °W	"	
44770	3035	MO	UK	BOT	OK	OK	OK			OK	OTS	35,5 °N	40,0 °W	"	
44616	3318	MO	UK	BOT	OK	OK	OK	-	-	OK	OTS	55,6 °N	41,8 °W	"	
44613	3324	MO	UK	BOT	OK	OK	OK	-	-	OK	OTS	49,7 °N	40,5 °W	"	
62524	4625	MO	UK	BOT	OK	OK	-	-	-	-	T	27,2 °N	46,8 °W	"	
62696	6288	MO	UK	BOT	OK	OK	OK	-	-	-	OTS	71,1 °N	24,1 °E	"	
44624	6292	MO	UK	BOT	OK	OK	OK	-	-	OK	OTS	45,6 °N	14,5 °W	"	
44726	6296	MO	UK	BOT	OK	OK	OK	-	-	OK	OTS	54,4 °N	11,6 °W	"	
44764	6306	MO	UK	BOT	OK	OK	OK	OK	OK	OK	OTS	59,7 °N	8,6 °W	"	
44777	14733	WOCE	UK	BOT	OK	OK	-	-	-	-	OTS	36,9 °N	41,5 °W	"	
44779	14737	WOCE	UK	BOT	OK	OK	-	-	-	-	OPTS	34,0 °N	41,2 °W	"	

N-Atlantic Drifting Buoy Reception in Reykjavik, April 1995

Cut-off time 90 minutes after time of observation

Mean number of useful reports (including air pressure) received per day via LFPW (Paris, but originating in Toulouse), ENMI (Oslo), BGSF (Søndre Strømfjord), via a combination of two LUTs, and all three LUTs together.

The EGOS North Programme

WMO No.	Argos No.	Owner	Position on 30-09-1994	ENMI	LFPW	BGSF	Two LUTs together: ENMI LFPW	ENMI BGSF	LFPW BGSF	All LUTs	Remarks
44613	3324	UK	52.8°N 48.4°W	6.8		10.0	6.8	14.0	12.0	14.0	**7.-30.**
44614	6294	UK	57.0°N 5.8°W	12.6	13.3	8.8	16.2	17.1	17.2	19.3	
44616	3318	UK	55.3°N 39.4°W	7.6	12.4	11.8	14.1	16.0	18.1	19.1	
44624	6292	UK	50.0°N 15.9°W	9.9	12.2	7.9	14.2	14.9	15.8	17.5	
44726	6296	UK	54.5°N 19.3°W	10.2	13.4	8.8	15.2	15.4	17.6	18.7	
44728	3024	UK	56.2°N 39.6°W	7.3	11.6	11.0	13.2	15.3	17.3	18.3	
44742	2953	UK	58.0°N 39.7°W	10.3	15.0	13.0	17.3	18.8	20.7	22.1	**7.-30.**
44764	6306	UK	58.8°N 14.1°W	12.5	13.9	11.8	17.1	19.3	19.5	21.8	
44766	4274	The Netherlands	53.1°N 9.7°W	11.8	13.6	9.5	15.6	17.6	17.7	19.4	**1.-18.**
44776	6305	UK	59.1°N 7.0°W	13.0	13.4	11.6	16.7	19.6	19.2	21.7	
44780	1250	UK	54.8°N 12.2°W	12.3	13.9	11.0	16.4	18.5	19.3	21.0	
62696	6288	UK	71.4°N 19.6°E	10.7	10.7	8.5	13.7	16.1	15.6	18.1	
62805	2927	UK	57.7°N 28.8°W	10.9	14.5	12.9	16.8	18.9	20.2	21.7	
64528	9306	The Netherlands	58.2°N 6.3°W	8.6	11.1	11.9	16.1	17.7	20.0	21.4	
64529	3037	Ireland	60.7°N 24.1°W	8.2	6.2	7.1	10.7	12.8	10.6	13.9	
65562	1298	Germany	60.8°N 25.9°W	12.2	14.6	8.8	17.4	17.3	18.6	20.8	
65571	3676	The Netherlands	58.4°N 6.5°W	12.2	10.3	7.0	14.7	16.3	14.2	17.8	
65581	1299	Germany	58.9°N 40.6°W	9.4	12.5	12.9	15.2	18.2	19.1	20.8	**18.-30.**
Mean				**10.4**	**12.5**	**10.2**	**14.9**	**16.9**	**17.4**	**19.3**	

Reports received more than 90 minutes after time of observation have been excluded. When the same observation has been received more than once or two or more observations made within 15 minutes have been received only the first received has been included.

Table 2: N-Atlantic Drifting Buoy Reception in Reykjavik. Cut-off time 90 minutes after time of observation.

N-Atlantic Drifting Buoy Reception in Reykjavik, April 1995

Cut-off time 210 minutes after time of observation

Mean number of useful reports (including air pressure) received per day via LFPW (Paris, but originating in Toulouse), ENMI (Oslo), BGSF (Søndre Strømfjord), via a combination of two LUTs, and all three LUTs together.

The EGOS North Programme

WMO No.	Argos No.	Owner	Position on 30-09-1994	ENMI	LFPW	BGSF	Two LUTs together ENMI LFPW	ENMI BGSF	LFPW BGSF	All LUTs	Remarks
44613	3324	UK	52.8°N 48.4°W	8.6		11.4	8.6	15.5	11.4	15.5	**7.-30.**
44614	6294	UK	57.0°N 5.8°W	14.8	18.5	10.1	19.9	18.6	20.7	21.7	
44616	3318	UK	55.3°N 39.4°W	9.9	17.7	13.7	18.8	17.9	20.9	21.7	
44624	6292	UK	50.0°N 15.9°W	13.0	16.5	9.4	18.2	17.5	18.4	20.1	
44726	6296	UK	54.5°N 19.3°W	13.4	18.3	10.2	19.4	17.8	20.2	21.2	
44728	3024	UK	56.2°N 39.6°W	9.7	17.3	13.0	18.2	17.1	20.0	20.8	
44742	2953	UK	58.0°N 39.7°W	13.0	20.5	14.4	21.8	20.5	23.5	24.7	**7.-30.**
44764	6306	UK	58.8°N 14.1°W	14.7	20.0	13.3	21.7	21.0	22.5	24.2	
44766	4274	The Netherlands	53.1°N 9.7°W	13.9	17.4	10.7	18.7	18.9	19.7	21.1	**1.-18.**
44776	6305	UK	59.1°N 7.0°W	15.0	19.1	12.8	21.3	20.8	21.9	24.0	
44780	1250	UK	54.8°N 12.2°W	14.6	18.8	12.3	20.5	20.0	21.6	22.9	
62696	6288	UK	71.4°N 19.6°E	10.9	18.5	8.6	20.2	16.3	21.3	22.8	
62805	2927	UK	57.7°N 28.8°W	13.7	20.0	14.4	21.5	20.8	23.0	24.4	
64528	9306	The Netherlands	58.2°N 6.3°W	8.6	14.7	13.0	19.5	18.7	22.5	23.9	
64529	3037	Ireland	60.7°N 24.1°W	10.4	10.5	8.4	14.3	14.8	13.3	16.3	
65562	1298	Germany	60.8°N 25.9°W	14.6	20.9	9.9	22.4	19.3	22.7	24.2	
65571	3676	The Netherlands	58.4°N 6.5°W	14.4	15.4	7.6	18.2	17.8	17.3	20.0	
65581	1299	Germany	58.9°N 40.6°W	11.7	19.7	14.3	20.8	19.2	22.7	23.6	**18.-30.**
Mean				**12.5**	**17.9**	**11.5**	**19.1**	**18.5**	**20.2**	**21.8**	

Reports received more than 210 minutes after time of observation have been excluded. When the same observation has been received more than once or two or more observations made within 15 minutes have been received only the first received has been included.

Table 3: N-Atlantic Drifting Buoy Reception in Reykjavik. Cut-off time 210 minutes after time of observation.

Table 4: N-Atlantic Drifting Buoy Reception in Reykjavik. Cut-off time 90 minutes after time of observation.

N-Atlantic Drifting Buoy Reception in Reykjavik, April 1995

Cut-off time 90 minutes after time of observation

Mean number of useful reports (including air pressure) received per day via LFPW (Paris, but originating in Toulouse), ENMI (Oslo), BGSF (Søndre Strømfjord), via a combination of two LUTs, and all three LUTs together.

The EGOS South Programme

WMO No.	Argos No.	Owner	Position on 30-09-1994				Two LUTs together				
				ENMI	LFPW	BGSF	ENMI LFPW	ENMI BGSF	LFPW BGSF	All LUTs	Remarks
62524	4625	UK	25.5°N 38.9°W	0.2	8.9	2.9	8.9	3.1	10.4	10.4	

Reports received more than 90 minutes after time of observation have been excluded. When the same observation has been received more than once or two or more observations made within 15 minutes have been received only the first received has been included.

N-Atlantic Drifting Buoy Reception in Reykjavik, April 1995

Cut-off time 210 minutes after time of observation

Mean number of useful reports (including air pressure) received per day via LFPW (Paris, but originating in Toulouse), ENMI (Oslo), BGSF (Søndre Strømfjord), via a combination of two LUTs, and all three LUTs together.

The EGOS South Programme

WMO No.	Argos No.	Owner	Position on 30-09-1994	ENMI	LFPW	BGSF	Two LUTs together: ENMI LFPW	ENMI BGSF	LFPW BGSF	All LUTs	Remarks
62524	4625	UK	25.5°N 38.9°W	0.3	12.9	4.3	12.9	4.6	14.1	14.1	

Reports received more than 210 minutes after time of observation have been excluded. When the same observation has been received more than once or two or more observations made within 15 minutes have been received only the first received has been included.

Table 5: N-Atlantic Drifting Buoy Reception in Reykjavik. Cut-off time 210 minutes after time of observation.

N-Atlantic Drifting Buoy Reception in Reykjavik, April 1995

Cut-off time 90 minutes after time of observation

Mean delay in minutes from time of observation to time of reception via LFPW (Paris, but originating in Toulouse), ENMI (Oslo), BGSF (Søndre Strømfjord), via a combination of two LUTs, and all three LUTs together.

The EGOS North Programme

WMO No.	Argos No.	Owner	Position on 30-09-1994				Two LUTs together				
				ENMI	LFPW	BGSF	ENMI LFPW	ENMI BGSF	LFPW BGSF	All LUTs	Remarks
44613	3324	UK	52.8°N 48.4°W	32.9		28.5	32.9	29.0	28.5	29.0	**7.-30.**
44614	6294	UK	57.0°N 5.8°W	34.1	33.0	28.3	34.5	30.6	30.1	31.1	
44616	3318	UK	55.3°N 39.4°W	31.9	30.1	28.7	30.6	28.6	28.6	28.4	
44624	6292	UK	50.0°N 15.9°W	32.5	31.7	29.7	32.9	30.2	29.9	30.9	
44726	6296	UK	54.5°N 19.3°W	32.5	31.8	28.9	32.0	29.8	30.2	30.3	
44728	3024	UK	56.2°N 39.6°W	31.5	29.6	28.0	30.5	28.3	27.8	28.3	
44742	2953	UK	58.0°N 39.7°W	31.7	28.7	28.9	28.7	28.3	27.1	26.8	**7.-30.**
44764	6306	UK	58.8°N 14.1°W	34.2	31.6	28.3	33.0	28.3	28.8	30.3	
44766	4274	The Netherlands	53.1°N 9.7°W	34.7	31.8	29.3	34.4	31.0	28.9	30.8	**1.-18.**
44776	6305	UK	59.1°N 7.0°W	34.2	32.4	28.5	33.2	30.4	29.1	30.3	
44780	1250	UK	54.8°N 12.2°W	33.9	30.5	29.5	33.1	30.8	29.0	30.6	
62696	6288	UK	71.4°N 19.6°E	25.9	25.3	17.2	26.1	22.2	21.1	22.8	
62805	2927	UK	57.7°N 28.8°W	32.4	30.3	27.9	31.4	28.6	27.3	27.9	
64528	9306	The Netherlands	58.2°N 6.3°W	26.4	32.6	28.4	32.4	28.1	31.3	31.3	
64529	3037	Ireland	60.7°N 24.1°W	31.0	33.9	29.5	32.0	28.7	30.4	29.1	
65562	1298	Germany	60.8°N 25.9°W	34.3	29.7	27.1	32.1	29.9	27.8	29.4	
65571	3676	The Netherlands	58.4°N 6.5°W	34.2	33.8	28.7	34.3	31.2	30.6	31.5	
65581	1299	Germany	58.9°N 40.6°W	31.2	29.6	26.8	29.2	27.2	26.9	27.5	**18.-30.**
Mean				**32.2**	**31.0**	**27.9**	**31.9**	**29.0**	**28.5**	**29.2**	

Reports received more than 90 minutes after time of observation have been excluded. When the same observation has been received more than once or two or more observations made within 15 minutes have been received only the first received has been included.

Table 6: N-Atlantic Drifting Buoy Reception in Reykjavik. Cut-off time 90 minutes after time of observation.

N-Atlantic Drifting Buoy Reception in Reykjavik, April 1995

Cut-off time 210 minutes after time of observation

Mean delay in minutes from time of observation to time of reception via LFPW (Paris, but originating in Toulouse), ENMI (Oslo), BGSF (Søndre Strømfjord), via a combination of two LUTs, and all three LUTs together.

The EGOS North Programme

WMO No.	Argos No.	Owner	Position on 30-09-1994	ENMI	LFPW	BGSF	Two LUTs together ENMI LFPW	ENMI BGSF	LFPW BGSF	All LUTs	Remarks
44613	3324	UK	52.8°N 48.4°W	61.2		50.2	61.2	51.5	50.2	51.5	**7.-30.**
44614	6294	UK	57.0°N 5.8°W	60.2	67.5	54.4	63.8	50.9	56.6	53.9	
44616	3318	UK	55.3°N 39.4°W	65.4	65.3	52.1	63.8	50.9	53.8	52.2	
44624	6292	UK	50.0°N 15.9°W	63.6	63.4	56.5	62.4	55.1	54.4	53.6	
44726	6296	UK	54.5°N 19.3°W	62.2	63.0	52.8	60.0	54.6	54.3	52.7	
44728	3024	UK	56.2°N 39.6°W	66.5	70.0	54.0	67.7	53.7	56.7	55.6	
44742	2953	UK	58.0°N 39.7°W	62.6	61.2	49.2	58.0	48.4	50.5	47.9	**7.-30.**
44764	6306	UK	58.8°N 14.1°W	56.3	69.3	47.4	63.8	47.4	53.9	51.4	
44766	4274	The Netherlands	53.1°N 9.7°W	54.8	55.2	45.4	54.8	44.4	42.7	43.1	**1.-18.**
44776	6305	UK	59.1°N 7.0°W	56.5	68.8	44.5	65.7	46.0	52.7	51.8	
44780	1250	UK	54.8°N 12.2°W	61.0	63.7	53.0	62.2	50.4	50.2	50.8	
62696	6288	UK	71.4°N 19.6°E	30.6	78.0	21.6	65.9	25.8	57.1	50.8	
62805	2927	UK	57.7°N 28.8°W	62.1	65.1	48.3	60.7	48.3	52.4	49.9	
64528	9306	The Netherlands	58.2°N 6.3°W	26.7	60.7	42.9	52.1	38.2	48.5	46.5	
64529	3037	Ireland	60.7°N 24.1°W	59.7	85.6	52.4	68.8	51.8	63.1	56.0	
65562	1298	Germany	60.8°N 25.9°W	58.0	62.6	45.0	61.1	49.1	53.8	52.1	
65571	3676	The Netherlands	58.4°N 6.5°W	55.8	70.9	45.1	62.1	47.7	57.7	51.5	
65581	1299	Germany	58.9°N 40.6°W	59.3	74.3	46.2	67.0	45.0	58.6	53.6	**18.-30.**
Mean				**56.8**	**67.3**	**47.8**	**62.3**	**47.7**	**53.7**	**51.4**	

Reports received more than 210 minutes after time of observation have been excluded. When the same observation has been received more than once or two or more observations made within 15 minutes have been received only the first received has been included.

Table 7: N-Atlantic Drifting Buoy Reception in Reykjavik. Cut-off time 210 minutes after time of observation.

Table 8: N-Atlantic Drifting Buoy Reception in Reykjavik. Cut-off time 90 minutes after time of observation.

N-Atlantic Drifting Buoy Reception in Reykjavik, April 1995

Cut-off time 90 minutes after time of observation

Mean delay in minutes from time of observation to time of reception via LFPW (Paris, but originating in Toulouse), ENMI (Oslo), BGSF (Søndre Strømfjord), via a combination of two LUTs, and all three LUTs together.

The EGOS South Programme

WMO No.	Argos No.	Owner	Position on 30-09-1994	ENMI	LFPW	BGSF	Two LUTs together ENMI LFPW	ENMI BGSF	LFPW BGSF	All LUTs	Remarks
62524	4625	UK	25.5°N 38.9°W	34.9	30.7	25.5	30.8	26.4	28.4	28.4	

Reports received more than 90 minutes after time of observation have been excluded. When the same observation has been received more than once or two or more observations made within 15 minutes have been received only the first received has been included.

Table 9: N-Atlantic Drifting Buoy Reception in Reykjavik. Cut-off time 210 minutes after time of observation.

N-Atlantic Drifting Buoy Reception in Reykjavik, April 1995

Cut-off time 210 minutes after time of observation

Mean delay in minutes from time of observation to time of reception via LFPW (Paris, but originating in Toulouse), ENMI (Oslo), BGSF (Søndre Strømfjord), via a combination of two LUTs, and all three LUTs together.

The EGOS South Programme

WMO No.	Argos No.	Owner	Position on 30-09-1994	ENMI	LFPW	BGSF	Two LUTs together: ENMI LFPW	ENMI BGSF	LFPW BGSF	All LUTs	Remarks
62524	4625	UK	25.5°N 38.9°W	60.7	66.3	62.6	66.4	62.0	63.4	63.2	

Reports received more than 210 minutes after time of observation have been excluded. When the same observation has been received more than once or two or more observations made within 15 minutes have been received only the first received has been included.

Report from the Chairman of the International Arctic Buoy Programme (IABP) for the Eleventh Session of the Data Buoy Co-operation Panel; Pretoria, South Africa; October, 1995

ANNUAL MEETINGS OF IABP PARTICIPANTS

Since the First Annual Meeting of the IABP (Seattle, U.S.A., 1991), IABP Participants have met annually to share information on the programme and related matters (Oslo, Norway, 1992; Toulouse, France, 1993; Helsinki, Finland, 1994 and Landover, U.S.A., 1995). The Sixth Annual Meeting will be held June 1996 in London and will be scheduled to allow Participants to attend a joint Seminar with the European Group on Ocean Stations (EGOS). The meeting will also be scheduled to accommodate attendance at the Second Annual Meeting of the International Programme for Antarctic Buoys which we understand will be held in the same area at about the same time.

The 1993 Third Annual Meeting of the IABP was highlighted at the Ninth Session of the Data Buoy Co-operation Panel. No formal report was submitted at the Tenth Session of the Data Buoy Co-operation DBCP so this paper will outline activities of the IABP since the Ninth Session by summarizing the Fourth and Fifth Annual Meetings of the IABP.

FOURTH ANNUAL MEETING OF THE IABP, HELSINKI, JUNE 1994

The Fourth Annual Meeting of the IABP included posters on: *Patterns of Monthly Wind and Ice Motion in the Arctic Basin*, Roger Colony, Polar Science Centre, University of Washington; *Wind-Driven Ice Motion and Surface Ocean Currents in the Arctic Basin*, Roger Colony; and *International Arctic Buoy Programme as a Platform for Environmental Monitoring in the Arctic Basin*, Annette Kuhn and Manfred A. Lange, University of Lapland.

In the meeting, the IABP coordinator pointed out that the ice retreated/melted back an exceptional distance offshore across the Beaufort in 1993 and that many of the buoys in that area did not survive leaving that area data-sparse. Otherwise, the buoy network in place across the Arctic was deemed to be good. The coordinator displayed a draft report showing buoy motion and mean surface pressure analyses by month and by year for the years 1979 to 1993.

A brochure outlining the IABP was finalized.

Data Buoy Cooperation Panel Report - Etienne Charpentier presented a report outlining issues where the DBCP had been active since June 1993 in the potential interest of IABP.

Participants' Reports, Fourth Annual Meeting - The meeting included Participant reports from agencies in **Canada** - buoy deployment plans, outline of the fall 1994 Beaufort and Arctic Storms Experiment, and details of the buoy archiving done at the Marine Environment Data Centre; **Finland** - outline of how Arctic buoys can be used to determine organochlorine and heavy metal deposition in the Arctic Basin; **France** - Service Argos representative advised fellow Participants of three satellite service, improved location processing, smart mini-transmitters including transmitters with GPS/Argos equipment (The integration of GPS onto buoys and the resultant very accurate position fixes facilitates the use of buoy arrays to look at divergence/convergence within ice fields and rotation of large floes. GPS will additionally facilitate finding, and recovering, the buoys); **Germany** - cooperation between German and Russian scientists in the deployment of buoys in the Laptev Sea, buoys air-deployed by a Norwegian aircraft, and a cooperative agreement between the Arctic and Antarctic Research Institute (Russia), the Polar Science Centre (U.S.A.) and Alfred Wegener Institute for Polar and Marine Research (Germany) to design and manufacture Argos reporting buoys; **Norway** - Christian Michelsen Institute remains active in buoy construction; **Russia** - deployment of ten buoys provided by U.S. Naval Oceanographic Office, buoy design and manufacture as mentioned in the Participant Report from

Germany; **United Kingdom** - annual buoy contribution and deployment; **United States of America** - Arctic studies by the Pacific Marine Environmental Laboratory including participation in the 1994 Arctic Section, use of IABP data for research at the Polar Science Centre, buoy deployments including cooperative deployments, establishment and operation of a field site at Point Barrow, Alaska, to performance test various buoys in use by Participants, and preliminary results from the buoy comparisons; **World Climate Research Programme** -need for IABP data including reliable surface air temperature for the Arctic Climate System Study (ACSYS) to achieve its main goal of providing a satisfactory scientific basis for a realistic representation of the Arctic region in coupled global climate models.

Other Reports, Fourth Annual Meeting - Reports were tabled from **Finland** - study of heat and water exchange between the North Atlantic and the Iceland, Greenland, and Norwegian Seas in the frame of World Ocean Climate Experiment but no drifting buoy program in the Arctic Basin; and **Japan** - National Institute of Polar Research has two buoys in the Arctic Basin that gather primarily oceanographic data. The data is not on GTS.

FIFTH ANNUAL MEETING OF THE IABP, APRIL 1995, LANDOVER, U.S.A.

The Fifth Annual Meeting of the IABP included several technical presentations: *IABP Data in Support of Arctic Nuclear Waste Assessment Program*, Roger Colony, Polar Science Center; *IABP on the Information Highway*, Ignatius Rigor, Polar Science Center; *RADARSAT and the Use of Synthetic Aperture Data at the National Ice Center*, David Benner, (U.S.) National Ice Center; *Beaufort and Arctic Storms Experiment (Canadian)*, Ed Hudson, Arctic Weather Centre; *Value of IABP Buoy Data to Operational Forecasters*, Ed Hudson; and *Argos-2*, Jeff Wingenroth, Service Argos.

Information on related observational and data programs was also presented at the meeting. Participants were advised that the suite of products being generated by the RADARSAT Geophysical Processing System (RGPS) may include or use an IABP daily averaged temperature product. Proposed RGPS data products include a weekly ice motion product; gridded field of pressure, wind, and air temperature, and a gridded field of ice motion and ice age/thickness distribution. The IABP Coordinator discussed the Surface Heat Budget of the Arctic Ocean (SHEBA) field experiment which is planned to operate from spring 1997 through fall 1998 as an 'opportunity' for Participants to deploy surface buoys using the aircraft of this program.

The Fifth Annual Meeting also included presentations on the status of the International Programme for Antarctic Buoys, the Global Ocean Observing System (GOOS) and quality control of ship and buoy observations prior to their input to the models at the (U.S.) National Weather Service.

Data Buoy Cooperation Panel Report - Etienne Charpentier reported on behalf of the DBCP on topics related to the IABP. He noted that the IABP is meeting the DBCP's Terms of Reference for its Action Groups by providing good quality data in a timely fashion, insertion of data onto GTS in real or near real time, exchanging data buoy activities, and development and transfer of appropriate technology. It was noted that an IABP activities report was necessary for inclusion in the (1994) DBCP Annual Report.

(NEW) SENSORS FOR IABP BUOYS

Thermistor chains, temperature, snow depth - Interest in incorporating additional sensors on IABP buoys was expressed by Participants. Of particular interest is a thermistor chain extending from ice surface to underlying ocean. The technology for such thermistor chains is well-proven and should not add a prohibitive cost to surface deployed buoys. The IABP coordinator noted that RADARSAT data may preempt the importance of ice motion products currently being produced by the IABP. This trend coupled with an IABP focus on surface deployed buoys reinforces the interest in integrating additional environmental sensors. Internal stress sensors, for example, could provide valuable information to the scientific community. The cost of incorporating anemometers may not be justified by the collection of

data which can be explained by geostrophic wind calculations - although operational meteorologists do like to see "live" wind data. With respect to the WCRP Arctic Climate System Study, both temperature and snow depth (for studies of the hydrological cycle) were flagged as important

Work done on the measurement of air temperature using various buoys is being shared with attendees of the Eleventh Session of the Data Buoy Co-operation Panel by Dave Benner U.S. National Ice Centre.

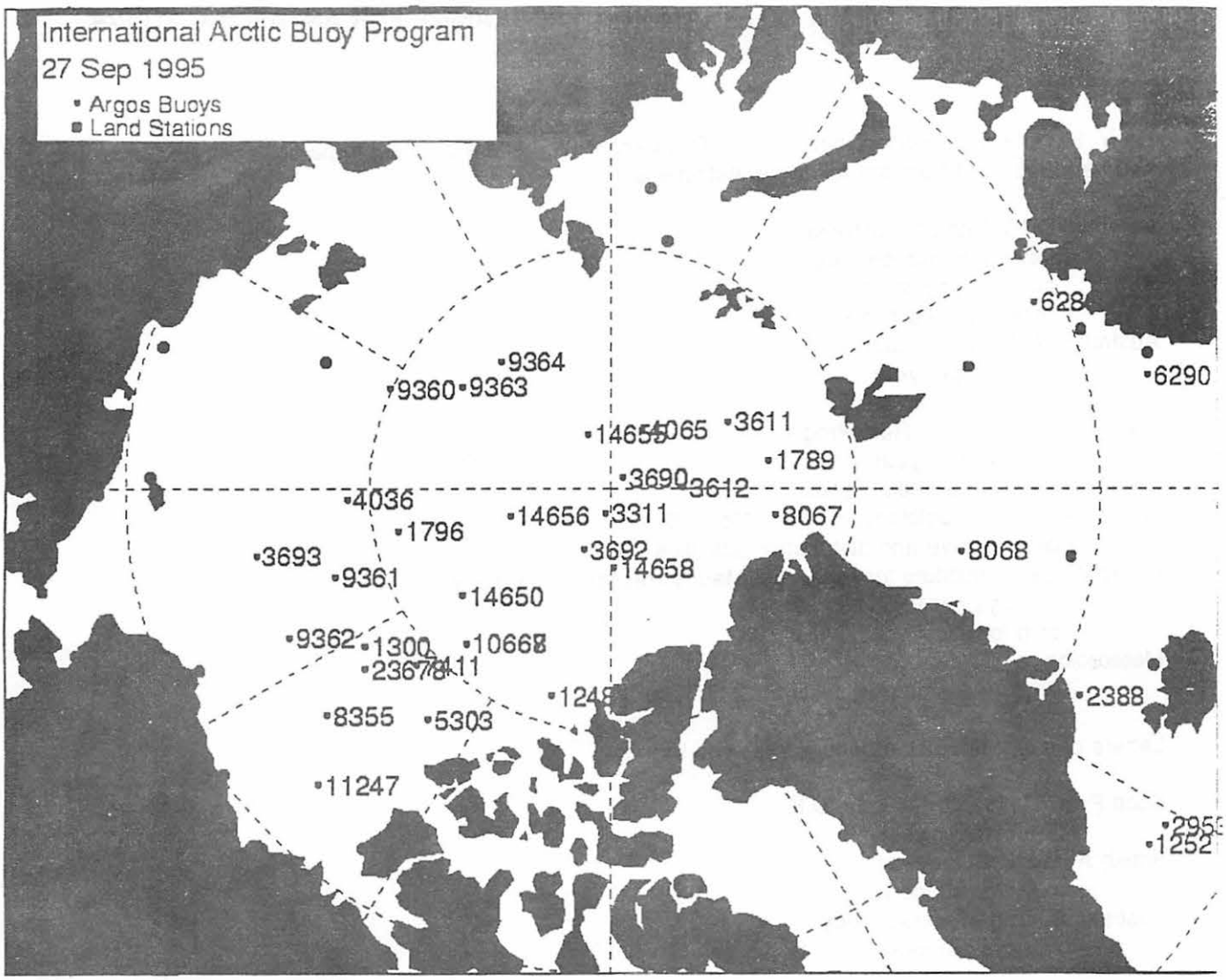
Participants' Reports, Fifth Annual Meeting - The meeting included Participant reports from an agency (agencies) in **Canada** - buoy deployments, buoy deployment opportunities, and buoy acquisition plans; **Germany and Norway** - buoy deployments 1992 to 1994 inclusive and comparison of GPS and Argos computed positions for two buoys deployed in 1994 (the positions were close); **Russia** - buoy assembly and planned buoy deployments including cooperative effects with Germany/ Alfred Wegener Institute for buoys/ buoy deployments in the northern Laptev Sea and with U.S.A./ Polar Science Center for buoys/ deployment of an array of GPS equipped buoys on a large multi-year flow in the Kara Sea, installation of a local users terminal at the Arctic and Antarctic Institute by the U.S. Naval and Oceanographic Office and supported by the IABP Executive council, proposed survey of the Arctic Basin in 1998; **United Kingdom** - provision of ICEX buoy for the cooperative air deployment planned for August 1995 and provision of another buoy for 1996; **United States of America** - contributions of the eight U.S. Government agencies that contribute fiscal resources and services to the U.S. Interagency Arctic Buoy Program and hence to the International Arctic Buoy Programme including funding for the IABP Coordinator position, deployment of buoys, Argos costs of buoys deployed in the Kara and Laptev Seas, installation of a Local Users Terminal (LUT) at Arctic and Antarctic Research Institute, aerial assets to deploy buoys in the Beaufort August 1995, and maintaining a buoy performance test site at Point Barrow, Alaska; **World Climate Research Programme** - update on the Arctic Climate Research Program (ACSYS) and the objectives of ACSYS.

INFORMATION ON THE IABP

A brochure describing the IABP is available (first edition August 1994, updated edition August 1995) and, effective fall 1994, IABP information became available on the World Wide Web - *http://iabp.apl.washington.edu*. The WEB site shares: monthly updates of mappings of buoy position and buoy status; listing of IABP Participants - there are presently 22 organizations spanning nine countries and one international organization; IABP data sets available; IABP images and plots to browse through and borrow; research highlights using IABP data sets, IABP data animations and more.

LATEST IABP BUOY POSITIONS AND STATUS

The latest buoy position map and buoy status sheet as accessed from the IABP homepage follow.



27 Sep 1995

DATE DEPLOYED	ARGOS ID	WMO ID	YPR NUMBER	GTS HEADER	POSITION LAT	POSITION LONG	DATA BYTES	P	T	BUOY DESCRIPTION
Aug 95	1300	48558	1053	SSVX06-KARS	77.926	-147.597	24	Y	Y	ICEX-AIR
May 93	1789		29		83.399	10.414	16			Norweigian Drifter
Aug 95	1796	48091	29		80.992	-168.855	16			ICEX-AIR
Sep 92	2388	25552	1053	SSVX02-CWEG	69.019	-23.936	16	Y		Zeno Ice Buoy
Sep 93	3311	63662	919	SSVX01-LFPW	88.977	-102.048	16	Y	Y	Seaice Beacon
May 94	3611		29		84.432	29.990	4			Norweigian Drifter
May 94	3612		29		86.991	1.316	16			Norweigian Drifter
May 93	3690	25011	314	SSVX01-LFPW	89.278	41.885	16	Y	Y	
May 94	3692		314	SSVX01-LFPW	87.271	-113.730	16	Y	Y	
Aug 95	3693	48092	314		75.056	-169.431	16	Y	Y	ICEX-AIR
Aug 95	4036	48101	484	SSVX01-LFPW	79.075	-177.833	16	Y	Y	ICEX-AIR
May 93	4065	25013	484		87.190	61.078	16	Y	Y	
Mar 95	5303	48526	627	SSVX02-CWEG	77.824	-128.767	4	Y	Y	CALIB Buoy
Aug 95	6288	62696	484	SSVX01-LFPW	71.084	24.062	28	Y	Y	
Aug 95	6290		484		67.509	12.077	28	Y	Y	
Aug 95	7411	48559	557	SSVX06-KARS	79.147	-138.014	4	Y	Y	Tiros Air Drop
May 94	8067	63665	919	SSVX01-LFPW	83.160	-8.921	24	Y	Y	ICEX
May 94	8068	63661	919	SSVX01-LFPW	75.386	-10.020	24	Y	Y	ICEX
Aug 95	8355	48560	282	SSVX16-KARS	75.023	-141.507	4	Y	Y	Tiros Air Drop
Aug 95	9360	65662	919	SSVX01-LFPW	79.923	155.772	16	Y	Y	ICEX-AIR
Aug 95	9361	25571	919	SSVX01-LFPW	78.037	-162.362	24	Y	Y	ICEX-AIR
Aug 95	9362	25572	919	SSVX01-LFPW	75.380	-155.183	24	Y	Y	ICEX-AIR
Aug 95	9363	25573	919	SSVX01-LFPW	82.513	145.691	28	Y	Y	ICEX
Aug 95	9364	25574	919	SSVX01-LFPW	82.999	131.182	28	Y	Y	ICEX
May 92	10667		1016		81.210	-133.466	32	Y	Y	
May 92	10668		1016		81.208	-133.472	32	Y	Y	
Sep 95	11247	48521	633	SSVX06-KARS	72.855	-134.796	4			CALIB Buoy
Sep 93	12487	48577	9053	SSVX02-CWEG	81.124	-106.341	32	Y	Y	Zeno Ice Buoy
May 94	14650	48520	282	SSVX16-KARS	82.417	-144.570	4	Y	Y	Tiros Air Drop
May 94	14655	25546	282	SSVX16-KARS	87.515	112.564	4	Y	Y	Tiros Air Drop
May 94	14656	25547	282	SSVX16-KARS	85.624	-165.371	4	Y	Y	Tiros Air Drop
May 94	14658	25564	282	SSVX16-KARS	86.760	-87.141	4	Y	Y	Tiros Air Drop
May 95	23678	48579	9053	SSVX02-CWEG	77.372	-144.011	32	Y	Y	Zeno Ice Buoy

REPORT BY THE INTERNATIONAL PROGRAMME FOR ANTARCTIC BUOYS

Dr. V. Savtchenko reported that as of 21 February 1995, Letters of Intent to participate in the programme had been received from the following institutions:

Antarctic CRC, Hobart, Australia
- several buoys per year
- coordinating office
- research data base

Australian Antarctic Division
- 4 buoys per year
- ship logistics

ENEA, Italia (Nat. Ant. Res. Prog.)
- 2 buoys per year
- ship and aircraft logitics

World Center for Glaciology, Boulder, Cc, U.S.A.
- data archive and distribution activities

Alfred Wegener Institute for Polar and Marine Research, Germany
- 4 buoys per year
- ship logistics

Meteorological Office, U.K.
- Argos transmission costs for 2 PTT per year

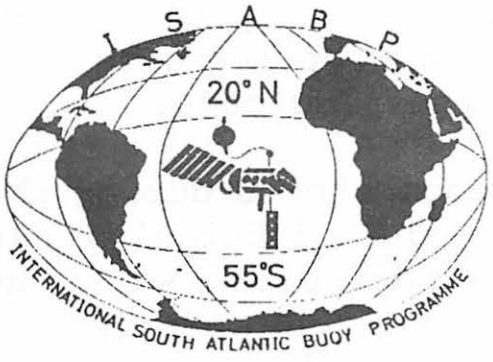
Letters of Intent have also been announced by:

Scott Polar Research Institute, U.K.
- 2 buoys per year

British Antarctic Survey
- logistical support

Australin Bureau of Meteorology
- 2 buoys per year.

Since March 1995, the programme has been a registered user with CLS Argos. All original data from platforms, nominated by the registered owners, are copied direct to the coordinating office, and form the basis of the Research Data Base. Original data from the period before the programme was registered with Argos have been received at the Coordinating office from the Participants.



ISABP CHAIRMAN'S REPORT

The ISABP was established after a unanimous positive vote from the participants during the second of two very successful preparatory meetings in Buenos Aires. During the First Meeting of the Programme Committee in early October 1994, the operating and programme principles of the ISABP were discussed and accepted. The terms of reference of the Programme Co-ordinator were also discussed. The Programme Steering Committee was elected and the nomination for the first Programme Co-ordinator was accepted. Towards the end of November 1994 the ISABP was firmly in place after it had been accepted by the DBCP as a regional action group of the Panel.

During May 1995 an interim report was drawn up. This report gives a brief historic review of the establishment of the ISABP and, for future reference purposes, also provides a summary of the operating principles as well as the terms of reference of the Programme Co-ordinator of the International South Atlantic Buoy Programme. The report, ISABP 11 Doc 3, also refers to the issuing of letters of intent to participants as well as interested organizations, institutions and individuals.

The problems identified during 1994 and referred to in Doc 3 still exist, i.e. the possible delay of data on the GTS as well as the delay in transferring data from the South Atlantic to the CLS Argos Toulouse.

As yet unresolved, and already encountered during the first quarter of 1995, is the difficulty in communication between some of the participants and the Programme Co-ordinator, as well as the problem of drifters south of 40 degree south moving out of the South Atlantic area of interest and into the Indian Ocean. Of the two the latter is the more serious problem, but it seems that until such time that an Indian Ocean buoy program has been established, very little can be done presently.

Looking back over the past year the ISABP-programme started off with the deployment of some 41 SVP-drifters, 24 deployed by the SA Navy and 17 deployed by the US Airforce. Unfortunately, due to budget cuts and the resultant effect thereof on shiptime, this relatively high deployment rate was not maintained. Fortunately, however, the mortality rate amongst these buoys has been very low, but the displacement from west to east out of the South Atlantic into the South Indian Ocean are high.

During the rest of the year till October 1995, five drifters were deployed during three voyages of opportunity. Ironically, if not tragically, buoys to be deployed were always in supply but deploy opportunities lacked. At one stage we had 30 buoys in the store but no ship or sea days to do the actual deployment. During May 1995, for example, a conserted effort was made to obtain funding for deployment. The netto result of this was that when we eventually managed to raise the funding the suitable deployment ships were in dry dock.

During the austral spring, however, we managed to make a breakthrough and everything was finalised for a deployment voyage to place 25 SVP-B drifters in the South Atlantic between 10°E and 30°W, 34°S and 55°. Also during this voyage the automatic ARGOS stations at Southern Thule and Zavodovski of the South Sandwich Island group will be serviced. During February and March 1996 the automatic station on Bouvet will be serviced on behalf of Norway.

Further plans for the foreseeable future are the installation of a DCP station on Tristan da Cunha Island as well as looking into possible anchored Atlas buoys along the mid Atlantic ridge.

ANNEX III

REPORTS FROM DATA MANAGEMENT CENTRES

This Annex contains the reports by the:

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

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

REPORT OF THE RNODC 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 94 - July 95).

Data Flow

We show in the attached table (page 5) various statistics derived for this 19-month period of activity. The first column of the table gives the month and year number, the second column provides the number of messages received by MEDS for this particular month-year. The next two columns provide the statistics on the buoys themselves; it shows first the number of buoys reporting on the GTS and for which MEDS is receiving the data while the second one of that group (column 4) 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 both numbers, MEDS number divided by the TC-DBCP number (see the discussion below concerning Figure 2).

Figure 1 is an illustration of the level of activities performed by MEDS during this same 19-month period. It displays on the right Y-axis the number of buoys for which MEDS received the data (continuous line) while the left Y-axis illustrates the number of messages received each month (bar chart) by MEDS. This figure also displays the average number (103,754) of messages received, processed and archived by MEDS each month. This average has increased by 6.7% from the same last year average reported for the January 93 - July 94 period. During this 19-month period, MEDS has received, processed and archived a total of 1,971,336 messages transmitted from drifting buoy platforms sending their data through the GTS route. The sharp increase on messages received seen on this Figure 1 since March 1995 is probably artificial. At the time this report is being written, the exact reason of this rise is unknown. It may be due to the ARGOS GTS sub-system where some messages are being sent as "quasi duplicates". In these particular messages, part of the information is re-sent with a slightly different time stamp. Investigations with the DBCP Technical Co-ordinator are underway to resolve this problem.

Figure 2 illustrates, over the same 19-month time period, the ratio of the number of buoys for which MEDS is receiving data via the GTS over the number of physical drifting buoys that transmitted at least once during that month. The variability of this ratio is rather small as illustrated by the small difference (<2.8%) between the +1 Sigma and -1 Sigma curves. After discussion with the DBCP Technical Co-ordinator, it appears that this 32% average could be small (by something like 5%). 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. More investigations will be required to resolve this issue. It may be necessary to perform an exhaustive analysis for one month, meaning define the exact status of every buoy sending data onto the GTS system and compare with the number of messages received from each of these. It will also be worthwhile to define exactly what is meant by "operational" drifting buoys.

The following table illustrates the increase (negative numbers indicate a decrease) for the last three calendar years with regard to the number of messages received by MEDS through the GTS. The first column indicates the year number; the second column indicates the increase or the decrease of the number of messages received by MEDS over the GTS.

% ± Over Previous Year / Year #	Number of messages received by MEDS	Number of Buoys from which MEDS received data
1992	43.27%	52.54%
1993	50.36%	3.47%
1994	-1.29%	-14.83%

The results of the above table shown that, as 1992 and 1993 were very active years with sharp increase of activities over the previous year, there was a small decline of activities during calendar year 1994.

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 Figure 3. At then end of December 1994, it contained a total of 8,218,347 messages. Figure 3 illustrates the different growth rates seen since 1978. Points 1 and 2 indicated on the figure points out the different years where a rapid change in growth was observed. The first one happens around 1983-84 and is probably a natural growth of the program and by TOGA. The second sharp increase (Point 2 on the curve) is around 1991-92 and this increase could be caused when the change in GTS software was implemented (Ref: *paragraph 6.5.1.1, page 6-10, Consolidated Report of the ARGOS Operations Committee Meetings, June 1995, Revision # 9*), causing some "quasi-duplicates" on the GTS system. This issue was already discussed in paragraph 3 of this report (See also Figure 1). Once this problem is resolved, the shape of the curve shown in Figure 3 may change substantially. This recent growth in traffic is also caused by a program such as WOCE.

Development

1) Use of BUFR for encoding Drifting Buoy Data: MEDS is connected to the GTS via a satellite link (Anikom dish) which receives its broadcast signal from Atmospheric Environment Service (AES) located in Montréal. It is our understanding that no data encoded into BUFR will be

distributed over the Anikom system. AES was carrying out some testing on this topic but the study was not completed and is now a low priority item. It will therefore be necessary for MEDS to continue receiving the coded data the same way we have been doing so far. Although BUFR decoders are available from various sources, the Anikom System will prevent MEDS access to this source of data. If the BUFR encoding for Drifting Buoy data is being pursued, MEDS will need to find new ways in getting the Drifting Buoy data or all data must also be circulated in BUOY format as well.

2) Software design: Last year, MEDS has made a substantial change in its procedure to process Drifting Buoy data. The archiving format is now different and it enables us to process the data more frequently than once a month. Although this change is transparent to the outside users, it will help MEDS providing a better and quicker service. The new format allows MEDS to archive along with the surface parameters all sub-surface measurements. The number of these have increased substantially lately as shown for example in Figure 4 where, during this same 19-month period, there is an average of 3,324 messages which included sub-surface measurements. MEDS can also now count the messages coming from drifting buoys as opposed to those coming from fixed platforms or ship reports. During this same 19-month period, there is an average of 93,295 messages (shown in Figure 4) coming from drifting buoys. This number represents an average of 89.9% over all messages received on GTS.

3) Delivery time Study: Along with other Data Centres, MEDS participated in February on a study for assessing the GTS delivery time from Toulouse and Landover to Buenos Aires and Pretoria. GTS bulletins containing buoy data were monitored during the period 17 to 23 January 1995. Starting with the 18 January data, the results were compiled and the table below shows the results by Header for MEDS.

GTS Header	Number of Bulletins sent on GTS	Number of Bulletins received by MEDS	% missing
SSVX01 (LFPW)	440	376	14.5
SSVX03 (LFPW)	311	298	4.2
SSVX04 (KARS)	152	172	?
SSVX05 (LFPW)	66	66	0
SSVX06 (KARS)	441	503	?
SSVX07 (LFPW)	134	132	1.5
SSVX09 (LFPW)	244	230	5.7
SSVX10 (KARS)	14	18	?
SSVX40 (KARS)	142	85	40.1

The above table shows that for most headers, MEDS is receiving all of the data. When the number of bulletins received is greater than the number of bulletins sent, this is an indication that some bulletins sent by KARS (Landover) were not accounted for at the source. There is an obvious problem with bulletin header SSVX40 from KARS. This particular problem is now being investigated with the assistance of the US National Weather Service which does the routing to Montréal AES, node from which MEDS receives its broadcast signal. For this comparison, we are correlating the number of messages and not the number of bulletins.

4) ALACE Buoys:

Although ALACE (Autonomous LAgrangian Circulation Explorer) floats have been used extensively in the World Ocean Circulation Experiment, they were designed to acquire velocity data in very remote regions of the world ocean. A recent development is to mount a CTD on the ALACE float creating a profiling Alace float, or P-Alace, or Palace float. The profiling Alace float supplies temperature to 0.006°C and salinity to 0.001ppt precision. Although this is still in the development stage, the Canadian Institute of Ocean Sciences (IOS) on the West Coast has acquired 4 of these so far, 2 for the Labrador Sea and 2 for the NE Pacific. The first deployment in the NE Pacific took place during early September 1995, at station PAPA (50°N, 145°W). The P-Alace does the CTD profile on the up part of its trajectory and transmits the data to a satellite in a highly compressed message. This is then downloaded to the Argos land station in Toulouse, France, where the message is automatically converted to an E-mail message and transmitted to IOS via InterNet. The E-mail message is then converted from a hexadecimal coded message to a KKXX message (TESAC) that is transmitted to MEDS, which inserts the message on the GTS.

This device is still experimental. However, it appears to be working well. At the time this report has been written, Dr. Howard Freeland (from IOS) has received 5 profiles so far since the original deployment and the Alace float appears to function well at sea. In the long term, Alace float could be used as a platform on which other sensors might be mounted. This represents a novel way of acquiring high quality data from remote regions of the global ocean.

5) ISABP: Further to last year meeting in La Jolla, California, MEDS has participated in the development of a monthly product in conjunction with the Inter South-Atlantic Buoy Program. MEDS has suggested to produce a monthly map showing buoy trajectory. The proposed map area was from 70°W to 20°E of longitude and from 80°S to 20°N. The area coverage can be changed to satisfy the requirement of the managers of ISABP. Also, MEDS has done some work in developing the necessary software to produce a Postcript file of that map. This will help in transmitting the map to the regional distribution centre.

Services

MEDS issues an annual report summarizing the data received and processed during the previous year and showing the locations of the buoys. The 1994 annual report is now being prepared and should be soon available to our clients. Every month, global maps are issued displaying the location of the buoys reporting over the GTS. In addition, MEDS also delivers data for a user specified area, time and range of buoys on computer magnetic tape in GF-3 format. If the volume of data requested is small enough, it can be obtained on computer diskette (5 1/4 or 3 !/2-inch) or can be transmitted through InterNet via Anonymous FTP. If the volume is too large, the data

can be copied onto Exabyte cartridge. Displays of buoy tracks are also available for any ocean area and time frame. The MEDS Monthly DRIBU track chart is also published in the IOC/WMO IGOSS Products Bulletin quarterly publication. Starting with the October map, MEDS will be producing this map in Postcript format to ease the distribution and for insertion on InterNet.

MEDS has completed the development and installation of a computer file providing information about the operators of the buoys as well as the program under which the buoys have been deployed. Other information, such as the program manager or organization and characteristics of the buoys are also kept if this information is made available to MEDS. This data file is updated on a monthly basis with the latest information received from the DBCP Technical Co-ordinator.

MEDS has developed an archiving mechanism for the Drifting Buoys Bulletin Board messages available each day through InterNet. For a particular buoy or set of buoys, all messages (if any) regarding its operational behaviour are available upon request on paper or on computer diskette. Because of the change of the delivery system (from ScienceNet to InterNet), the system had to be modified. Completion of the new processing procedure will soon be completed. Meanwhile, all messages are kept on our regular Electronic Mail System.

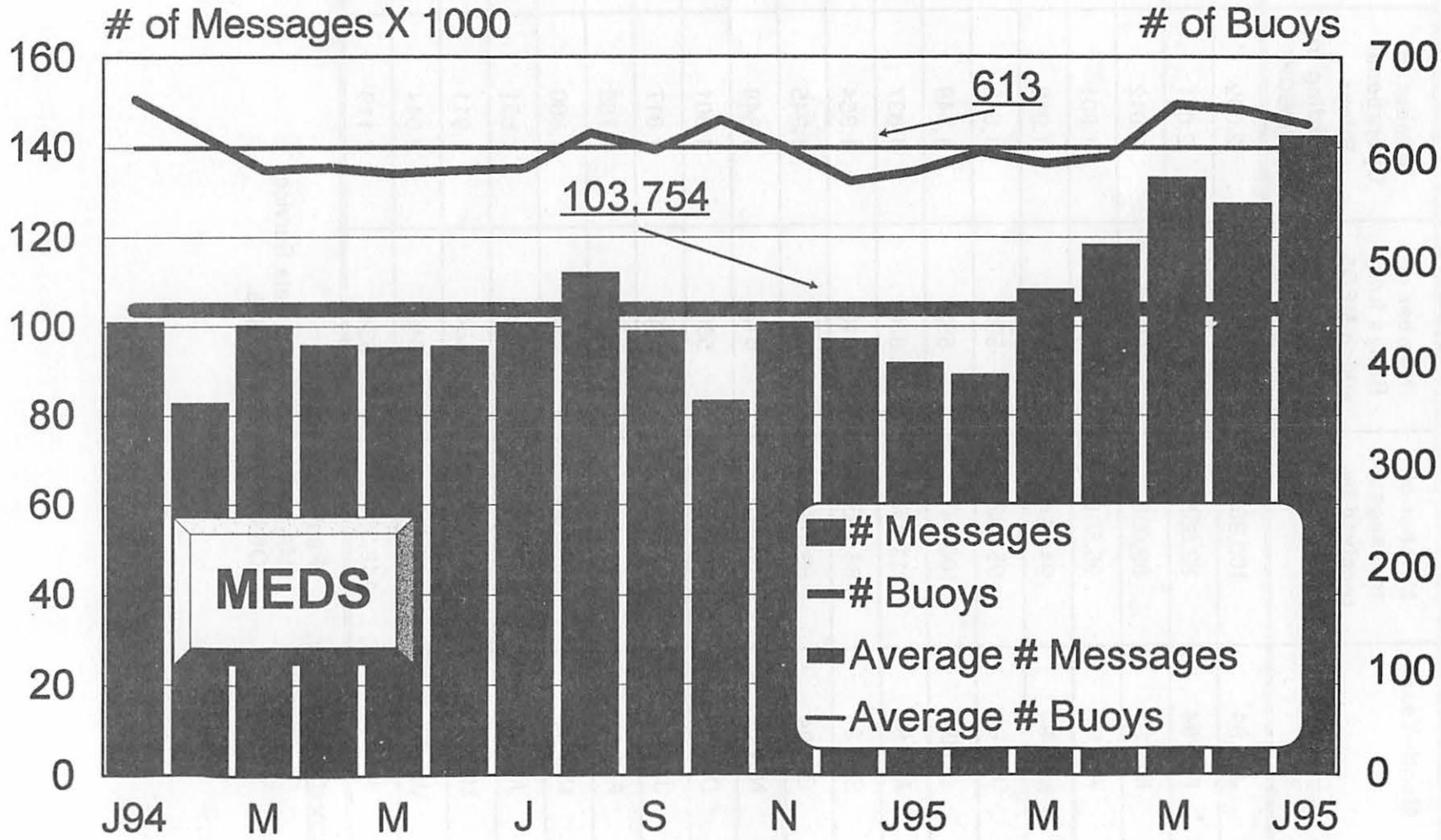
Table: Monthly Statistics on Number of Buoys and Number of Messages received at MEDS from January 94 to July 95 and Comparison with DBCP TC Reported Number

Month-Year	Number of messages received by MEDS	Number of Buoys from which MEDS received data	Number of Operational Buoys according to TC DBCP	Ratio in % MEDS / TC DBCP
Jan 94	100,857	659	2,049	32.16
Feb 94	82,655	625	2,071	30.18
Mar 94	99,998	590	2,012	29.32
Apr 94	95,561	593	1,901	31.19
May 94	94,964	587	1,913	30.68
Jun 94	95,333	590	1,882	31.35
Jul 94	100,747	592	1,849	32.02
Aug 94	111,856	626	1,837	34.08
Sep 94	98,733	610	1,954	31.22
Oct 94	83,143	639	1,945	32.85
Nov 94	100,673	612	1,849	33.10
Dec 94	96,956	580	1,801	32.20
Jan 95	91,579	589	1,817	32.42
Feb 95	88,900	608	1,765	34.45
Mar 95	108,166	597	1,880	31.76
Apr 95	118,172	604	1,851	32.63
May 95	133,161	654	1,911	34.22
Jun 95	127,492	649	2,044	31.75
Jul 95	142,390	634	2,119	29.92

Report prepared by: Paul-André Bolduc
Marine Environmental Data Service
Ottawa, September 1995.

RNODC for Drifting Buoys

Number of Messages & Buoys + Averages

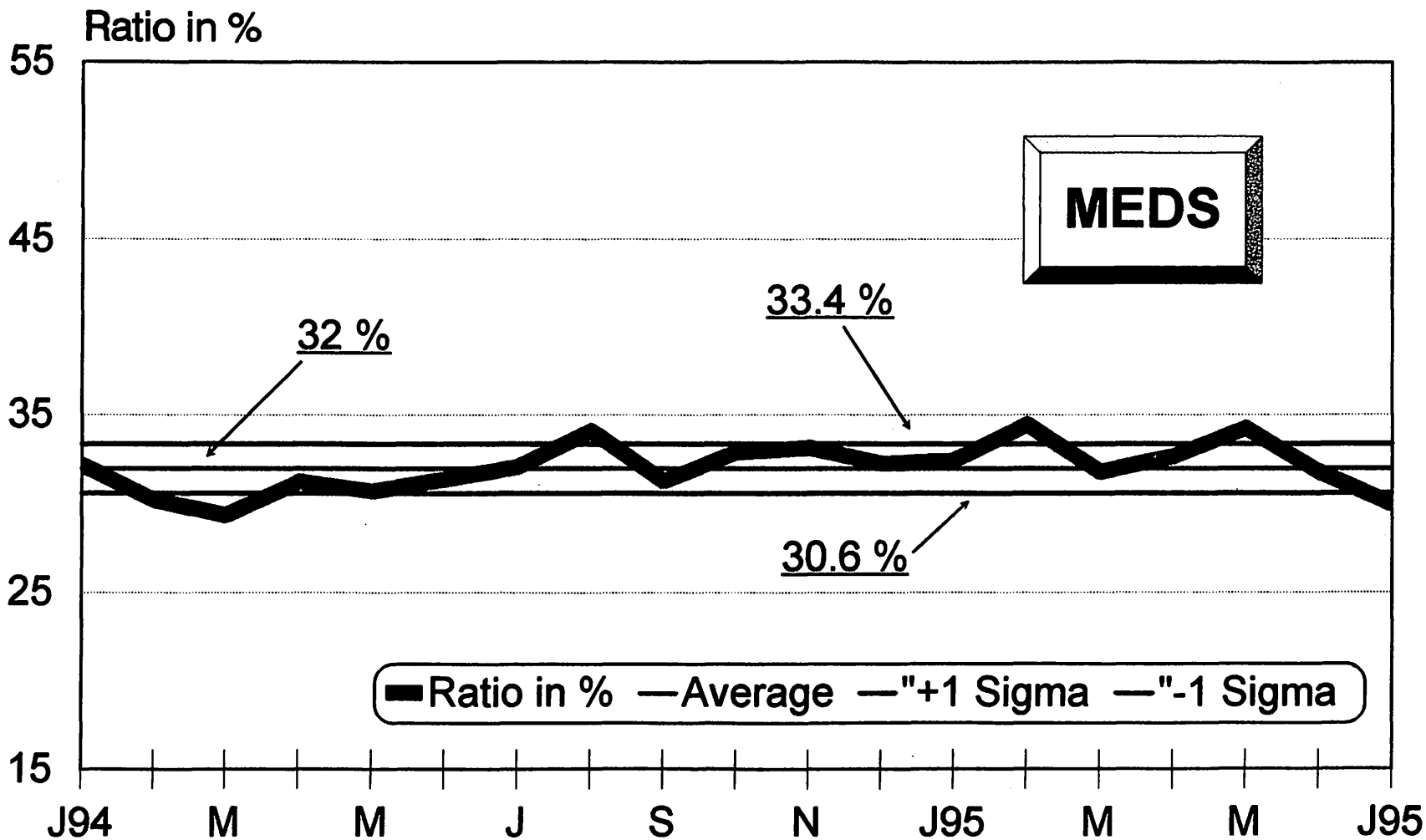


11th DBCP Session, Pretoria, South Africa

Figure 1

RNODC for Drifting Buoys

MEDS / TC DBCP

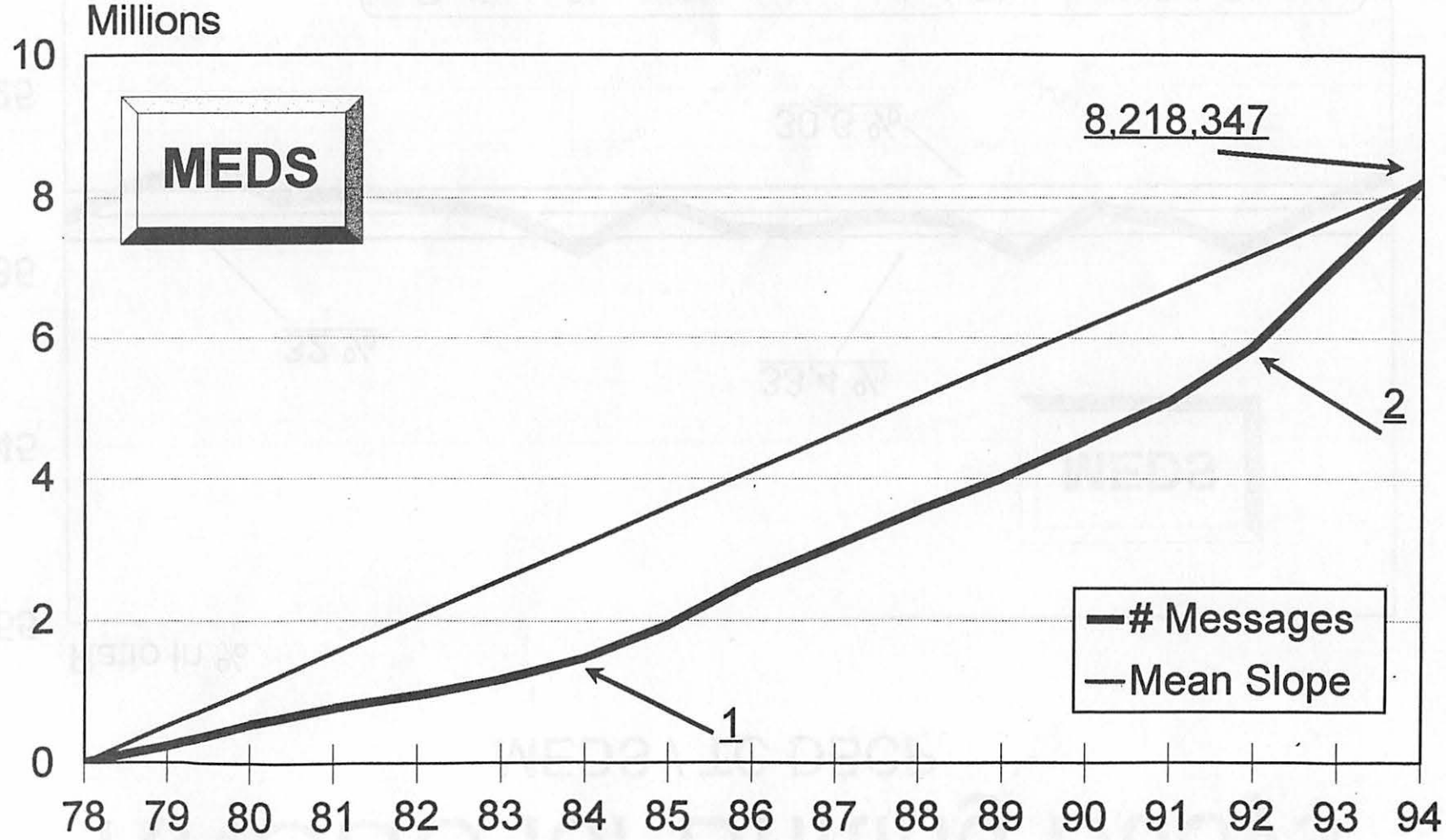


11th DBCP Session, Pretoria, South Africa

Figure 2

RNODC for Drifting Buoys

Cumulative Number of Messages

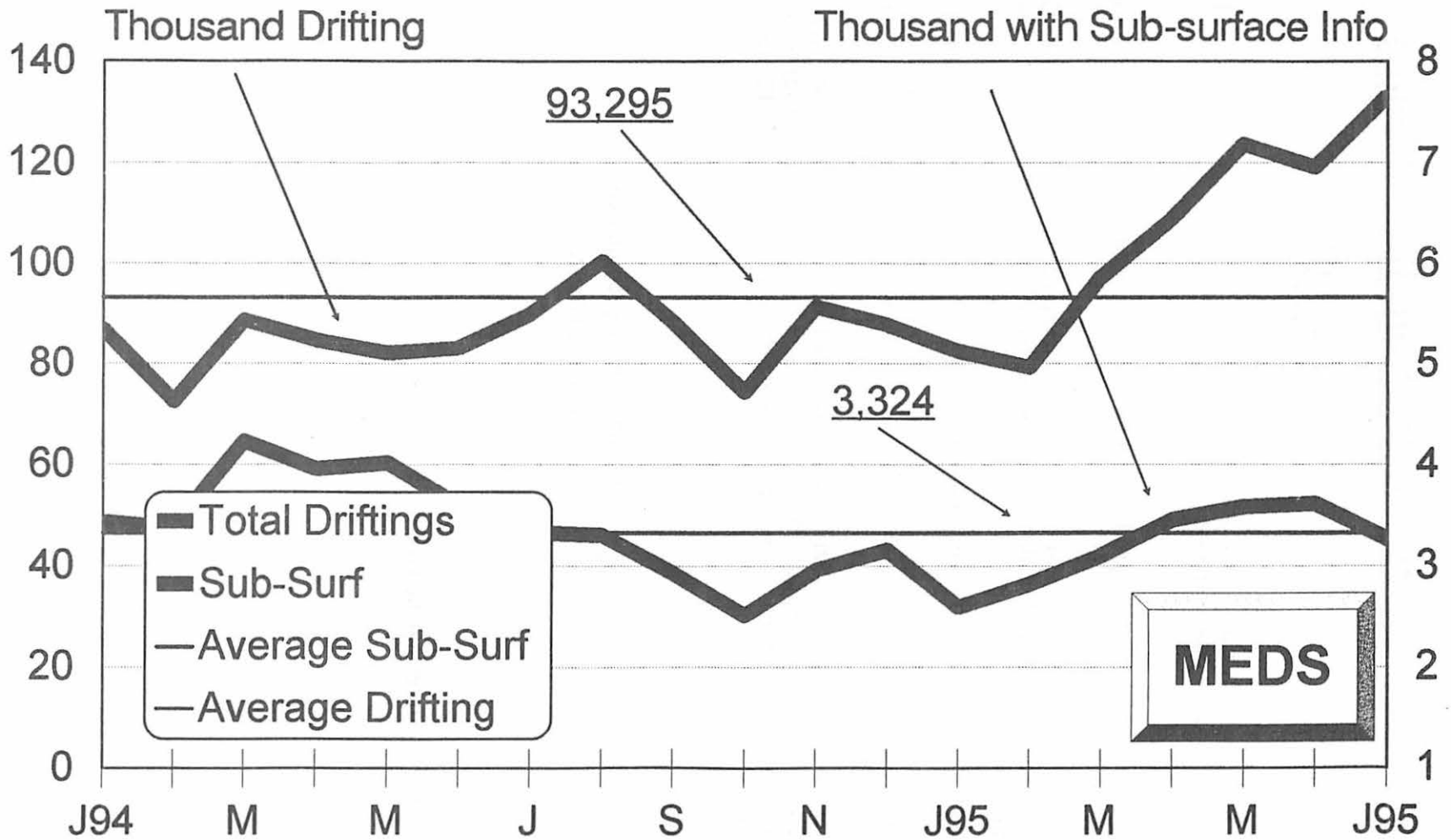


11th DBCP Session, Pretoria, South Africa

Figure 3

RNODC for Drifting Buoys

Messages-type received by MEDS



11th DBCP Session, Pretoria, South Africa

Figure 4

SOC for Drifting Buoy Report

1994-1995

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.

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 1994.

Figure 5 shows the time evolution of waveobs reports since the 1st of January 1994.

Each month mapping position plot charts and Marsden square distribution are produced for Buoys and Ships and are sent to 70 users in the world. Figures 6, 7, 8, 9 show products for June 1995.

Each month Marsden square distribution chart 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 produce, Figures 10, 11, 12, 13 show products for June 1995 .

French SOC Representative

Joël POITEVIN

email : joël.poitevin@meteo.fr

Time evolution of BUOYS reports for wind and pressure

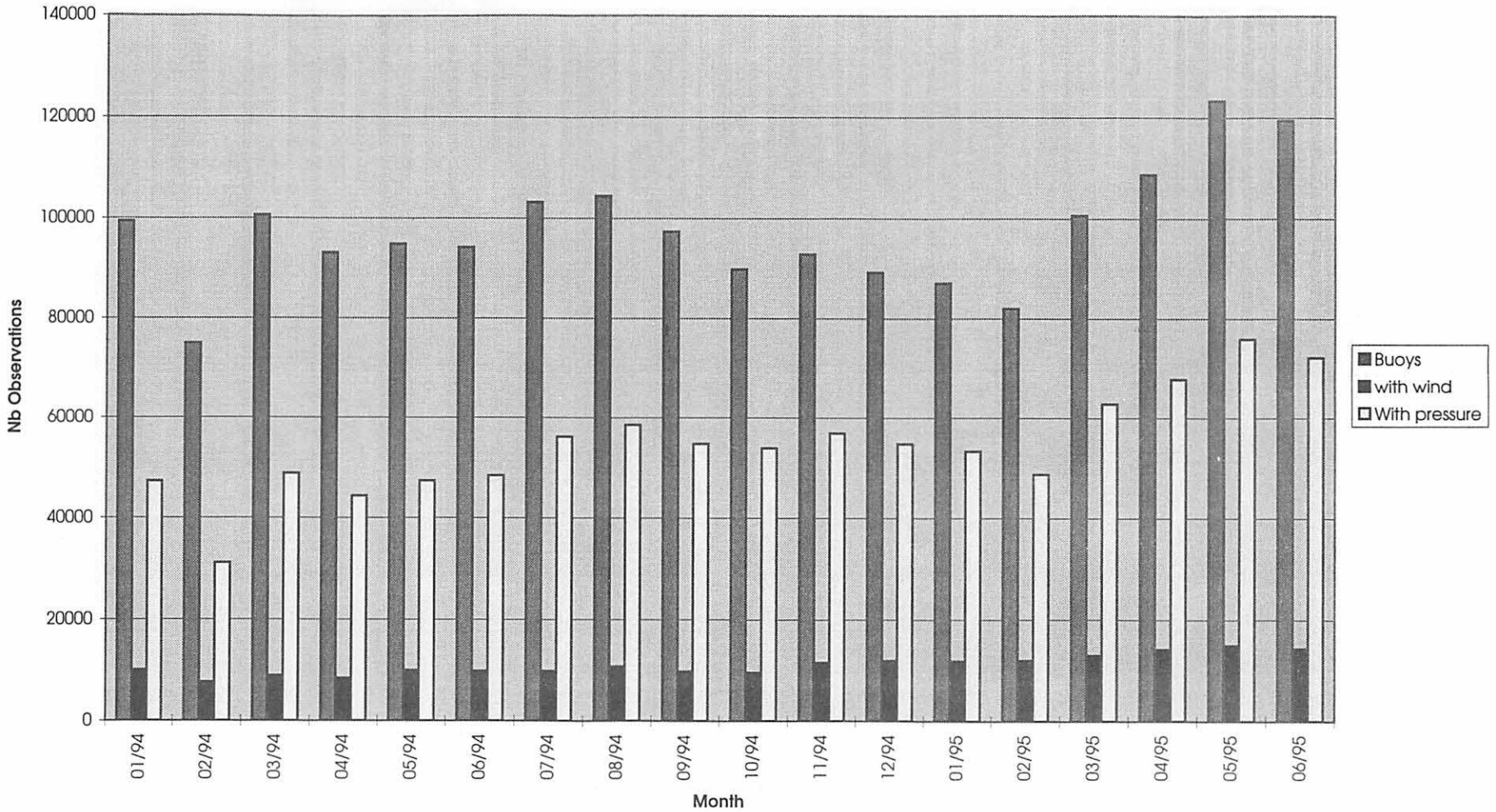


Figure 1

Time evolution of Moored Buoys reports for wind and pressure

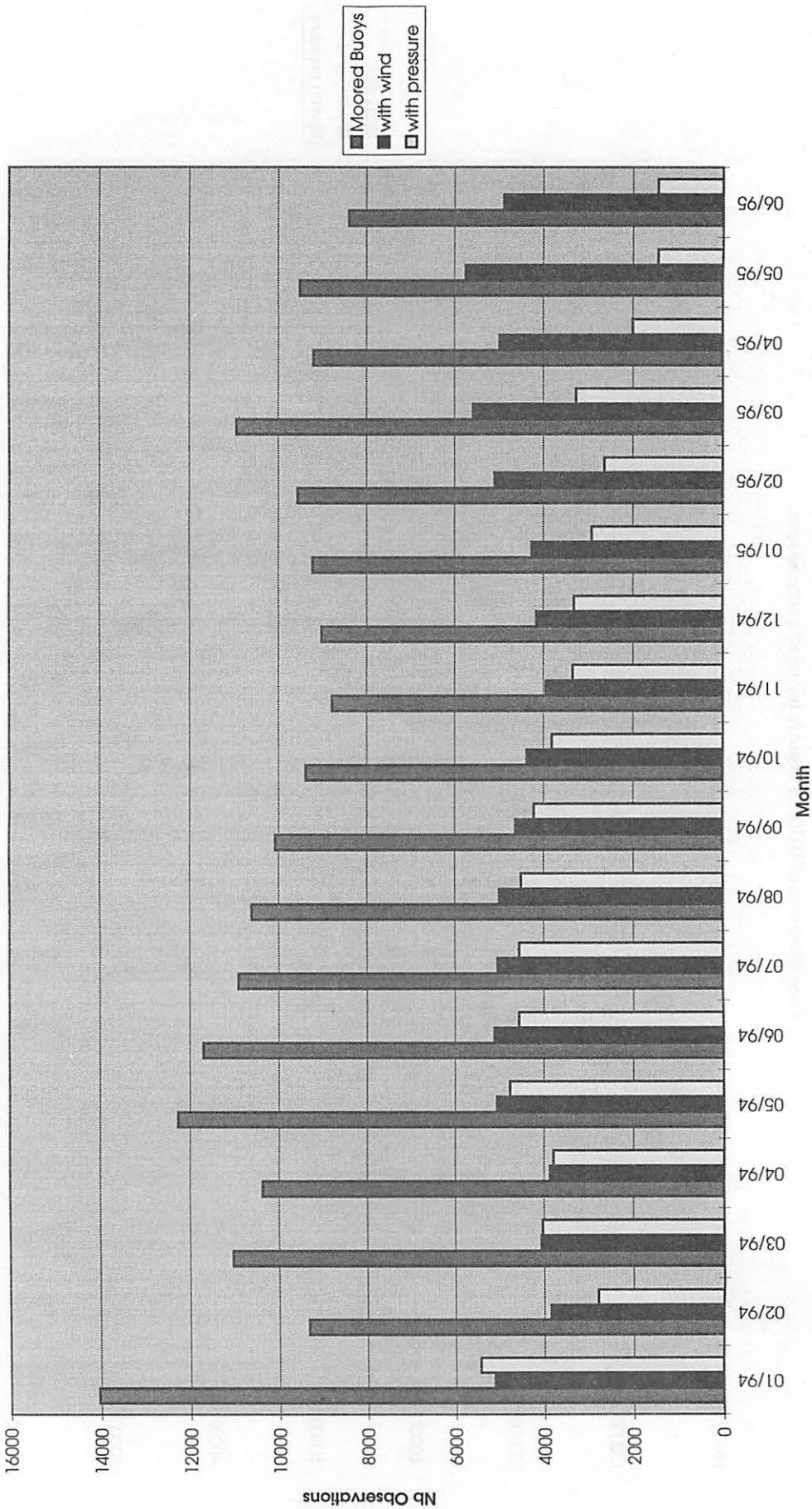


Figure 2

Time evolution of Drifting BUOYS reports for wind and pressure

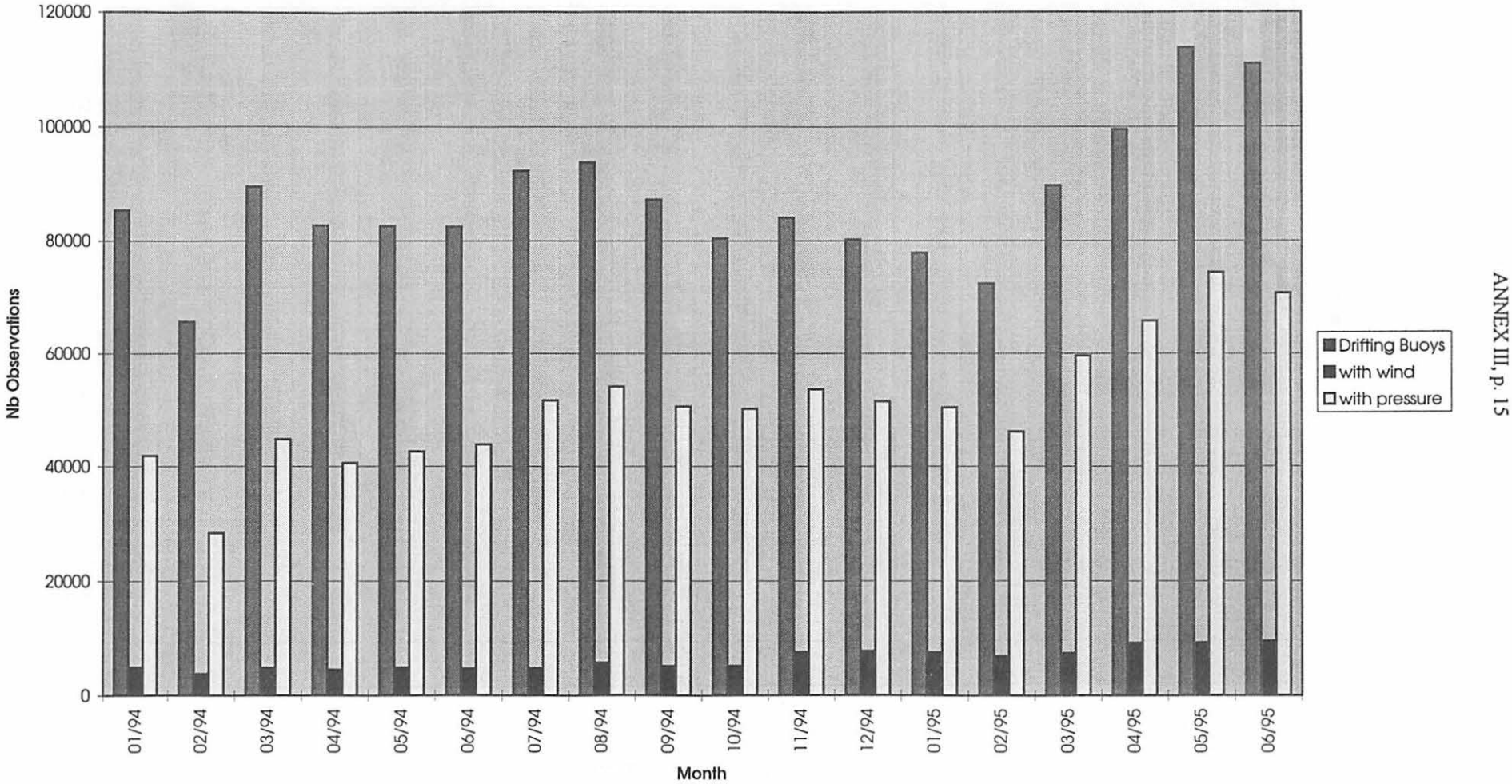


Figure 3

Time evolution of SHIP reports for wind and pressure

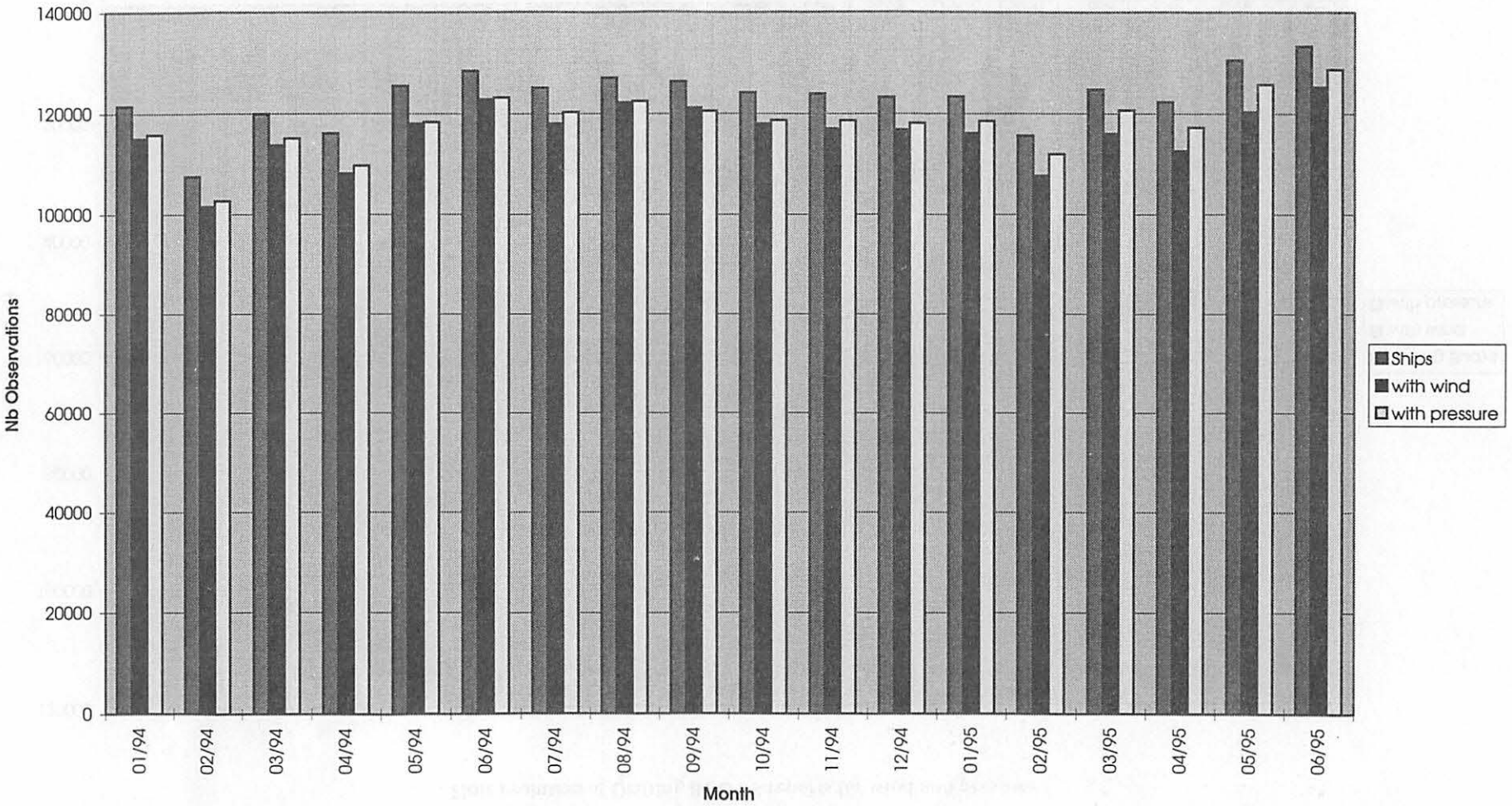


Figure 4

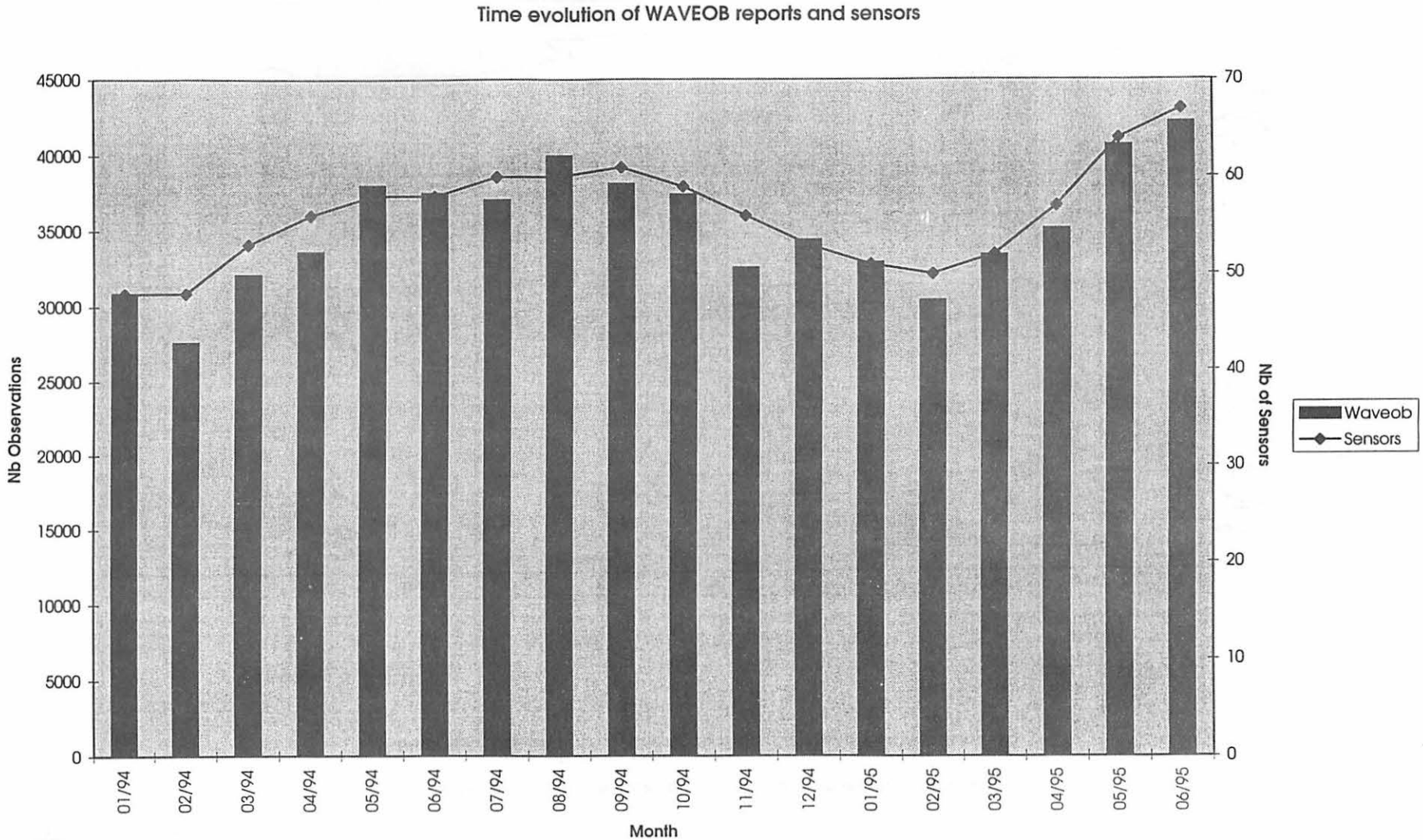

Time evolution of WAVEOB reports and sensors
Nb Observations
Nb of Sensors
Month
Waveob
Sensors
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
70
60
50
40
30
20
10
0
01/94
02/94
03/94
04/94
05/94
06/94
07/94
08/94
09/94
10/94
11/94
12/94
01/95
02/95
03/95
04/95
05/95
06/95

Figure 5

METEO FRANCE

METEO-FRANCE/SMISO

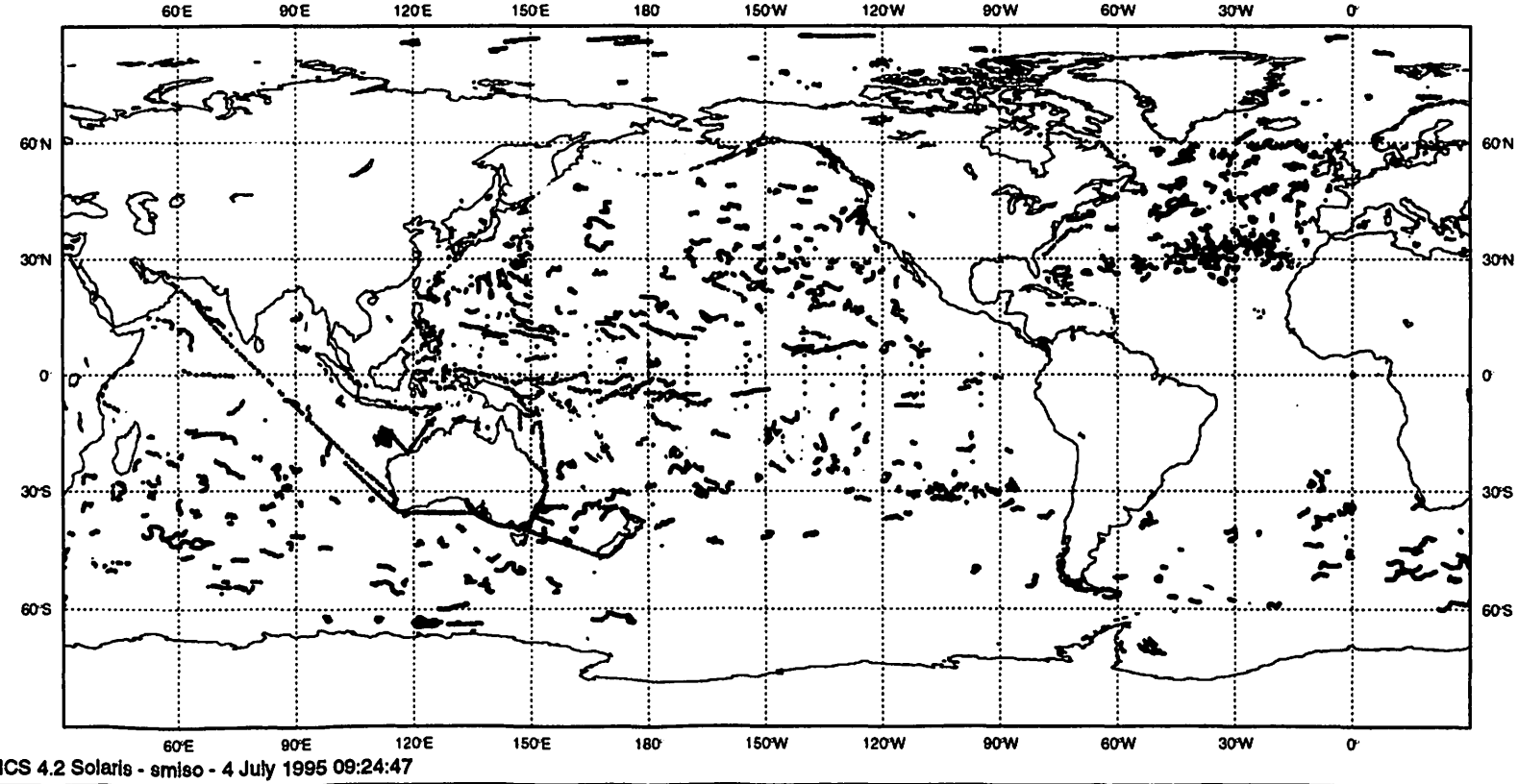
FRENCH MET OFFICE/IGOSS

Carte de pointage des observations recues en Juin 95

Mapping position plot chart of data received during June 95

Messages : BUOY

Total : 119052



MAGICS 4.2 Solaris - smiso - 4 July 1995 09:24:47

METEO FRANCE

METEO-FRANCE/SMISO

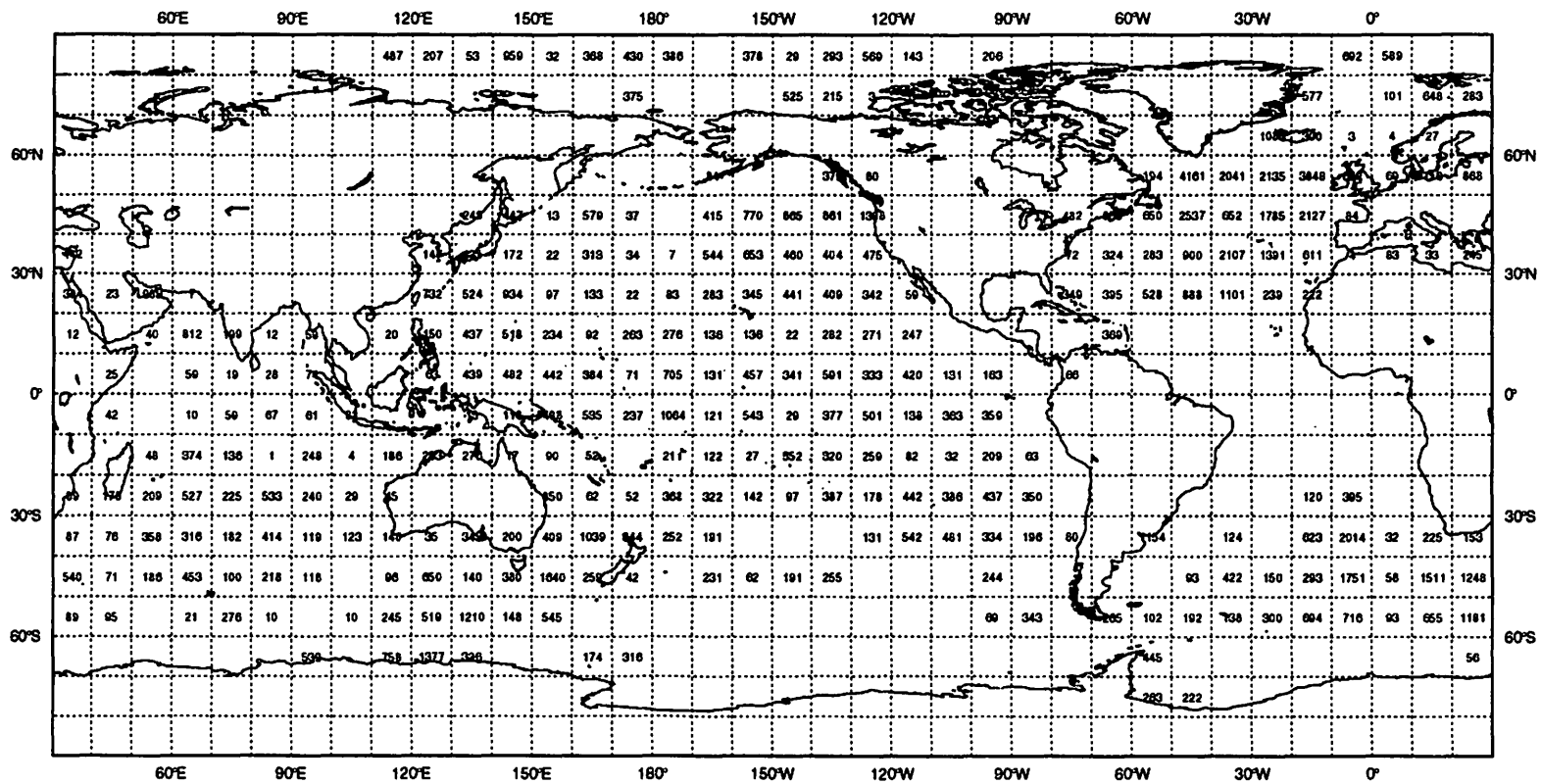
FRENCH MET OFFICE/IGOSS

Repartition par carre Marsden des observations recues en Juin 95

Marsden square distribution chart of data received during June 95

Messages : BUOY

Total : 119052



MAGICS 4.2 Solaris - smiso - 4 July 1995 09:25:30

METEO FRANCE

METEO-FRANCE/SMISO

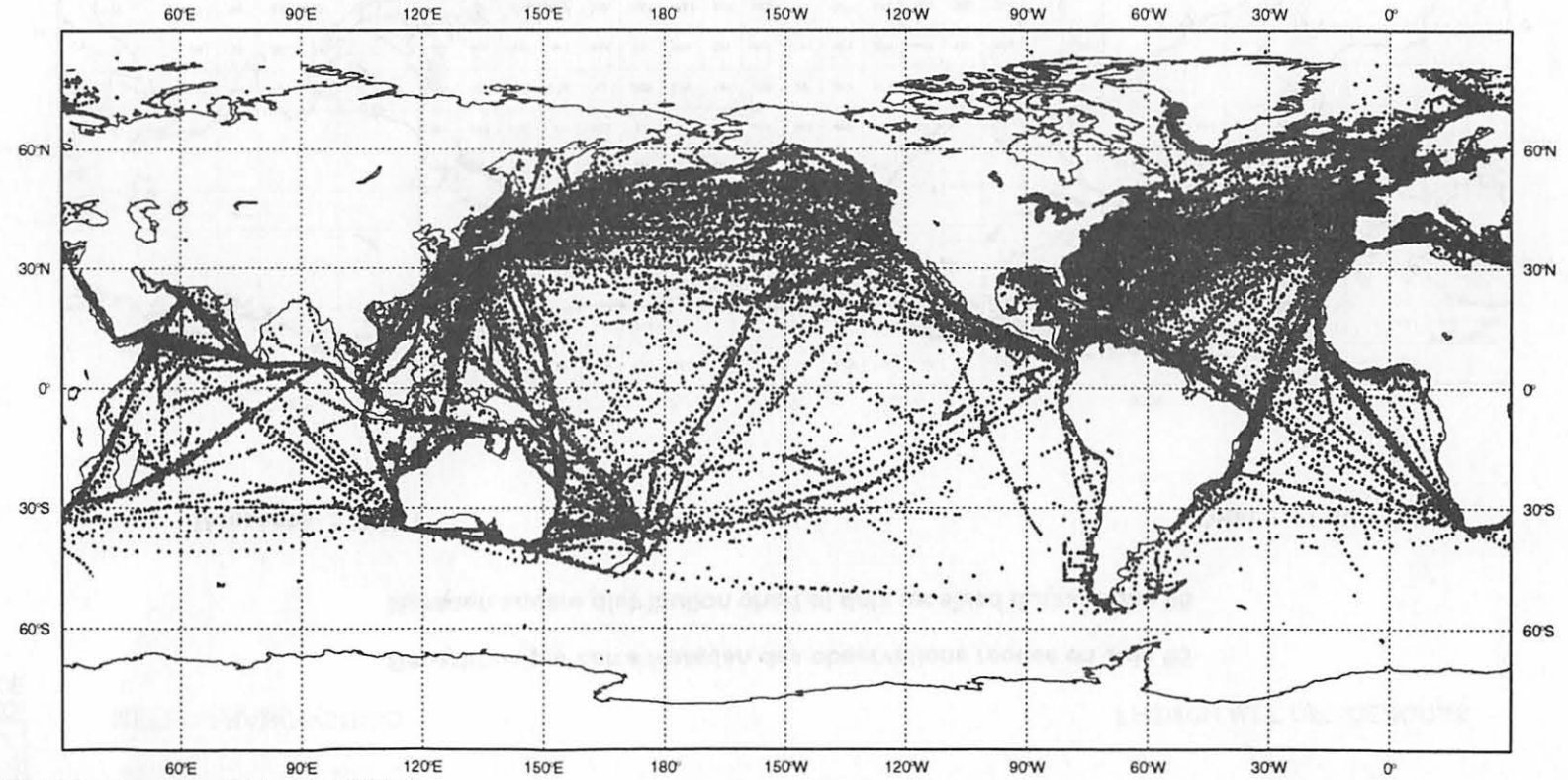
FRENCH MET OFFICE/IGOSS

Carte de pointage des observations recues en Juin 95

Mapping position plot chart of data received during June 95

Messages : SHIP

Total : 131138



MAGICS 4.2 Solaris - smiso - 5 July 1995 09:11:18

METEO FRANCE

METEO-FRANCE/SMISO

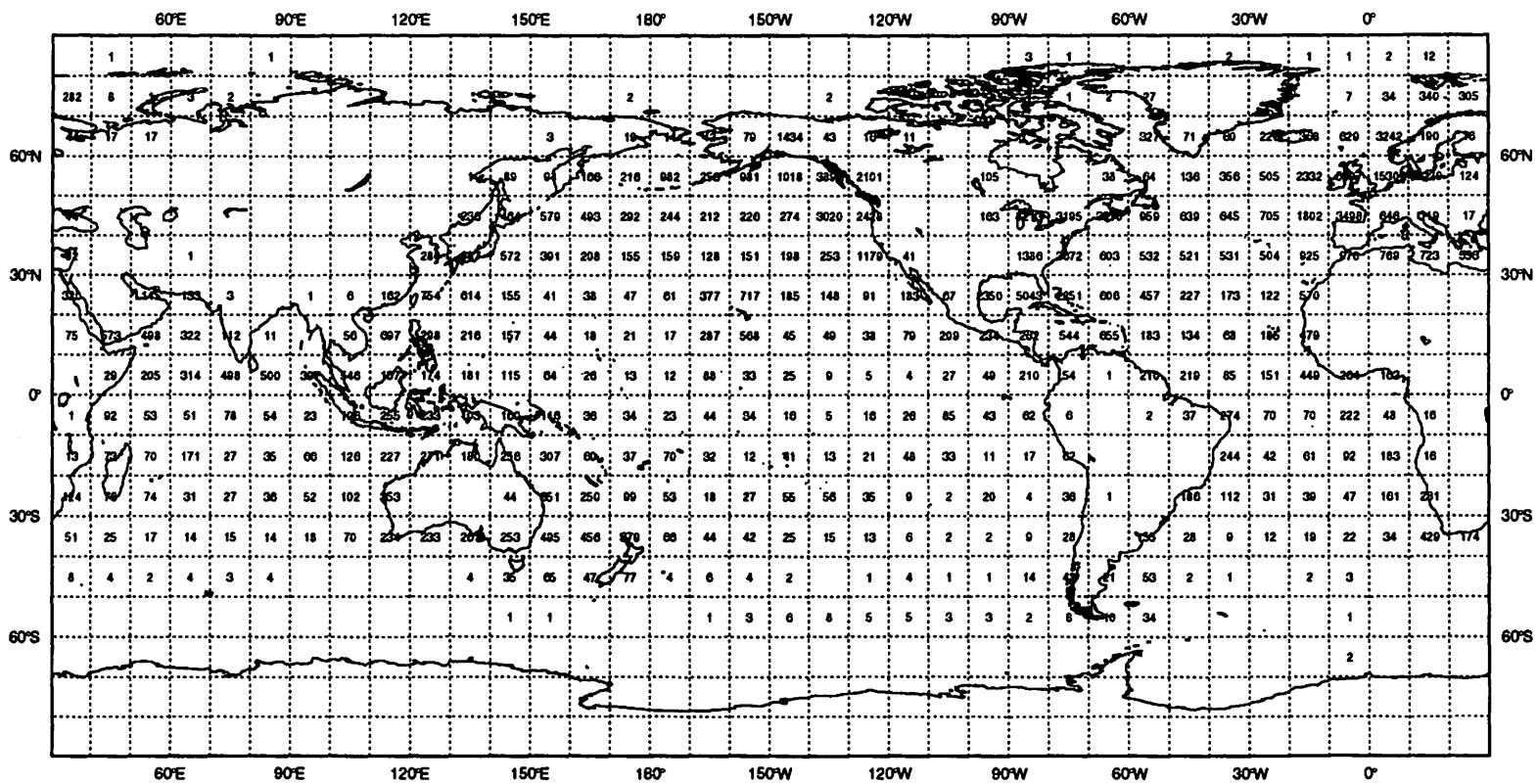
FRENCH MET OFFICE/IGOSS

Repartition par carre Marsden des observations recues en Juin 95

Marsden square distribution chart of data received during June 95

Messages : SHIP

Total : 131138

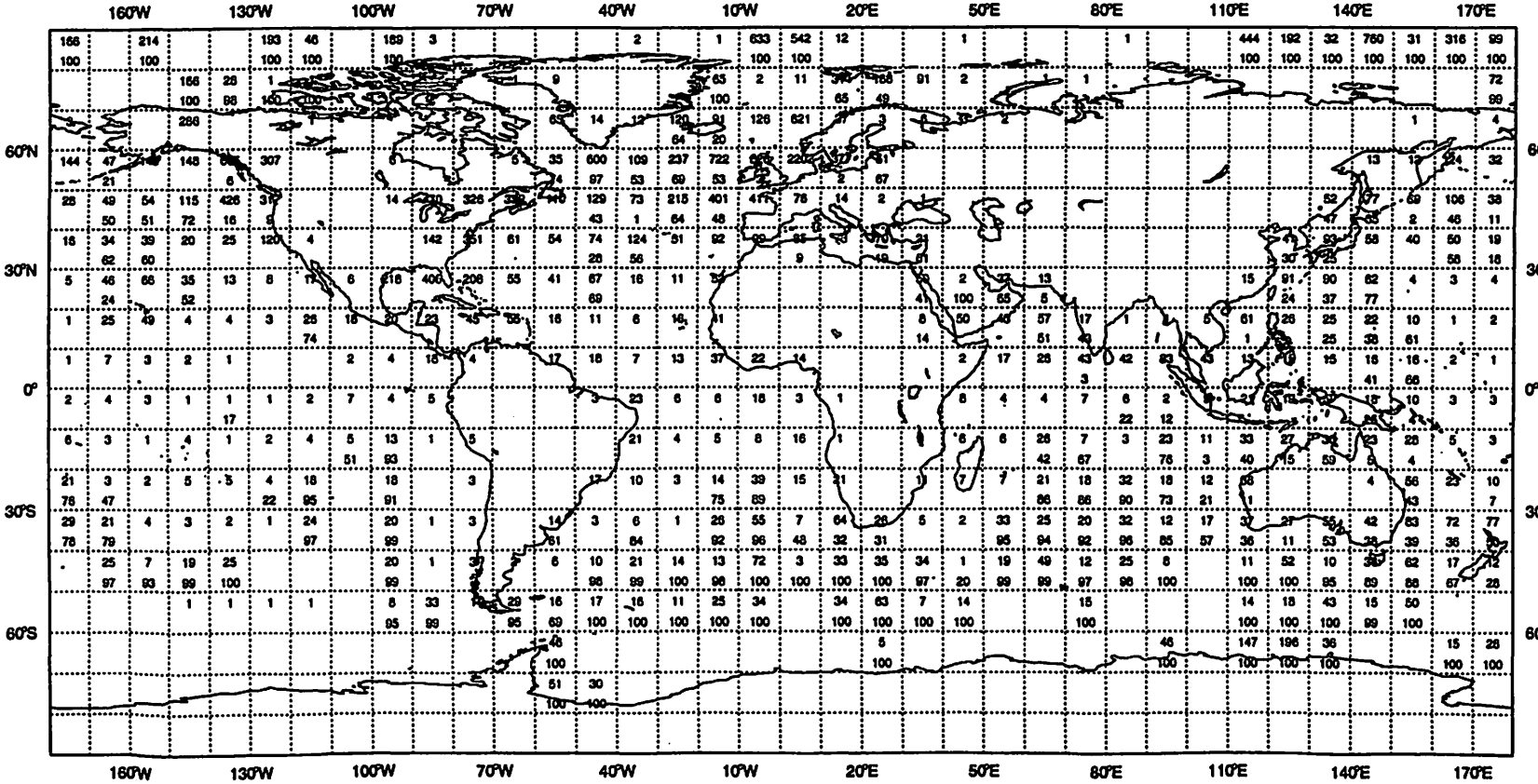


MAGICS 4.2 Solaris - smiso - 5 July 1995 09:12:05

METEO FRANCE

METEO - FRANCE **PRESSURE** **JUNE 1995**

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

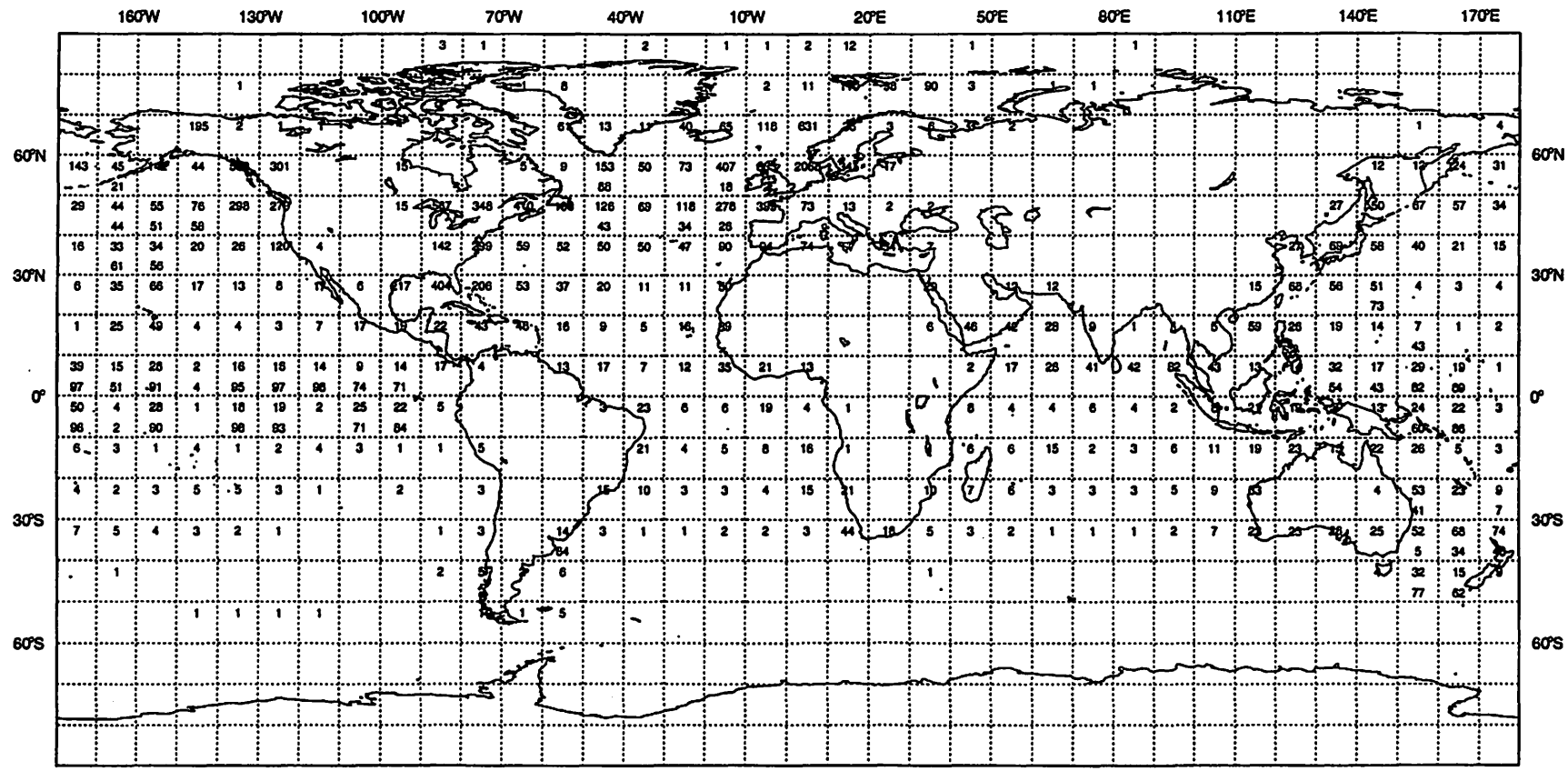


MAGICS 4.2 Solaris - ludjet - 5 July 1995 09:06:36

METEO FRANCE

METEO - FRANCE **WIND** **JUNE 1995**

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

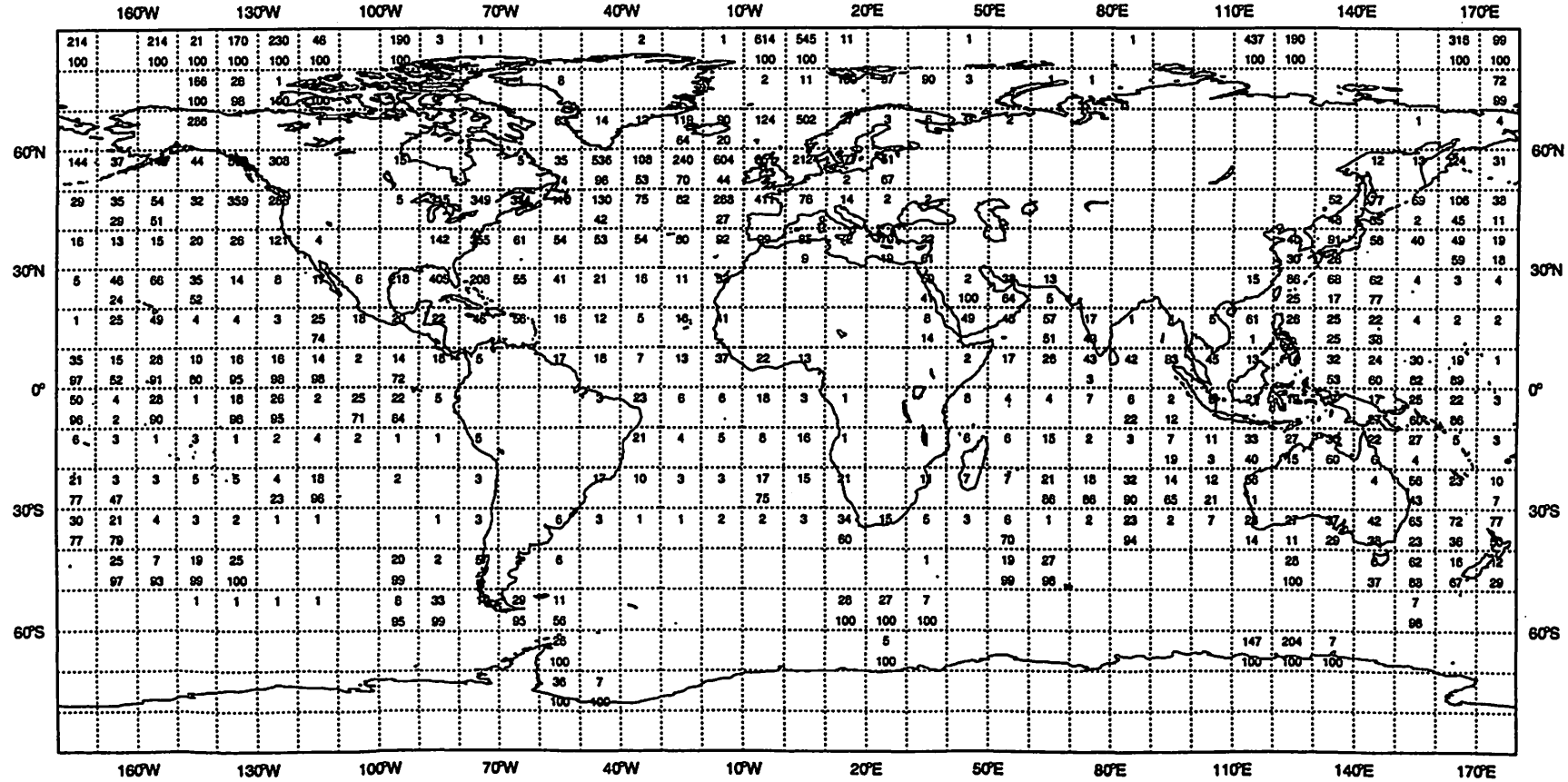


MAGICS 4.2 Solaris - ludjet - 5 July 1995 09:06:46

METEO FRANCE

METEO - FRANCE **TEMPERATURE** **JUNE 1995**

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

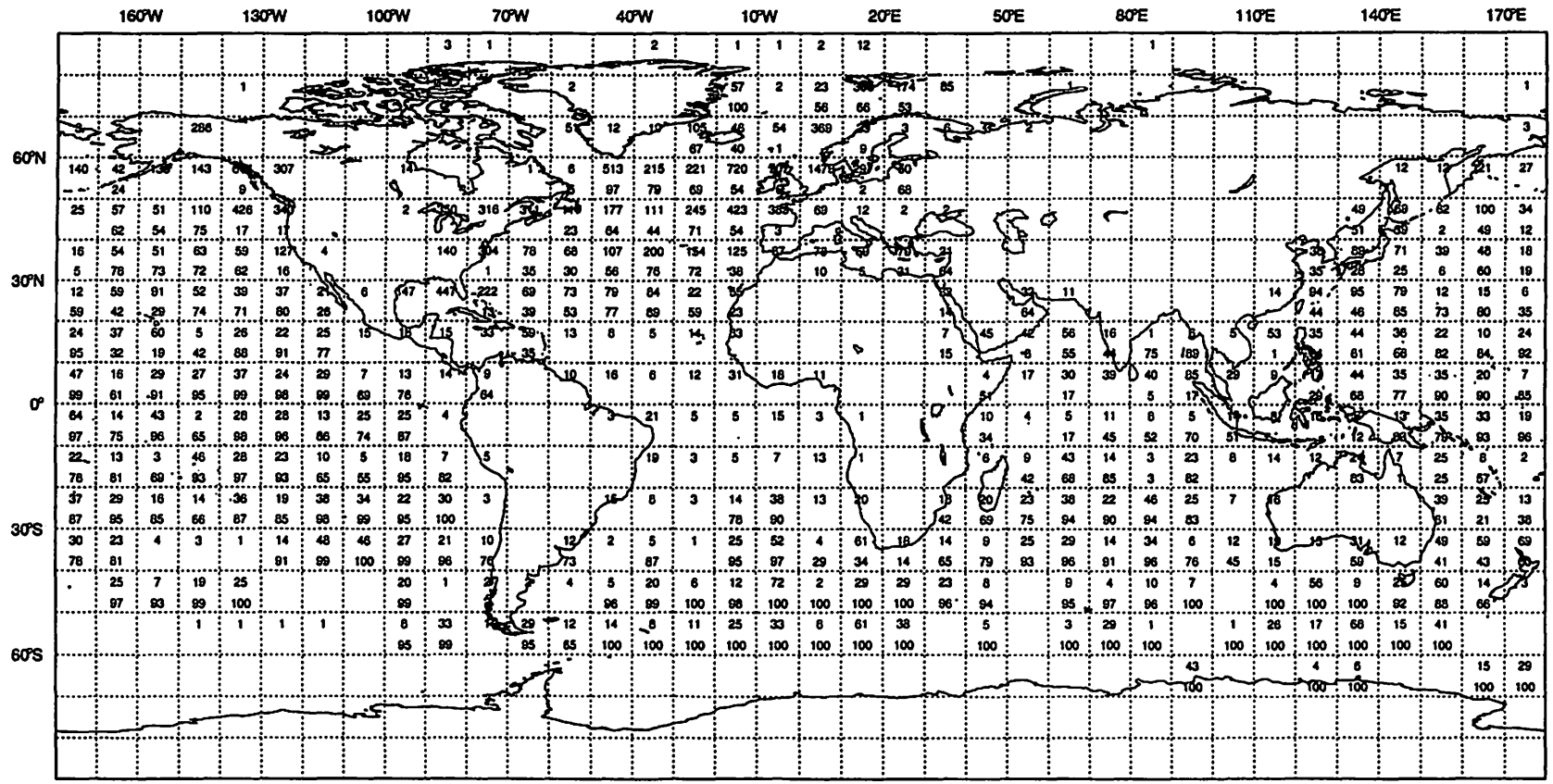


MAGICS 4.2 Solaris - ludjet - 5 July 1995 09:06:50

METEO FRANCE

METEO-FRANCE **SEA SURFACE TEMPERATURE** **JUNE 1995**

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



MAGICS 4.2 Solaris - ludjet - 5 July 1995 09:06:41

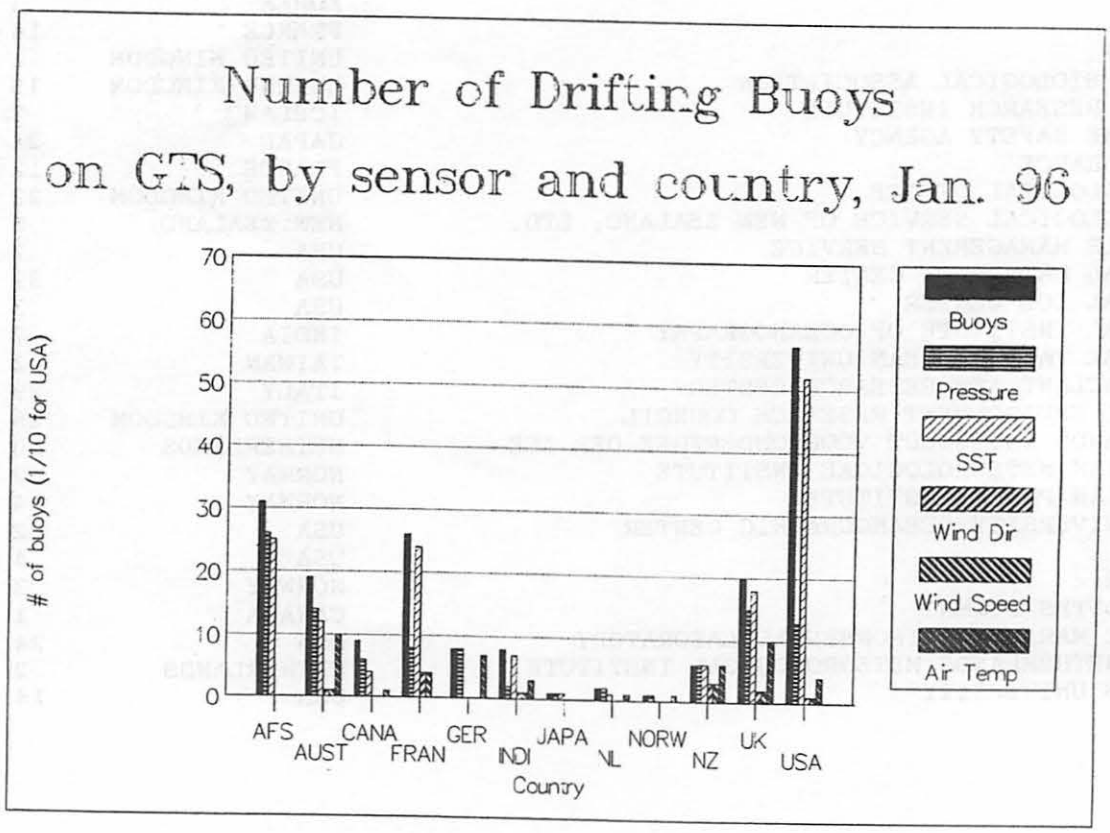
ANNEX IV

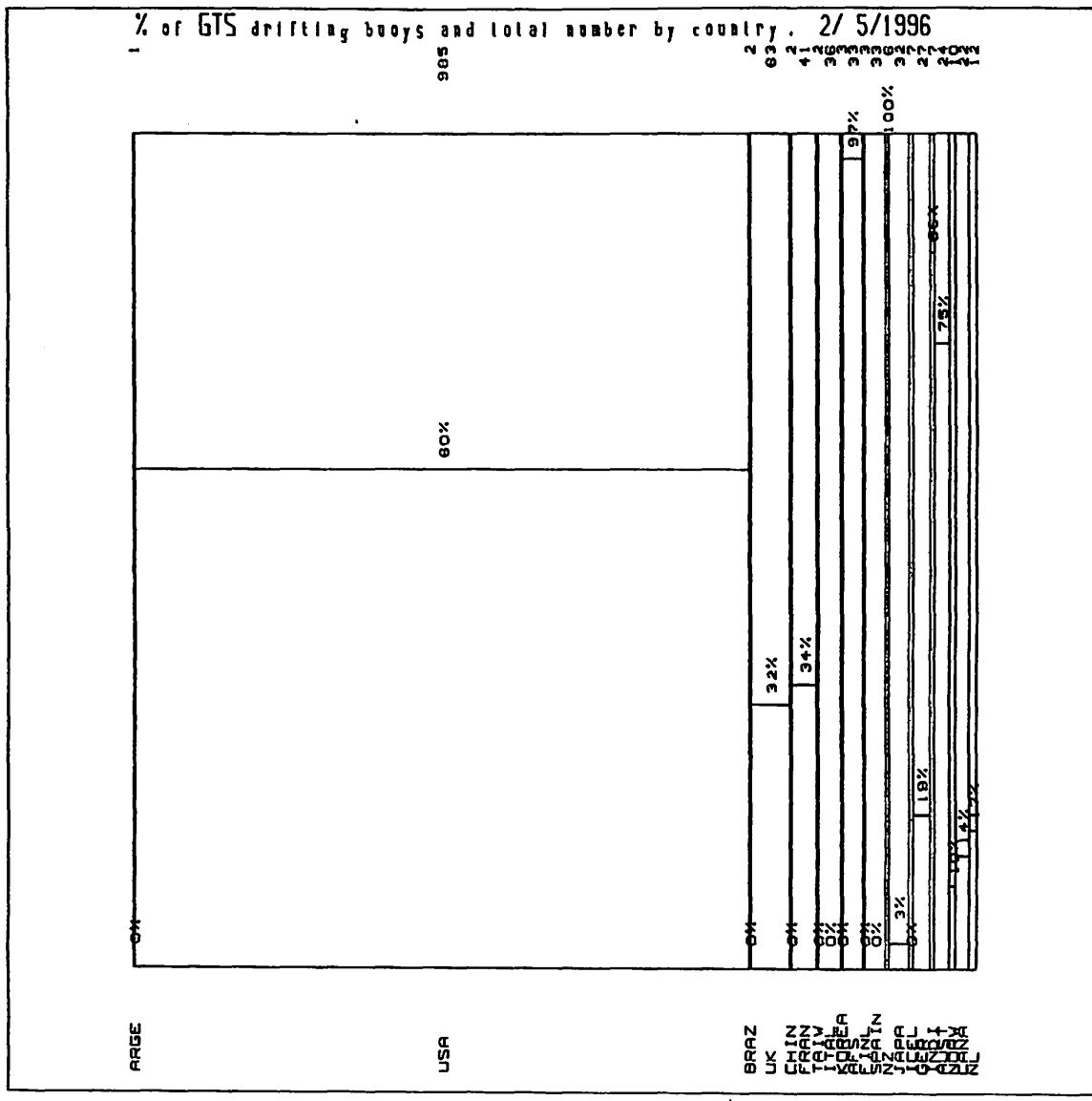
NUMBER OF DRIFTING BUOYS BY COUNTRY AND THOSE REPORTING VIA THE GTS

(As of January 1996 based on actual transmissions between 19 and 29 January 1996

Organism	Country	Buoys	GTS
ANTARCTIC CRC	AUSTRALIA	1	1
ANTARCTIC DIVISION	AUSTRALIA	5	4
ATLANTIC OCEANOGRAPHIC AND METEOROLOGICAL LABORATORY	USA	70	48
AUSTRALIAN BUREAU OF METEOROLOGY	AUSTRALIA	15	13
BEDFORD INSTITUDE OF OCEANOGRAPHY	CANADA	1	0
BERMUDA BIOLOGICAL STATION FOR RESEARCH, INC.	USA	1	0
CALVOPESCA	SPAIN	26	0
CLS	FRANCE	1	0
COAST GUARDS	CANADA	4	0
COMMISSARIAT A L'ENERGIE ATOMIQUE	FRANCE	2	0
CSIRO	AUSTRALIA	3	0
CYFRA	SPAIN	2	0
ENVIRONMENT CANADA	CANADA	3	3
EPSHOM	FRANCE	7	0
HORIZON MARINE, INC.	USA	6	0
IFREMER	FRANCE	5	0
INPE	BRAZIL	2	0
INSTITUTE OF MARINE RESEARCH	NORWAY	1	0
INSTITUTE OF OCEAN SCIENCES	CANADA	13	0
INSTITUTO UNIVERSITARIO NAVALE	ITALY	7	0
JAPAN MARINE SCIENCE AND TECHNOLOGY CENTER	JAPAN	2	0
JAPAN METEOROLOGICAL AGENCY	JAPAN	1	1
KORDI	KOREA	3	0
LODYC	FRANCE	14	5
M.A.F.F.	UNITED KINGDOM	1	0
MARINE BIOLOGICAL ASSOCIATION	UNITED KINGDOM	15	0
MARINE RESEARCH INSTITUTE	ICELAND	7	0
MARITIME SAFETY AGENCY	JAPAN	24	0
METEO FRANCE	FRANCE	12	9
METEOROLOGICAL OFFICE	UNITED KINGDOM	22	17
METEOROLOGICAL SERVICE OF NEW ZEALAND, LTD.	NEW ZEALAND	6	6
MINERALS MANAGEMENT SERVICE	USA	7	0
NATIONAL DATA BUOY CENTER	USA	39	38
NATIONAL ICE CENTER	USA	3	3
NATIONAL INSTITUTE OF OCEANOGRAPHY	INDIA	7	6
NATIONAL TAIWAN OCEAN UNIVERSITY	TAIWAN	2	0
NATO SACLANT ASW RESEARCH CENTER	ITALY	29	0
NATURAL ENVIRONMENT RESEARCH COUNCIL	UNITED KINGDOM	25	3
NEDERLANDS INSTITUUT VOOR ONDERZOEK DER ZEE	NETHERLANDS	10	0
NORWEGIAN METEOROLOGICAL INSTITUTE	NORWAY	2	1
NORWEGIAN POLAR INSTITUTE	NORWAY	4	0
NOVA UNIVERSITY OCEANOGRAPHIC CENTER	USA	2	0
NUSS	USA	4	0
OCEANOR	NORWAY	3	0
OCEANROUTES SEIMAC	CANADA	1	0
PACIFIC MARINE ENVIRONMENTAL LABORATORY	USA	24	0
ROYAL NETHERLANDS METEOROLOGICAL INSTITUTE	NETHERLANDS	2	2
RUTGERS UNIVERSITY	USA	14	0

SCRIPPS INSTITUTION OF OCEANOGRAPHY	USA	584	367
SEA FISHERIES RESEARCH INSTITUTE	SOUTH AFRICA	1	0
SEIKAI NATIONAL FISHERIES RESEARCH INST	JAPAN	1	0
SERVICE ARGOS, INC.	USA	1	0
SERVICIO DE HIDROGRAFIA NAVAL	ARGENTINA	1	0
SOUTH AFRICAN WEATHER BUREAU	SOUTH AFRICA	32	32
SOUTH CHINA SEA SUB-BUREAU OF NBO	CHINA	2	0
TOKYO UNIVERSITY OF FISHERIES	JAPAN	1	0
U.S. NAVAL OCEANOGRAPHIC OFFICE	USA	96	32
UNIVERSITAT POLITECNICA DE CATALUNYA	SPAIN	5	0
UNIVERSITY OF HAMBURG	GERMANY	7	0
UNIVERSITY OF HANNOVER	GERMANY	9	5
UNIVERSITY OF HAWAII	USA	26	24
UNIVERSITY OF HELSINKI	FINLAND	3	0
UNIVERSITY OF KIEL	GERMANY	11	0
UNIVERSITY OF MIAMI	USA	70	53
UNIVERSITY OF NEW HAMPSHIRE	USA	2	0
UNIVERSITY OF OREGON	USA	7	7
UNIVERSITY OF SOUTHERN MISSISSIPPI	USA	2	0
UNIVERSITY OF TOKYO	JAPAN	3	0
UNIVERSITY OF WASHINGTON	USA	1	1
US COAST GUARD, INTERNATIONAL ICE PATROL	USA	8	6
WEBB RESEARCH CORPORATION	USA	1	0
WOODS HOLE OCEANOGRAPHIC INSTITUTION	USA	17	10
Total		**1351**	**697**
(% of Total)			**51.6**





Total number of drifting buoys : 1351
Total number of meteo buoys : 697 = 51.6%

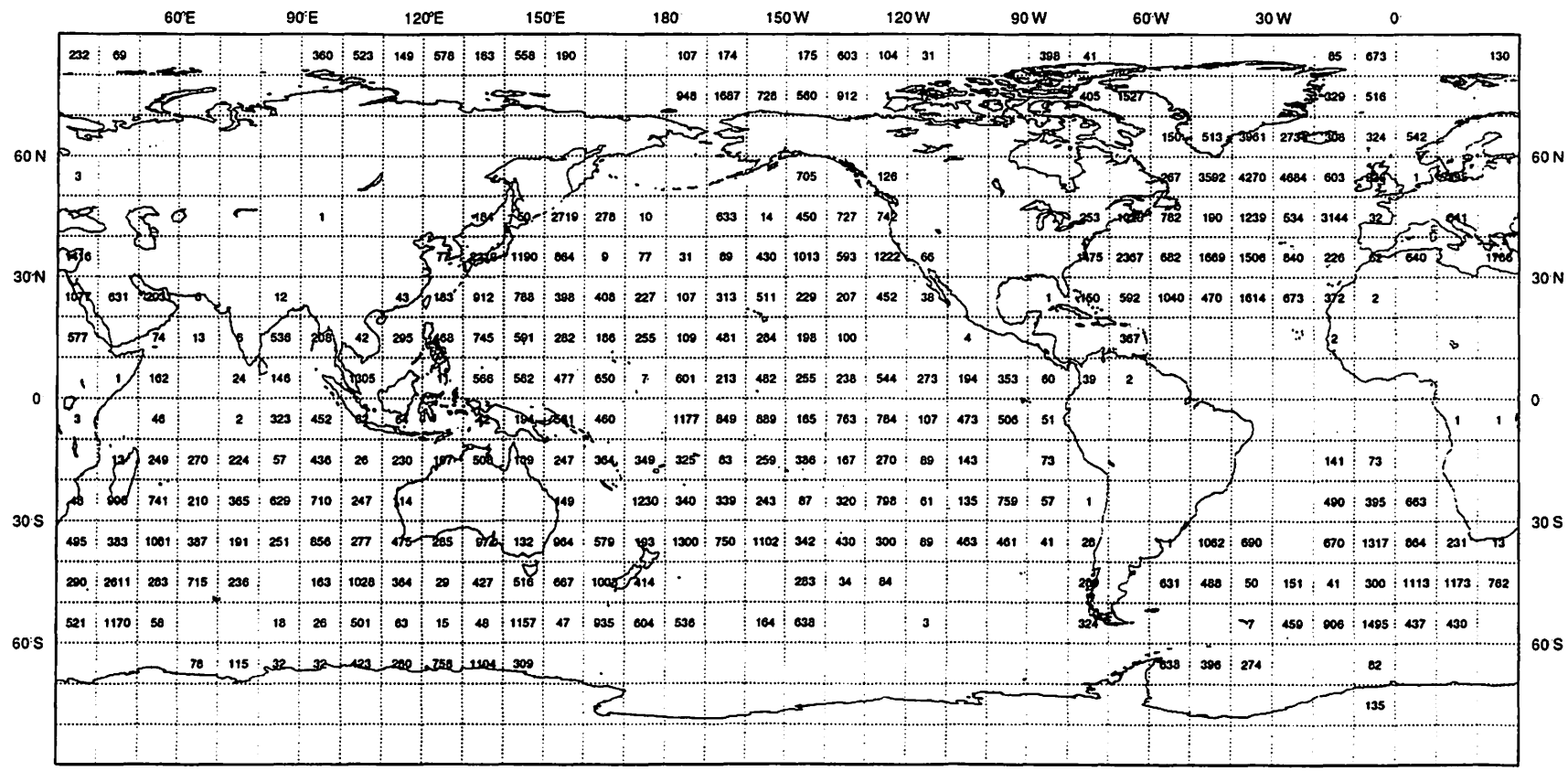
METEO FRANCE

METEO-FRANCE/SMISO **FRENCH MET OFFICE/IGOSS**

Repartition par carre Marsden des observations recues en Decembre 95

Marsden square distribution chart of data received during December 95

Messages : BUOY **Total : 167521**



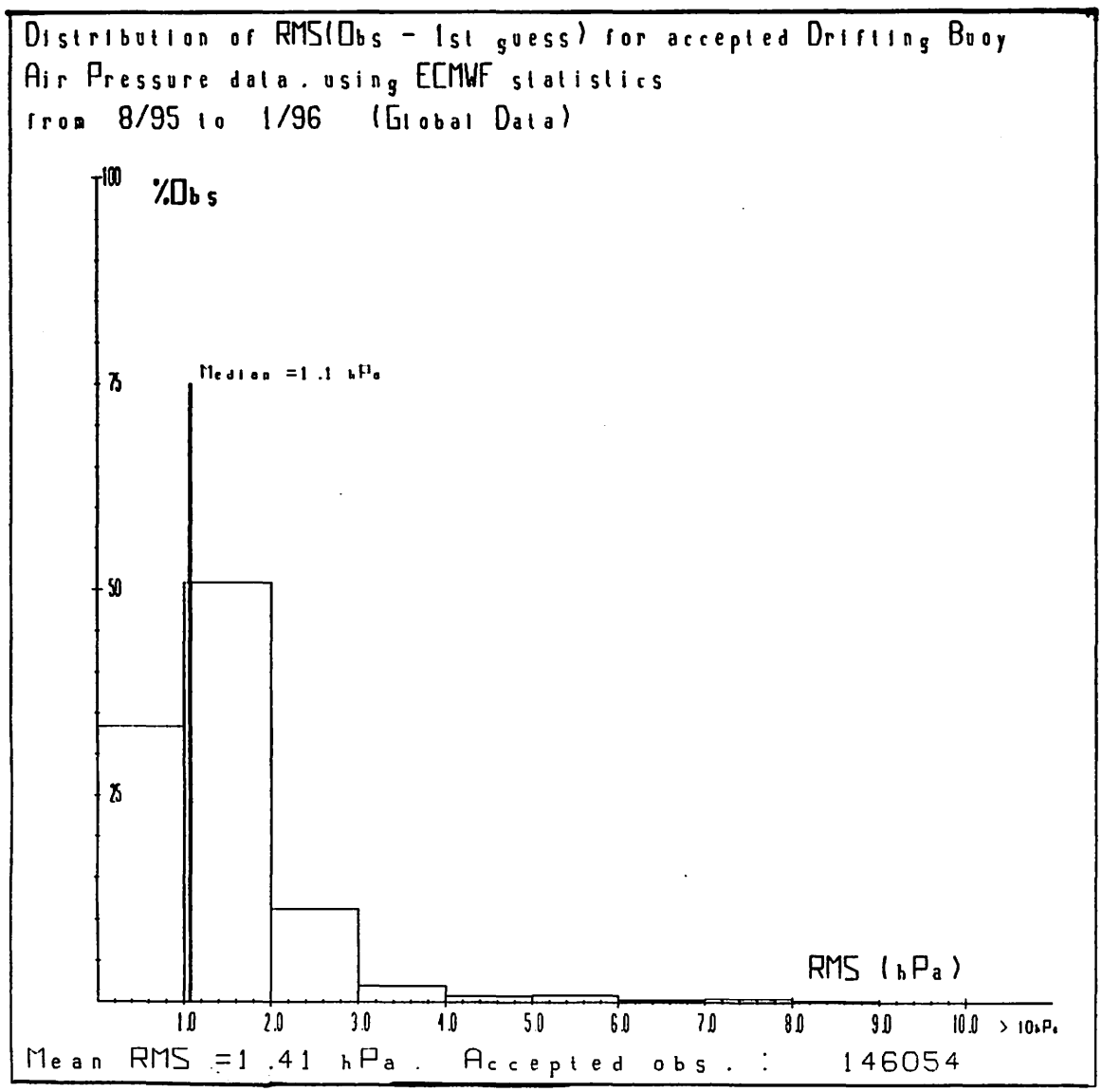
MAGICS 4.2 Solaris - smiso - 8 January 1996 08:35:45

ANNEX V

NUMBER OF BUOY REPORTS RECEIVED AT TOULOUSE DURIND DECEMBER 1995

ANNEX VI

DISTRIBUTION OF STANDARD DEVIATION (RMS) FOR AIR PRESSURE DATA



Global Data

ANNEX VII

Quality Control Guidelines for GTS buoy data

These are principles adopted during previous DBCP sessions:

(i) Meteorological Centres are in the best position to undertake data Quality Control (DBCP VI).

(ii) Principal Investigators and Meteorological Centres share the responsibility of data Quality Control (DBCP VI).

(iii) The Technical Co-ordinator is in the best position to act as a focal point between GTS users and Principal Investigators (DBCP V, VI).

(iv) Argos is responsible for assuring that gross errors are automatically eliminated from reports distributed on GTS (DBCP VI).

In order to realize these principles, the following operating procedures or actions are proposed:

1. PGCs

Each Principal Investigator (PI) of an Argos buoy programme reporting data on GTS, designates a person responsible for making changes on PTT or sensor information present in the Argos GTS sub-system. This person is named the Programme GTS Co-ordinator (PGC). The PGC can, of course, be the PI himself but could also be a designated programme Technical Co-ordinator, as is done for the EGOS programme. If such a person does not exist as yet, for a given Argos Programme, the Technical Co-ordinator of the DBCP would contact the Principal Investigator and discuss the issue in order to find one. In a few cases, when a PI allows his platforms being distributed on GTS but does not want to be involved in the process, the Technical Co-ordinator could act as a PGC (i.e. the Technical Co-ordinator of the DBCP can directly ask Argos to make status changes).

2. PMOCs

The DBCP requests one or more Agencies or Institutions to volunteer for acting as Principal Meteorological or Oceanographic Centre responsible for deferred time GTS buoy data Quality Control (PMOC). PMOCs work on an operational basis, for given physical variables, either regionally or globally. The following centres are presently acting as PMOCs:

- The Australian Bureau Of Meteorology (BOM, Melbourne, Australia);
- The Centre de Météorologie Marine (Météo-France, Brest, France);
- The European Centre for Medium Range Weather Forecasts (ECMWF, Reading, United Kingdom);
- The Icelandic Meteorological Office (IMO, Reykjavik, Iceland);
- The Japan Meteorological Agency (JMA, Tokyo, Japan);
- The Meteorological Center of New Zealand, Ltd. (NZMS, Wellington ,New Zealand);

- The National Data Buoy Center (NOAA/NDBC, Stennis Space Center, Mississippi, USA);

- The Ocean Product Center (NOAA/OPC, Camp Spring, Maryland, USA);

- The United Kingdom Meteorological Office (UKMO, Bracknell, UK).

- The South African Weather Bureau (SAWB, Pretoria, South Africa).

National Focal Points for Drifting Buoy Programmes are requested to designate National PMOCs, and possibly to act themselves as PMOCs.

3. INTERNET distribution list (mailing list).

It is proposed that the mechanism for exchanging QC information among the Guidelines Participants shall be an INTERNET distribution list. PMOCs send the proposed messages to a unique INTERNET address which name is BUOY-QC@node_path. "node_path" depends upon who actually operates the distribution list. The full INTERNET address of the Distribution List shall be circulated among the Guidelines participants.

To date the Icelandic Meteorological Office is operating the distribution list server and the Internet address is:

BUOY-QC@VEDUR.IS

The messages are then automatically forwarded to all the individual addresses from a maintained distribution list. Adding, reading, modifying, or deleting a name form the list can be done via INTERNET messages according to an agreed format.

3.1 ECMWF, OPC, METEO FRANCE, and UKMO monitoring statistics are delivered onto the INTERNET Distribution List.

3.2 Any suggestion for modification (i.e. recalibrate or remove sensor from GTS) or any problem noticed (e.g. bad location) on a drifting buoy reporting data on GTS should be placed on the Distribution List. Meteorological Centres are encouraged to make such suggestions.

3.3 Any feed back available on a recalibration actually implemented shall be placed on the distribution list.

4. Operating Procedures for dealing with Potential Problems on GTS (Drifting and Moored Buoy data)

4.1 PMOCs noticing potential problems on GTS can suggest an action via the INTERNET Distribution List. A standardized, telegraphic format is proposed (see Appendix): one message per platform or per sensor, showing the WMO number and the proposed change, directly in the "subject" line, with additional comments appearing in the text itself, using a free format if felt necessary by the PMOC (see example in Appendix).

4.2 PMOCs noticing bad location or bad sensor data episodically appearing on GTS message can copy the message on the INTERNET Distribution List, indicating from which source the message was transmitted. Although it is recommended that LUT operators access to the INTERNET Distribution List as well, if not possible, the Technical Co-ordinator of the DBCP or the responsible PGC or a designated PMOC (see paragraph 4.7.2) would keep them informed by telefax or another mean.

4.3 A 7-day delay is respected by the Technical Co-ordinator of the DBCP before he actually contacts the PGC to propose the change, so that other meteorological centres may also have the opportunity to comment on the suggestion. In that case, the Technical Co-ordinator of the DBCP is given the responsibility to decide which request to consider. Other data users who are on the INTERNET Distribution List are encouraged to check the received messages regularly.

4.4 Then, if the PGC accepts the modification, he requests the adequate Argos center (i.e. CLS or SAI) to make the change. In order to keep the GTS user community informed, Service Argos announces the change as soon as possible by means of the INTERNET Distribution List (a standardized message is proposed in the Appendix) and also effects the change as prescribed. It is recommended that the PGC also requests appropriate LUTs to implement the same changes.

4.5 If the PGC is not willing to go ahead with a proposed change, the Technical Co-ordinator of the DBCP deposits a standardized message on the INTERNET Distribution List (see Appendix) in order to inform PMOCs.

4.6 Local User Terminals are urged to adopt these Quality Control Operating Guidelines.

4.6.1 It is desirable that LUTs not willing to participate should distribute drifting buoy data on GTS only to local users (i.e. no global GTS distribution).

4.6.2 LUT operators participating and registered on the INTERNET Distribution List are encouraged to inform the participants back by the mean of the Distribution List each time a change is implemented, using the same format as Argos (see paragraph 4.4). If LUTs are not on the Distribution List, they would be encouraged to inform the Technical Co-ordinator of the DBCP of actual changes so that he can forward adequate messages onto the Distribution List.

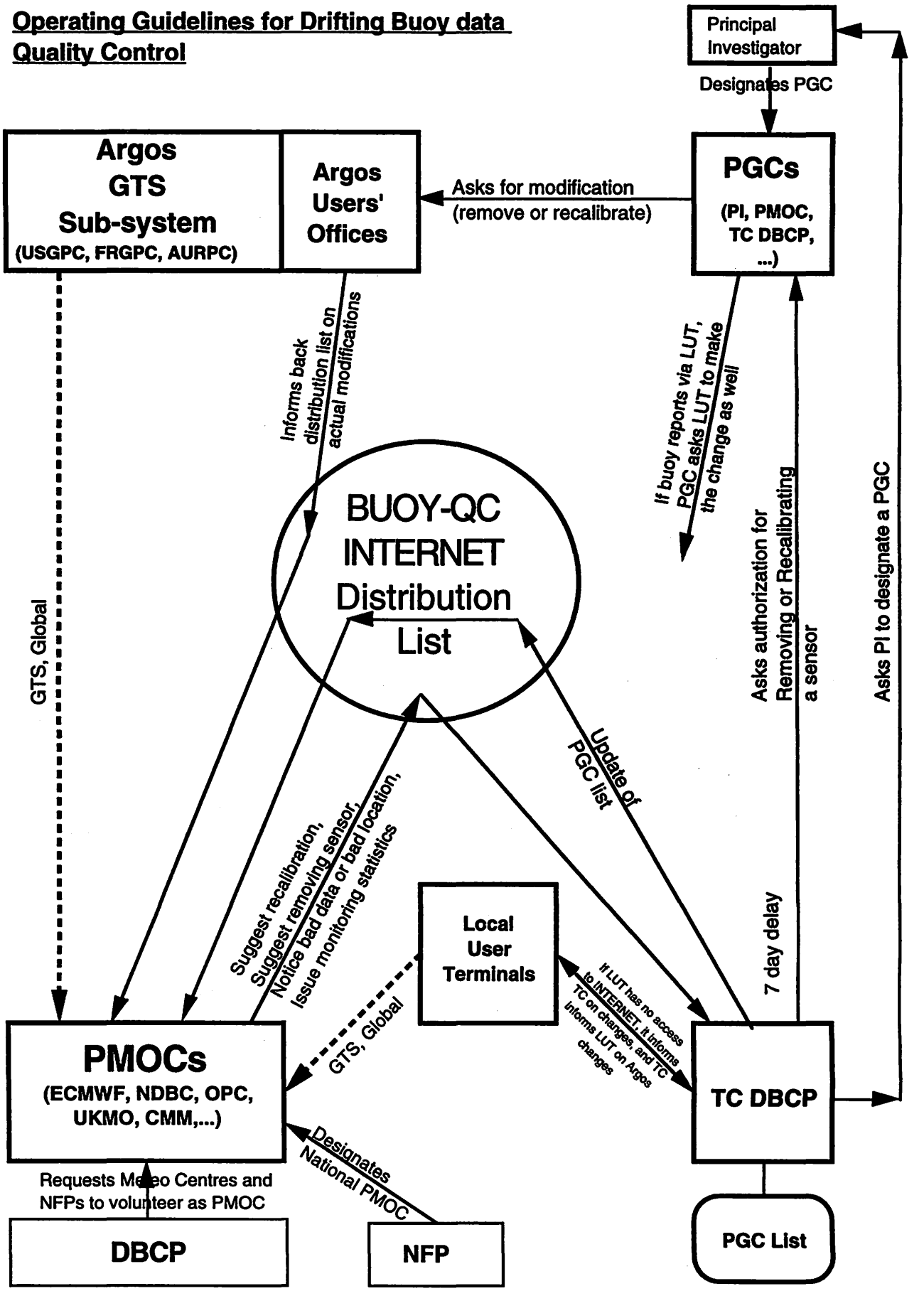
5. List of PGCs

This list is published by the Technical Co-ordinator of the DBCP on a monthly basis. It is forwarded onto the INTERNET Distribution List and sent by regular mail.

6. DBCP, WMO and IOC Secretariats

They will promote these Quality Control operating guidelines and encourage participation in this scheme.

Operating Guidelines for Drifting Buoy data Quality Control



Appendix

Standardized Format for Information Deposited on the INTERNET Distribution List

Notations:

-1- UPPERCASES in **bold** are constant field values and will appear "as shown" in the subject line; e.g. **ASK** will appear as the 3 characters 'ASK' in the subject line.

-2- Lowercases are used to designate variable data fields; If the name of the field is on 5 characters, then the field value must be coded using 5 characters (completed with spaces if necessary); e.g. ttt can be coded as '**AP** ' to indicate Air Pressure or as '**SST**' to indicate Sea Surface Temperature.

-3- The line 12345678901234567890123456789012 is just here to indicate the number of characters used (32 maxi) and their position; It has no other specific meaning.

1. **Proposals for status change** (by Meteo Centres, i.e. PMOCs):

When detecting bad data circulating on GTS, Meteorological Centres can propose changes on buoy status (remove or recalibrate sensor) via the INTERNET Distribution List. Proposals are done using a standardized telegraphic format in the subject line. Comments can be added in the body text.

Format:

```
12345678901234567890123456
hASK ttt wmo## ppp ovalue
```

Meaning:
It is proposed to remove or recalibrate one or more sensors for one given buoy.

h : One figure, **1** to **9**, to indicate the number of the request for the same buoy, for example, the first proposal would be coded **1ASK...**, and if another Meteo Centre feels necessary to comment on the same proposal, it can suggest another action and name it **2ASK**, etc...

ttt : Type of proposal:
- **RMV** : for removing sensor data from GTS
- **REC** : for recalibrating a sensor
- **CHK** : for checking data carefully; in that case, it is recommended to add in the body text of the message: (1) Example(s) of the suspicious or erroneous GTS message(s), (2) the GTS bulletin header that was used (i.e. originating centre for the bulletin), (3) a description of the problem and (4) if possible, proposed action to solve it.
- **COM** : for commenting on a particular problem. Explanation is given in the body text of the message.

wmo## : WMO number of the buoy ($A_1b_wn_bn_bn_b$) or **LIST** if more than one buoy are concerned.

It is preferable to make status change proposals for different buoys on distinct messages. However, in case the **LIST** option is used, proposals can be detailed in the body text of the message: it is recommended to state the proposal for each buoy by starting with a line encoded according to the standard format followed by the comments on a few lines included inside brackets; then the next proposal can be listed etc.. General comments can be included in free format after the last proposal.

Example for the body text in case more than one proposal are included (subject line could be 1ASK CHK LIST AP):

1ASK CHK 61412 AP
(this buoy has been transmitting erroneous data
in the last 2 week)

1ASK CHK 54814 AP
(this buoy shows strong departure of Air Pressure
from the first guess field)
...
Mr. W. Xyz., National Meteorological Service.

ppp : Physical variable (sensor) to consider:

AP	:	Air Pressure (coded as '**AP** ')
AT	:	Air Temperature (coded as '**AT** ')
SST	:	Sea Surface Temperature
WD	:	Wind Direction (codes as '**WD** ')
WS	:	Wind Speed (coded as '**WS** ')
APT	:	Air Pressure Tendency
POS	:	Position of the buoy
TZ	:	Subsurface temperatures (coded as '**TZ** '): The depths of the probes and proposed actions should be placed in the body text, not in the subject line (not enough room)
ALL	:	All buoy sensors (e.g. remove all buoy data from GTS)
Blank	:	(coded as 3 space characters, i.e. ' ') Informations are detailed in the body text.

o : Operator to use for proposed recalibration (mandatory and used only when ttt='**REC**'):

+	:	Add the following value to the calibration function
-	:	Subtract the following value from the calibration function
*	:	Multiply the calibration function by the following value (e.g. rate for recalibrating wind speed sensor)

value: Value to use for proposed recalibration (mandatory and used only when ttt='**REC**'); the value is coded on 5 characters and completed with space characters if necessary. It is provided using the following physical units:

Air Pressure :	Hecto Pascal
Temperatures :	Celsius degrees
Wind speed :	m/s
Wind Direction :	Degrees
Air Pressure Tendency :	Hecto Pascal
Positions :	Degree + Hundredth
Rate :	No unit

Examples:

From	Date	Subject
FLETCHER@METDP1.MET.CO.NZ	10-Oct-1994	1ASK REC 17804 AP +2.2
ARADFORD@EMAIL.METO.GOVT.UK	11-Oct-1994	1ASK RMV 62501 ALL
BLOUCH@IFREMER.FR	11-Oct-1994	2ASK REC 17804 AP +2.4
MBURDETTE@NDBC.NOAA.GOV	11-Oct-1994	1ASK CHK 44532 POS
GXB@ORVILLE.HO.BOM.GOV.AU	12-Oct-1994	1ASK REC 44704 WS *1.5

Message1: NZMS proposes to recalibrate Air Pressure sensor of buoy 17804 by adding 2.2 hPa.

Message2: UKMO proposes to remove buoy 62501 from GTS distribution. Explanations are given in the body text.

Message3: Météo France comments (**2ASK**) on NZMS proposal for recalibrating air pressure sensor of buoy 17804. Météo France suggests to add +2.4 hPa instead of +2.2 hPa. Argumentation is provided in the body text.

Message4: NDBC suggests to check positions of buoy 44532. Details are given in the body text, including copy of one suspicious GTS message, the GTS bulletin header, and a description of the error.

Message5: BOM proposes to recalibrate Wind speed sensor of buoy 44704, by multiplying data by 1.5.

2. Argos or LUT answer for changes actually implemented

When a change is implemented on GTS platforms, a message is normally forwarded to the INTERNET Distribution List, by Argos or the considered LUT, no later than 24 hours after the change was implemented. All the information is encoded in the subject line, the body text is empty. The format of the subject line is as follow:

Format:

```
12345678901234567890123456789012345678
cccc ttt wmo## ppp ovalue yymmddhhmm
```

Meaning:
Argos (i.e. the French Global Processing Center of Toulouse (FRGPC) or the US Global Processing Center of Landover (USGPC)) or Local User Terminals (LUT) inform the INTERNET Distribution List each time a change is actually implemented on a buoy status.

cccc : Originating Center:
- **LFPW** = FRGPC, Toulouse
- **KARS** = USGPC, Landover
- **ENMI** = Oslo LUT
- **BGSF** = Sondre Stromfjord LUT
- **CWEG** = Edmonton LUT

ttt, wmo##, ppp, ovalue: Same as for paragraph 1. In addition, for recalibrations, when the transfer function has been completely modified, ovalue can be coded as a question mark followed by 5 space characters, i.e. '? ' , to indicate that the change is not as simple as a +X, -X or *X transformation.

yymmddhhmm: UTC time the change was implemented: Format=Year (2 digits), Month (2 digits), Day of the month (2 digits), Hour (2 digits), and Minutes (2 digits).

Example:

```
From                      Date         Subject
GTS@GTSVAX.ARGOSINC.COM   14-Oct-1994  KARS REC 17804 AP  +2.3 9410141216
GTS@GTSVAX.ARGOSINC.COM   14-Oct-1994  KARS REC 33809 AP  ?    9410141306
```

Message6: Buoy 17804 Air Pressure sensor was recalibrated by adding +2.3 hPa. the change was implemented at 12h16 UTC the 14 October 1994. As you may notice, two proposal had been made for this buoy: NZMS proposed +2.2 hPa and Météo France proposed 2.4 hPa. The Technical Co-ordinator of the DBCP contacted both agencies and it was then decided to apply a 2.3 hPa correction.

Message7: Buoy 33809 Air Pressure sensor was recalibrated. The change was implemented at 13h06UTC the 14 October 1994. The question mark '? ' indicates that the transfer function was completely modified.

3. PGC Answer if the proposal was denied

Format:

```
123456789012345678901234 56
DENI ttt wmo## ppp ovalue
```

Meaning:
The proposal was denied by the Principal GTS Co-ordinator (PGC) of the drifting buoy programme. No action was taken. Complementary information can be included in the body text.

ttt, wmo##, ppp, ovalue: same meaning as in paragraph 1. ovalue is mandatory and used only when ttt='**REC**'.

Example :

From	Date	Subject
BLOUCH@IFREMER.FR	15-Oct-1994	DENI RMV 62501 ALL

Message8: In the body text: Data were sent on GTS before deployment by mistake. The buoy is now deployed and data look good. There is therefore no need for removing data from GTS distribution.

4. Monitoring Statistics

Format:

```
12345678901234567890123456789
STAT center ppp year mm dd
```

Meaning:
The monitoring statistics are available in the body text. Format is free for the moments but it is recommended that each center uses the same format all the time.

center: Name of the center producing the statistics, e.g.
ECMWF = European Center for Medium Range Weather Forecasts
OPC = NOAA Ocean Products Center
CMM = Météo France, Centre de Météorologie Marine
UKMO = United Kingdom Meteorological Office

ppp: Type of physical variable concerned or **ALL** if many variables are included. Same as for paragraph 1 (i.e. **AP, AT, WD, WS, SST** ...)

year: Year concerned (e.g. **1994**)

mm: Month concerned (e.g. **08** for August)

dd: Last day of the 1-month period concerned. It is optional and used only if the 1-month period does not end on the last day of the month. For example dd=**15** if the 1-month period concerned is 16 July to 15 August.

Example :

From	Date	Subject
BLOUCH@IFREMER.FR	02-Oct-1994	STAT CMM ALL 1994 09

Message9: The September 1994 monitoring statistics for many geo-physical variable and produced by the Centre de Météorologie Marine of Météo France are available in the body text.

5. WMO/Argos cross reference list

Format:

```
12345678901234
WMOS year mm
```

Meaning:
The WMO/Argos cross reference list sorted by WMO numbers is available in the body text.

year: Year concerned (e.g. **1994**)

mm: Month concerned (e.g. **08** for August)

Example :

```
From                          Date          Subject
CHARPENTIER@ATLAS.CNES.FR     02-Oct-1994   WMOS 1994 09
```

Message10: The September 1994 WMO/Argos cross reference list is available in the body text.

6. Principal GTS Coordinators (PGC) list

Format:

```
12345678901234
PGCS year mm
```

Meaning:
The list of Principal GTS Coordinators (PGC) sorted by Argos program number is available in the body text. The Principal GTS Coordinators are designated by the owners of the buoys for being responsible to request Service Argos and/or LUT operators to implement required status changes.

year: Year concerned (e.g. **1994**)

mm: Month concerned (e.g. **08** for August)

Example :

```
From                          Date          Subject
CHARPENTIER@ATLAS.CNES.FR     02-Oct-1994   PGCS 1994 09
```

Message11: The September 1994 list of Principal GTS Coordinators is available in the body text.

7. Information message

Format:

```
12345678901234567890123456789
INFO  subject...
```

Meaning:
An information message in free format is included in the body text.

subject...: Subject of the message (free format)

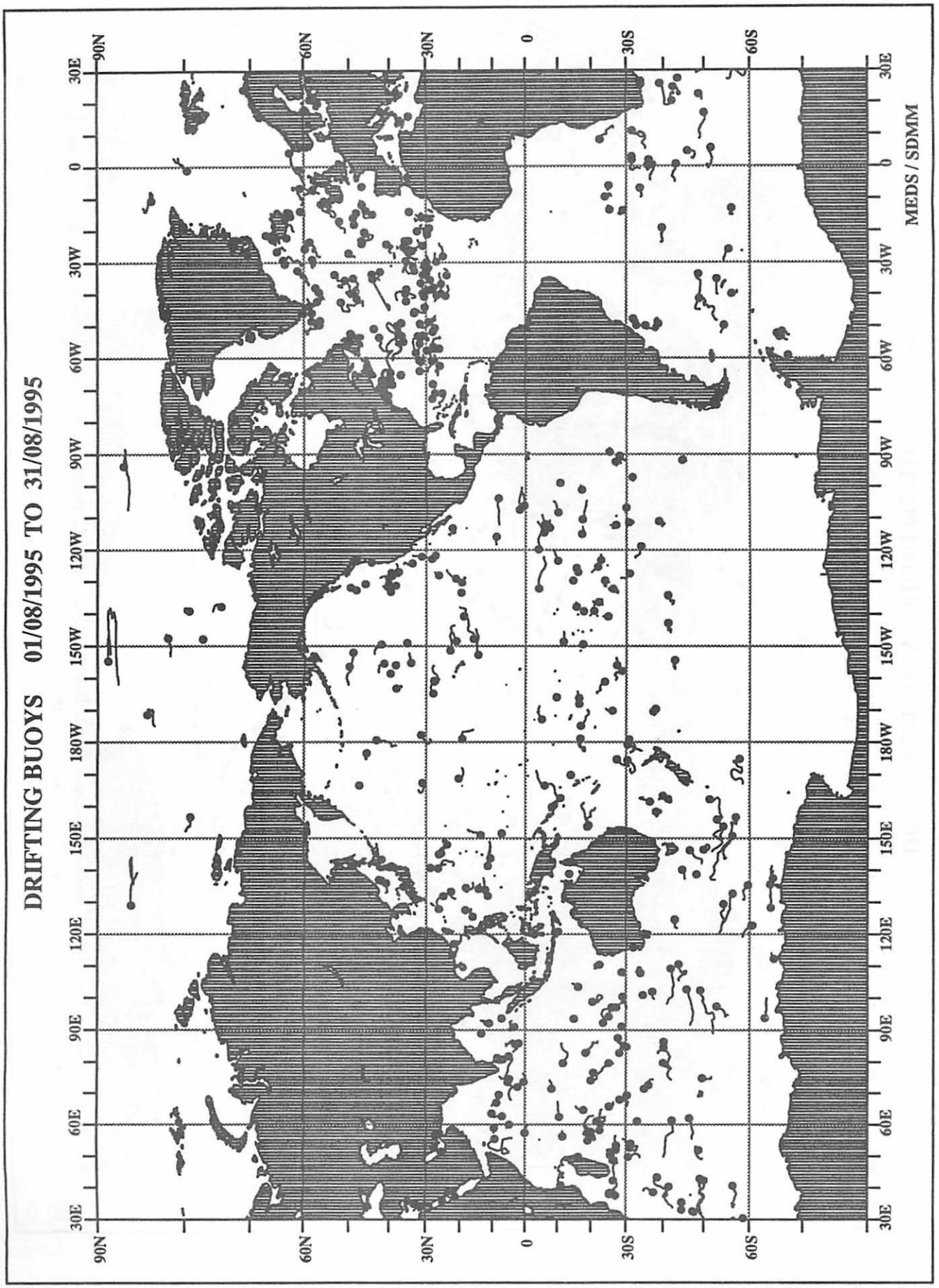
Example :

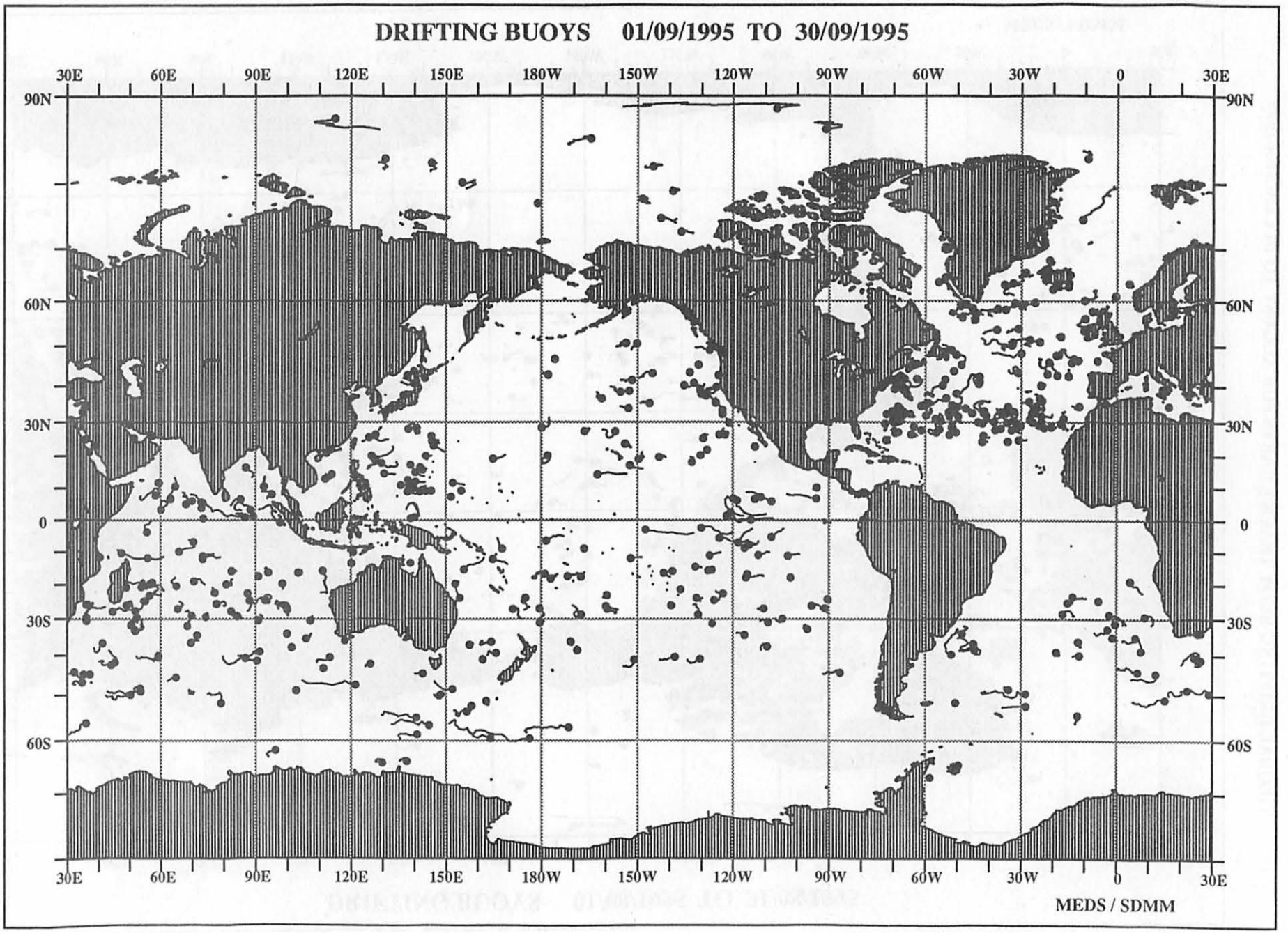
```
From                          Date         Subject
CHARPENTIER@ATLAS.CNES.FR     02-Oct-1994  INFO: New on DBCP W3 server
```

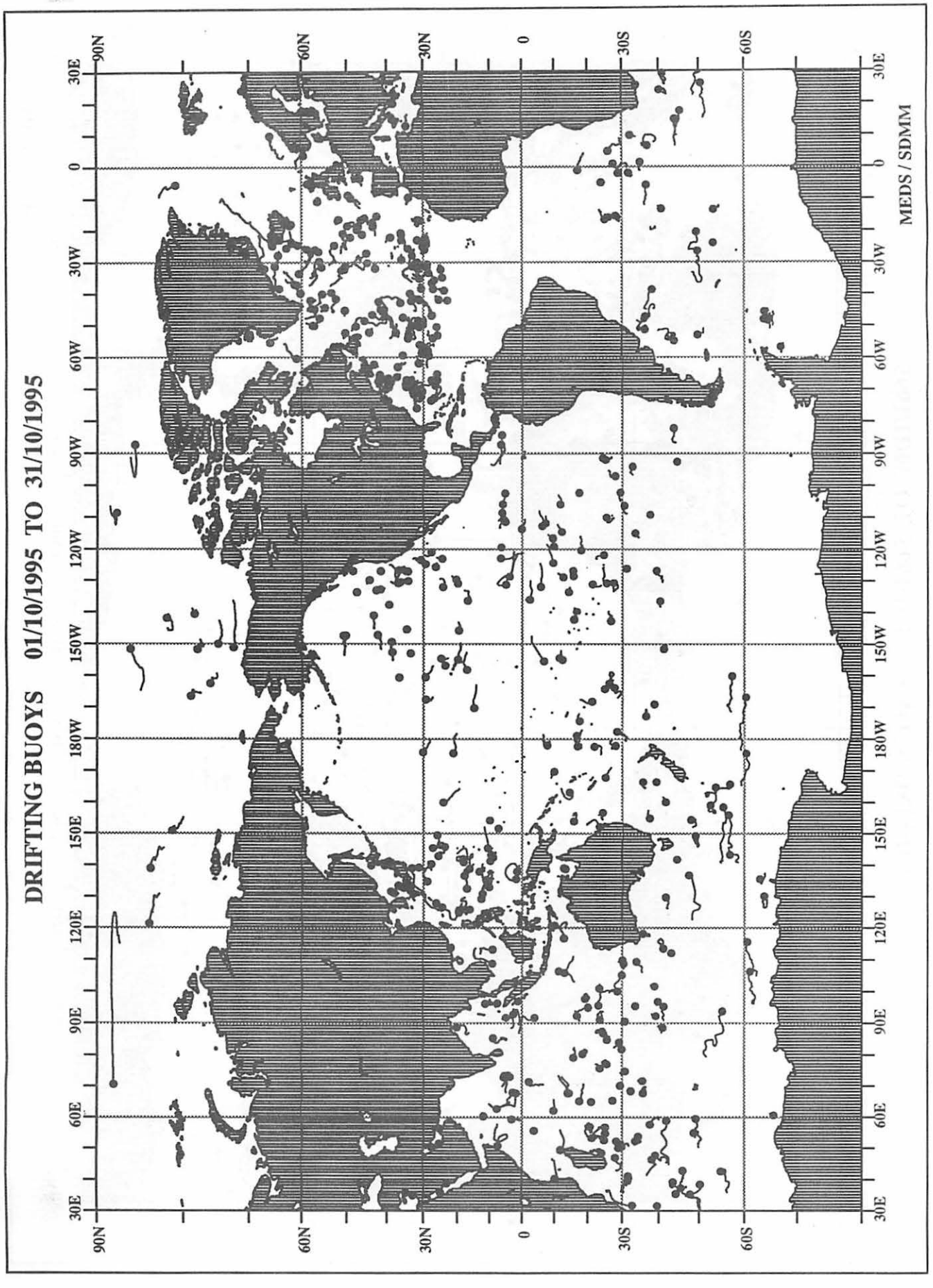
Message12: This message is to indicate that new products or information are available from the DBCP World Wide Web (W3) server. Details are given in the body text.

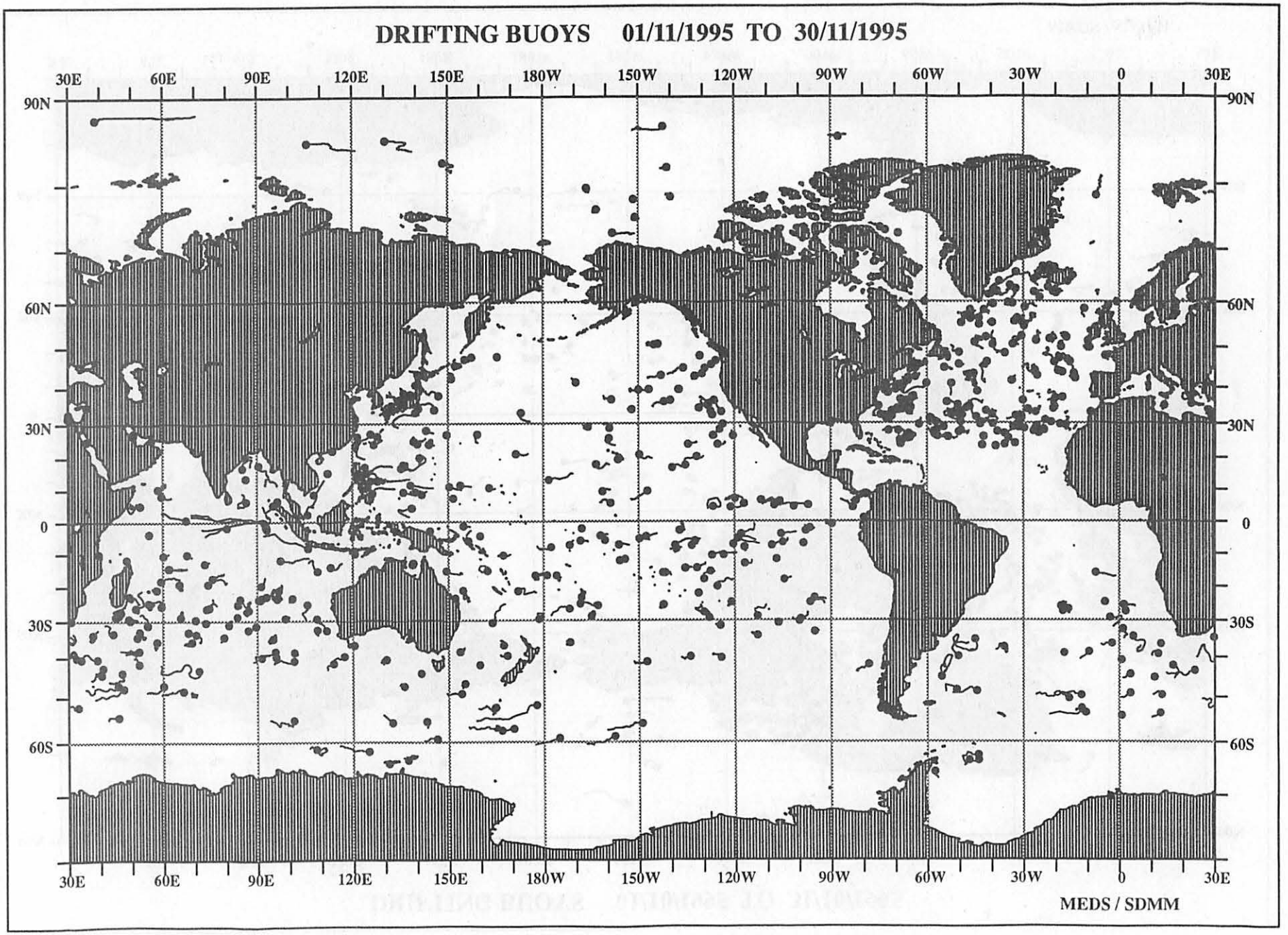
ANNEX VIII

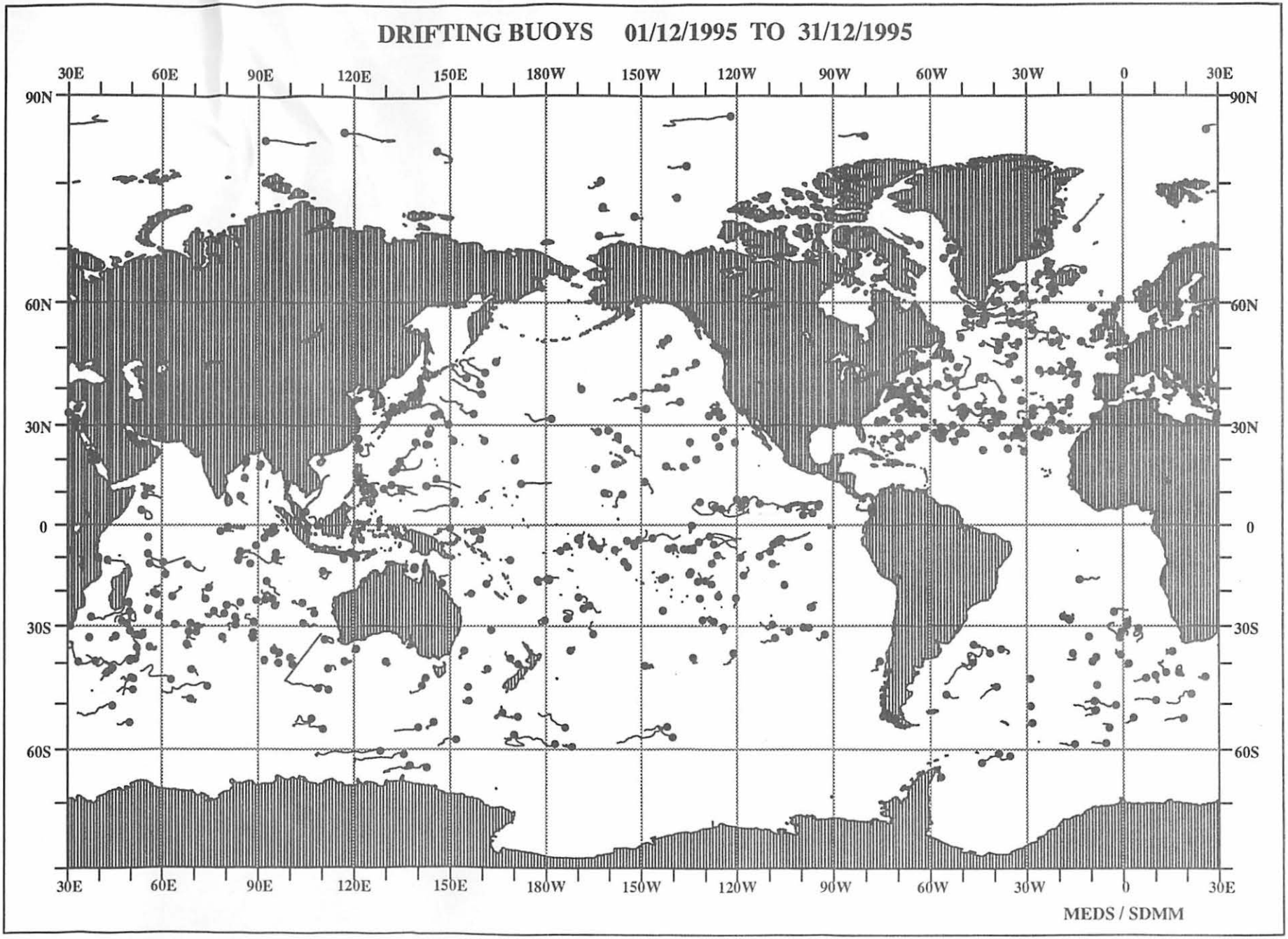
GLOBAL DRIFTING BUOY TRACK CHARTS FOR AUGUST TO DECEMBER 1995




DRIFTING BUOYS 01/09/1995 TO 30/09/1995
30E
60E
90E
120E
150E
180W
150W
120W
90W
60W
30W
0
30E
90N
60N
30N
0
30S
60S
MEDS / SDMM


DRIFTING BUOYS 01/10/1995 TO 31/10/1995
MEDS / SDMM
90N
60N
30N
0
30S
60S
30E
0
30W
60W
90W
120W
150W
180W
150E
120E
90E
60E


DRIFTING BUOYS 01/11/1995 TO 30/11/1995
30E
60E
90E
120E
150E
180W
150W
120W
90W
60W
30W
0
30E
90N
60N
30N
0
30S
60S
MEDS / SDMM


DRIFTING BUOYS 01/12/1995 TO 31/12/1995
30E
60E
90E
120E
150E
180W
150W
120W
90W
60W
30W
0
30E
90N
60N
30N
0
30S
60S
MEDS / SDMM

ANNEX IX

MANUFACTURERS OF SVP BAROMETER DRIFTER

Clearwater Instrumentation
49 Walnut Park, Building No. 2
Wellesley Hills, MA 02181
USA
Tel: (+1) 617 239 3305
Fax: (+1) 617 239 3314
Contact: Gary Williams

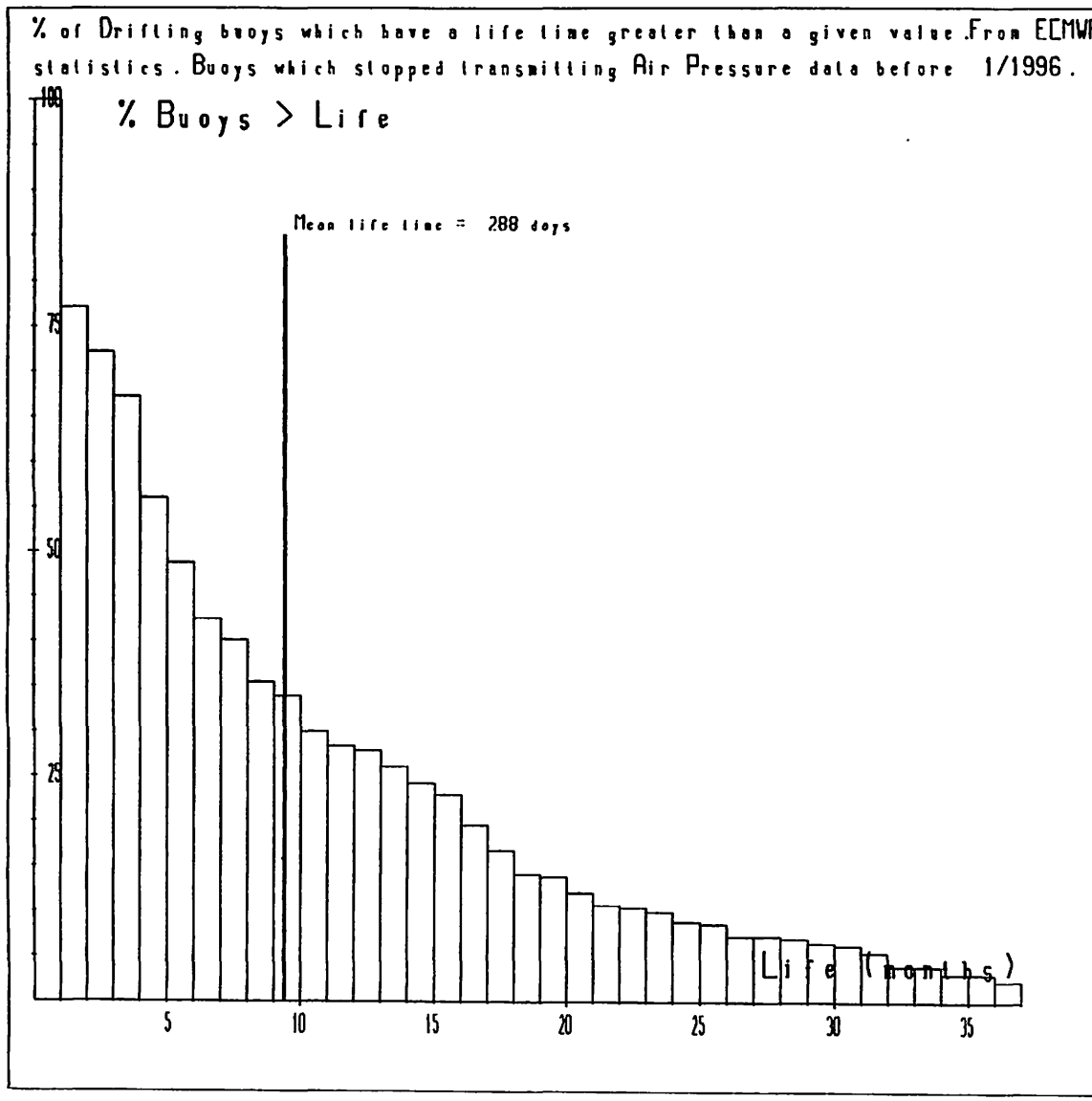
Metocean Data systems, Ltd.
PO Box 2427 D.E.P.S.
40 Fielding Avenue
Dartmouth, Nova Scotia
CANADA B2W 4A5
Tel: (+1) 902 468 2505
Fax: (+1) 902 468 4442
Contact: Mr. Bernie Petolas

Metocean Data Systems, Inc.
Building 1103, Suite 149
Stennis Space Center, Mississippi 39529
USA
Tel: (+1) 601 688 26 18
Fax: (+1) 601 688 28 39
Contact: David Rankin

Technocean Associates
4422 SE 9th Av.
Cape Coral, FL 33904
USA
Tel: (+1) 813 945 70 19
Fax: (+1) 813 574 5613
Contact: Hank White

Turo Technology Pty. Ltd.
P.O. Box 103
Sandy Bay
Tasmania 7006
AUSTRALIA
Tel: (+61) 02 369 511
Fax: (+61) 02 369 506
Contact: Alex Papij

ANNEX X


% of Drifting buoys which have a life time greater than a given value .From ECMWF statistics . Buoys which stopped transmitting Air Pressure data before 1/1996 .
% Buoys > Life
Mean life time = 288 days
100
75
50
25
5
10
15
20
25
30
35
Life (months)

ANNEX XI

GTS delays for buoy data

As requested by the International South Atlantic Buoy Program, the Technical Coordinator of the DBCP coordinated a GTS delivery time study for the period 17-23 January 95 included (i.e. transit time on the GTS). All requested centers agreed to participate and record reception time and GTS bulletin header information for all the drifting buoy GTS reports transmitted on GTS during the period (i.e. SSVX bulletins). Results of this study are detailed in paragraph 1.

In addition, another study has been conducted on delays between time of observation and distribution of the data onto the GTS. Results of this study are detailed in paragraph 2.

1) Transit time on the GTS for buoy data.

The study was conducted for the period 17-23 January 1995. The following centers participated in the study:

* UKMO, Bracknell, United Kingdom,
* SMN, Buenos Aires, Argentina,
* SAI, Landover, USA,
* BOM, Melbourne, Australia,
* MEDS, Ottawa, Canada,
* SAWB, Pretoria, South Africa,
* JMA, Tokyo, Japan,
* CLS, Toulouse, France,
* LFPW (Météo France), Toulouse, France,
* NWS, Washington DC, USA.

Some of the KWBC bulletins (bulletins generated in Landover, then forwarded towards NDBC, then Quality Controlled at NDBC, then forwarded to the NWS for insertion on GTS) have not been considered because the original KARS (SAI, Landover) bulletins could not be identified. Bulletins from Local User Terminals have not been considered because the insertion date on GTS was unknown.

Hence only the following GTS bulletin headers have been considered:

SSVX01 LFPW :	North Atlantic, Bulletins inserted from Toulouse
SSVX03 LFPW :	Southern Hemisphere, Bulletins inserted from Toulouse
SSVX04 KARS :	North Atlantic, Bulletins inserted from Landover
SSVX05 LFPW :	Northern Hemisphere, Bulletins inserted from Toulouse
SSVX06 KARS :	Northern Hemisphere, Bulletins inserted from Landover
SSVX07 LFPW :	Arctic Ocean, Bulletins inserted from Toulouse
SSVX09 LFPW :	Antarctic area, Bulletins inserted from Toulouse
SSVX10 KARS :	Southern Hemisphere, Bulletins inserted from Landover
SSVX40 KARS :	Equatorial Pacific Ocean, ATLAS moored buoys, Bulletins inserted from Landover

Results presented in annex A show that the data are received rather quickly.

Annex A graphs are summarized here in Table 1 (centers are listed from the most timely to the less timely (based on % within 5 minutes)):

Table 1: Delays by routing center and number of bulletins (17-23 Jan 95):

Received within	5 min	10 min	20 min	Total number of bulletins from Argos sources
Washington	87%	97%	98%	3228
Tokyo	83%	92%	97%	3414
Melbourne	79%	92%	98%	3479
Bracknell	79%	85%	97%	2989
Buenos Aires	77%	88%	96%	2112
Toulouse	72%	88%	98%	3266
Pretoria	60%	85%	92%	3304
Ottawa (MEDS)	43%	63%	84%	3048
Argos Centers	100%	100%	100%	3504

Although delays are quite acceptable when the bulletins get through, many reports are missing. Buenos Aires admitted that the link with Washington was shut down during a substantial period which explains why only 2112 reports have been received.

In order to estimate the percentage of bulletins missing by routing center and by type of bulletin, and to eliminate side effects, we worked on the sub-period 18-22 January 1995 included. Results are summarized in Table 2 (percentages of missing bulletins are indicated):

Table 2: Percentage of BUOY GTS bulletins missing by header and routing center.

	Center	SAWB	MEDS	BOM	LFPW	JMA	NWS	SMN	UKMO
Header	Nb bulletins transmitted								
All headers	1944	3.1%	10.8%	1.0%	0.9%	1.1%	0.2%	40.4%	13%
SSVX01 LFPW	440	3.2%	14.5%	0.9%	0.7%	1.1%	0.9%	10.5%	13.2%
SSVX03 LFPW	311	3.2%	4.2%	0.0%	0.0%	0.0%	0.0%	10.0%	9.3%
SSVX04 KARS	152	2.6%	7.9%	2.0%	0.0%	2.0%	0.0%	13.2%	18.4%
SSVX05 LFPW	66	3.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%	12.1%
SSVX06 KARS	441	2.7%	7.7%	1.8%	0.0%	1.8%	0.0%	100%	13.2%
SSVX07 LFPW	134	3.7%	1.5%	0.0%	0.0%	0.0%	0.0%	6.7%	6.0%
SSVX09 LFPW	244	4.1%	5.7%	0.4%	0.0%	0.4%	0.0%	11.5%	10.2%
SSVX10 KARS	14	0.0%	0.0%	0.0%	100%	0.0%	0.0%	0.0%	100%
SSVX40 KARS	142	2.8%	50%	2.8%	0.0%	2.8%	0.0%	100%	17.6%

From the figures in Table 2, it appears that:

-1- Bulletins generated from Service Argos in Toulouse and inserted on GTS from Météo France in Toulouse are well distributed towards LFPW, UKMO, NWS, JMA, and BOM. A few bulletins (0.7%) are missing at source (LFPW). Although UKMO figures tend to show that about 10% are missing, they cannot be missing because the bulletins have been received at NWS (link is LFPW => UKMO => NWS). Hence files submitted by UKMO to the TC DBCP are not representative of what was actually received in Bracknell.

-2- Bulletins generated from Service Argos in Landover and inserted on GTS from the National Weather Service in Washington are well distributed towards LFPW, UKMO, except SSVX10 bulletins which are missing entirely. Some bulletins are missing in Tokyo (1 to 2%). Consequently these missing bulletins are missing in Melbourne.

-3- Because the number of bulletins missing in Tokyo and Melbourne are very close, the link Tokyo => Melbourne is very efficient.

-4- About 1 to 2% of the bulletins are lost in link Washington => Tokyo.

-5- The link Washington => Buenos Aires has not been working correctly during the period.

-6- A substantial number of bulletins are lost in the link Washington => Ottawa => MEDS.

-7- About 3% of the bulletins are lost in the link Washington => Pretoria.

2) Delays between time of observation and insertion on GTS.

Before the data are inserted on GTS, delays after the actual time of measurement of the data can be expressed as the sum of :

-1- On board data processing delays. For example if a buoy memorizes measured data and transmits back hour data at the time the Argos message is transmitted towards the satellite, then such data are already old at the time of transmission. This is the case for SVP Barometer Drifters which keep in memory and transmit the last 24 hours of data. Hence at the time of the transmission, some of the data are already up to 24 hours old.

-2- Orbital delays and Argos acquisition delays. If the satellite sees a buoy and a receiving station at the same time (e.g. LUT) orbital delays are null (i.e. regional data). Data from the Argos global system include orbital delays because the satellite records the data before being able to download them towards a global receiving station (Lannion, Wallops Island, Fairbanks). Delays are also added for data processing and transmission of the raw data sets from the ground stations towards the Argos Global Processing Centers (acquisition delays).

-3 Argos location and data processing delays (Argos system at the Argos Global data Processing Centers). Once received at an Argos Global Center, the Argos System must compute the locations and do some pre-processing before the GTS sub-system can handle them.

-4- GTS data processing and encoding delays (Argos GTS sub system). Based on the raw data and the Argos locations the GTS sub-system must convert the data into physical units, sort the observations out, do some Quality Control checks, and encode the data according to WMO regulations.

For the period 21 and 22 May 1995, and for data processed in Toulouse only, we estimated the above delays. The summation of all these delays is equivalent to the time of GTS dissemination minus time of observation.

Results are presented in annex B and annex C. They show that :

13% of the data are disseminated on GTS within 1 hour after the observation time,
46% within 2 hours,
59% within 3 hours,
71% within 4 hours,
85% within 5 hours,
100% within 30 hours.

Conclusion

-1- GTS data processing delays are always very small (GTS sub system).

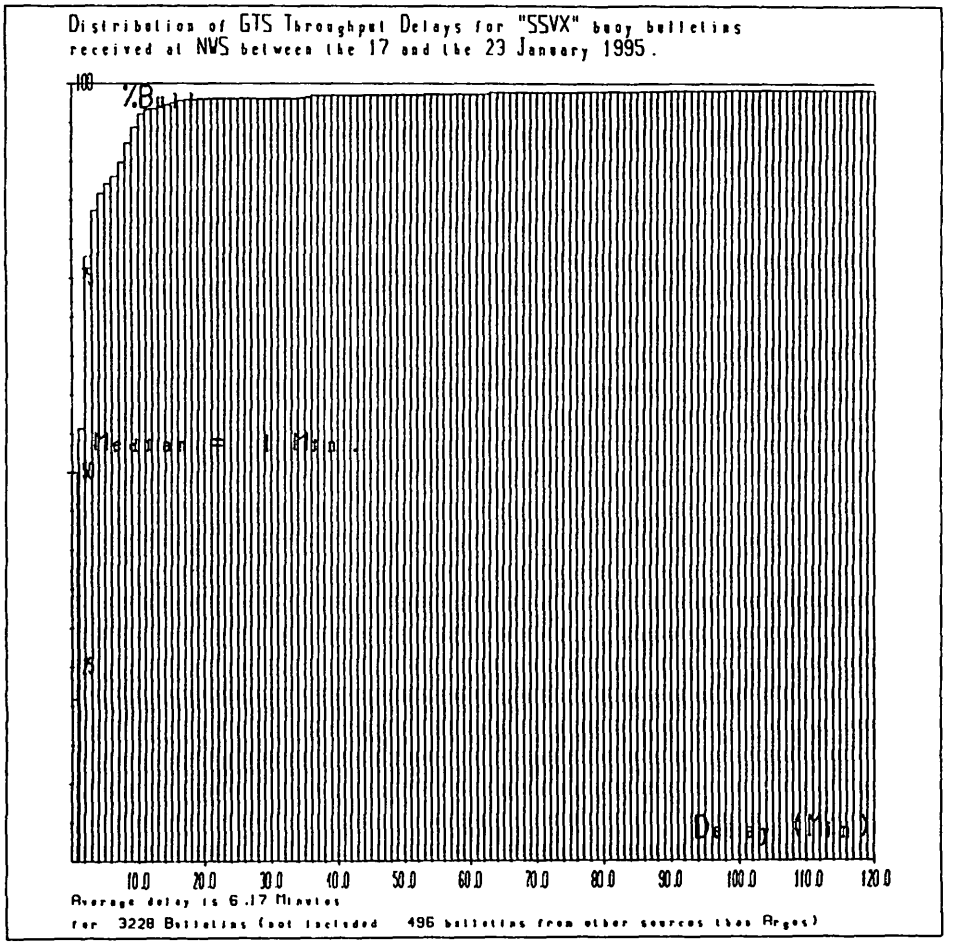
-2- For data received within 1 hour, most of the delays are due to orbital delays, Argos acquisition delays, and Argos data processing delays.

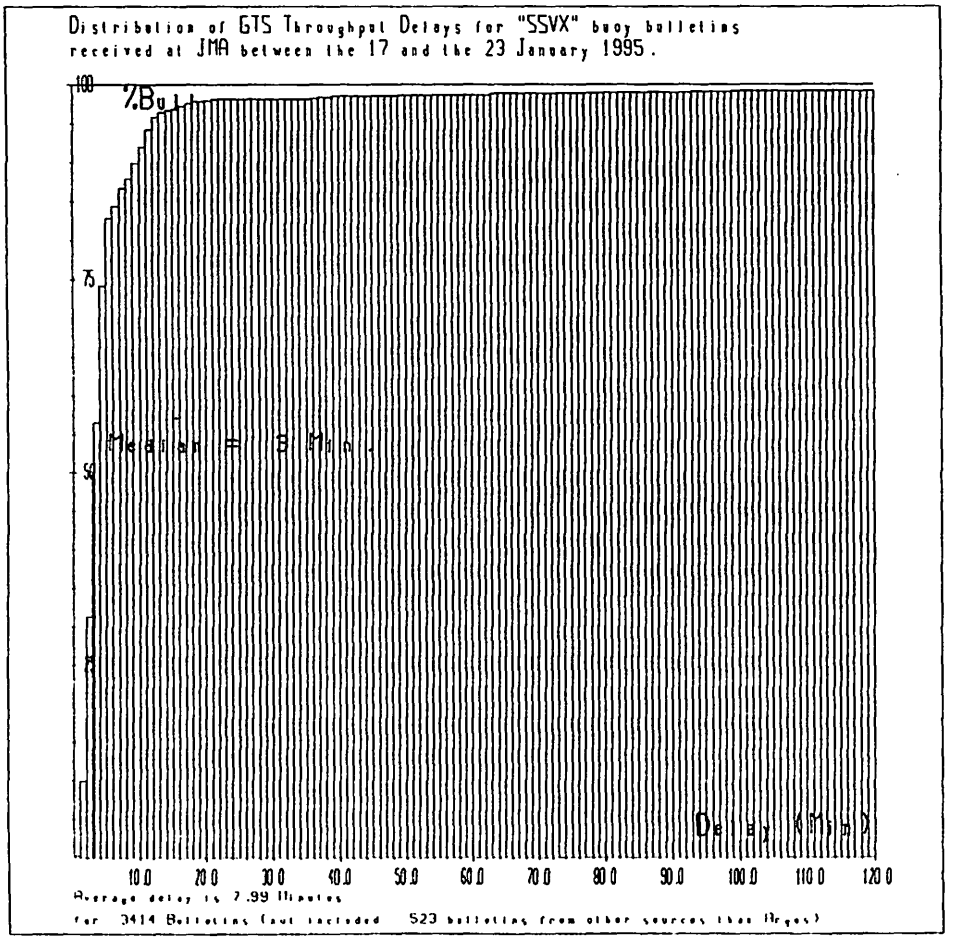
-3- For data received after 1 hour and within 4 hours, most of the delays are due to orbital delays, and Argos acquisition delays.

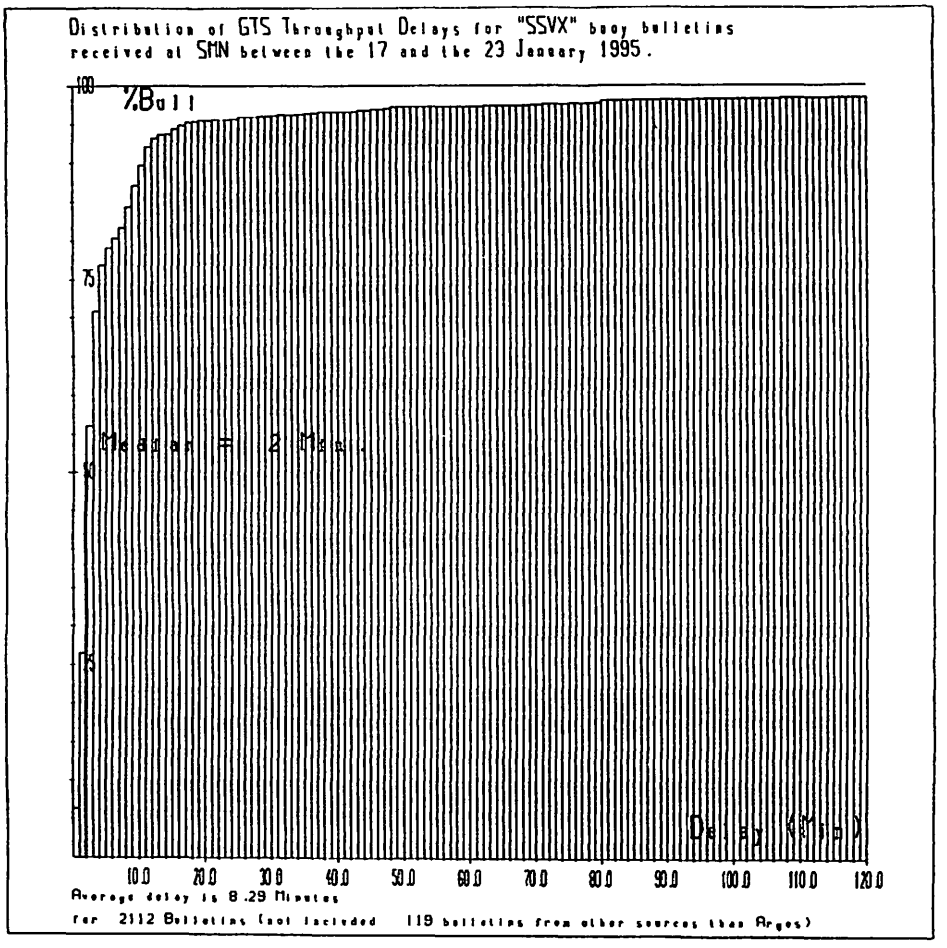
-4- For data received after 4 hours and within 10 hours, most of the delays are due to on-board delays, orbital delays, and Argos acquisition delays.

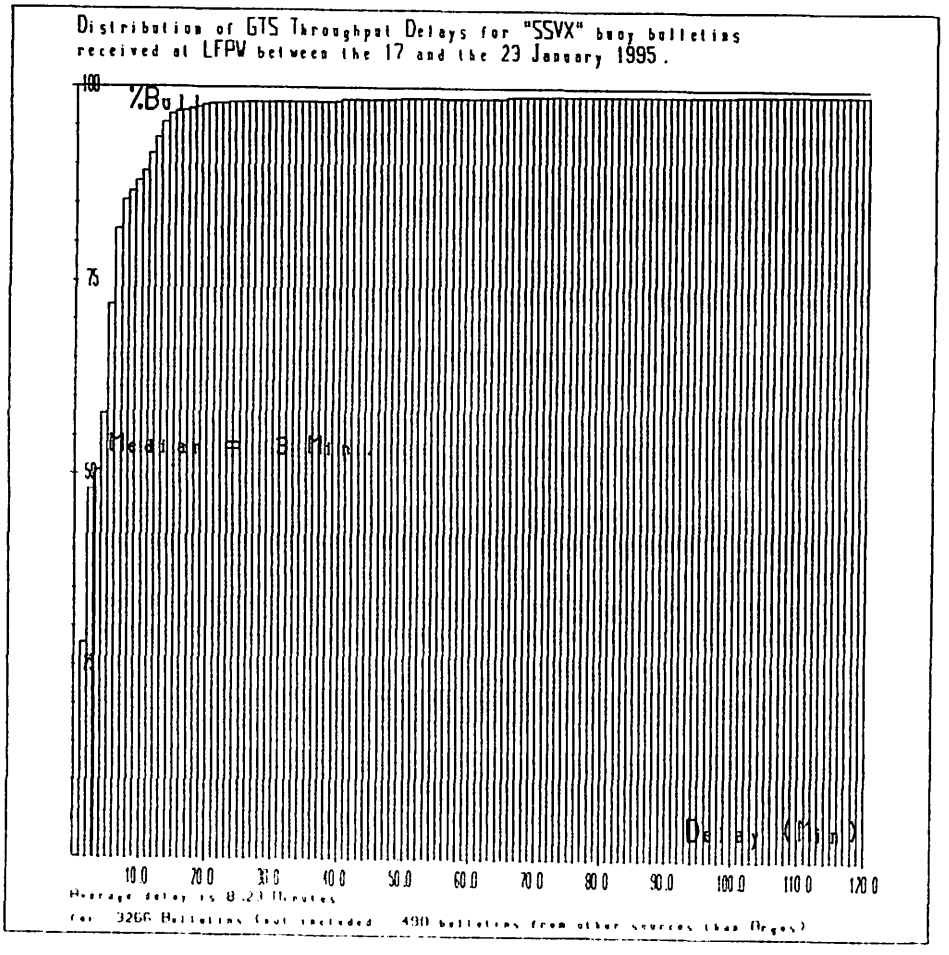
-5- For data received after 10 hours, most of the delays are due to on-board delays (back hour data).

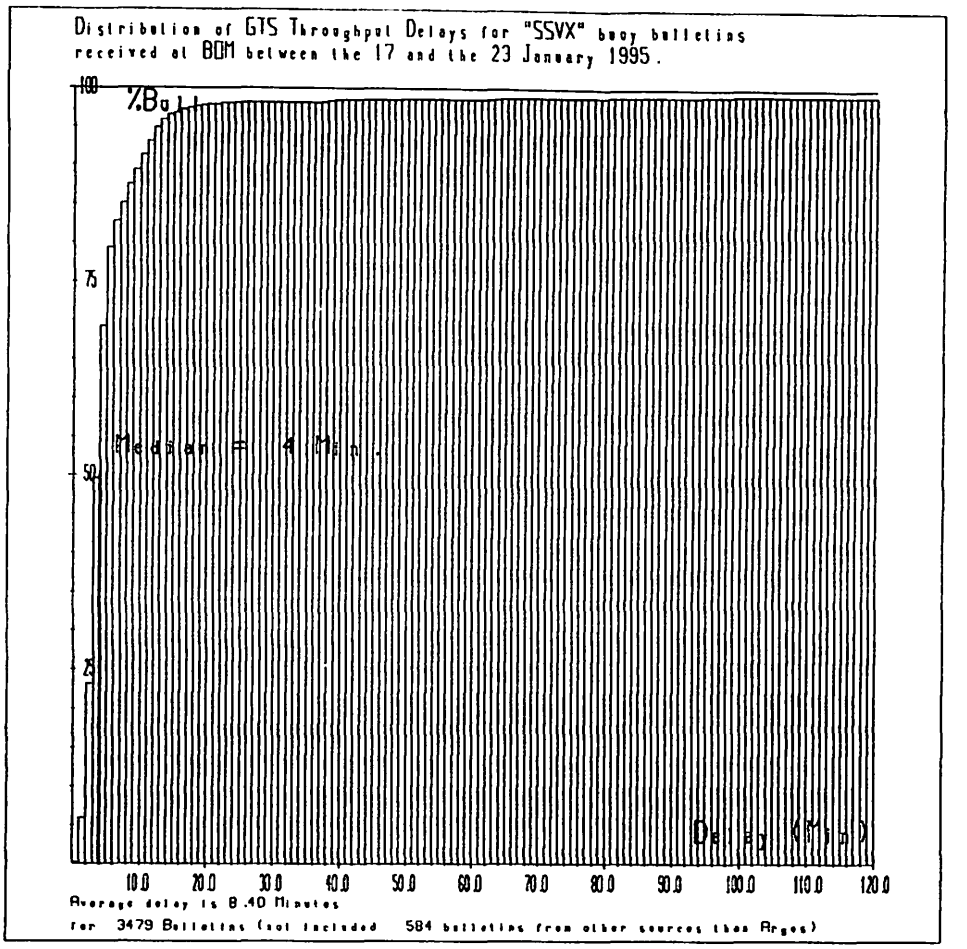
Annex A : Transit delays on GTS by center

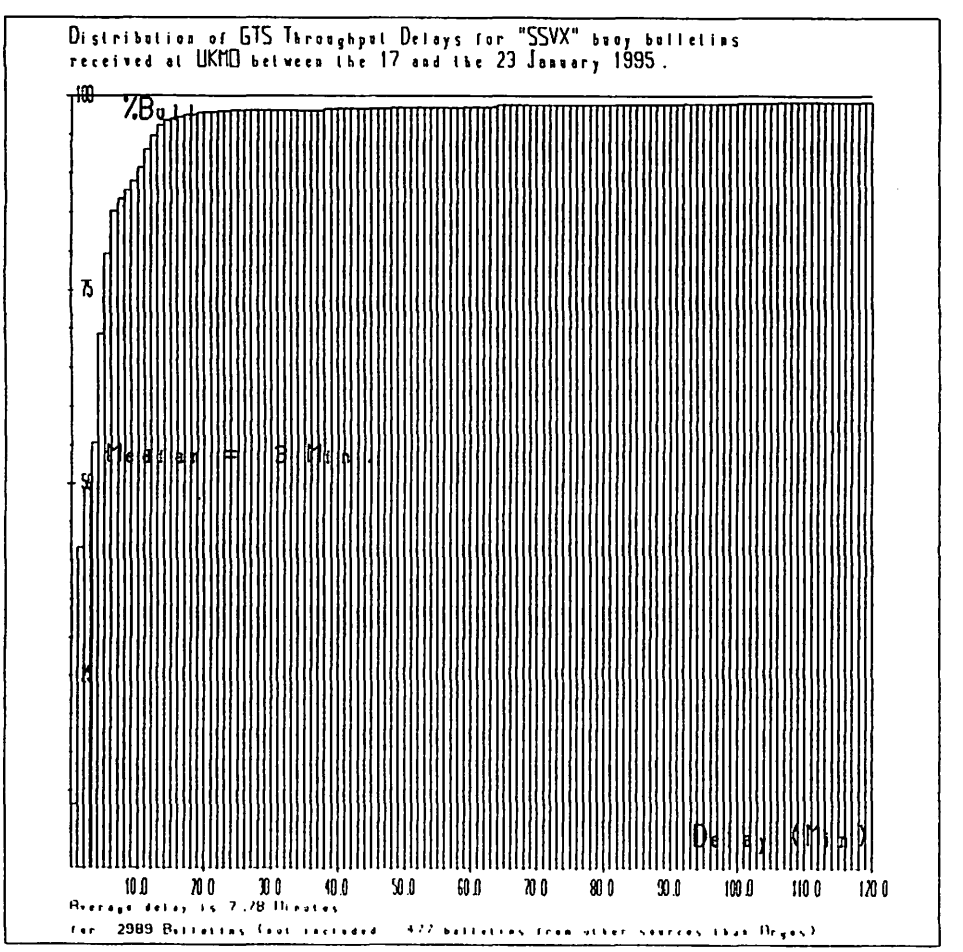


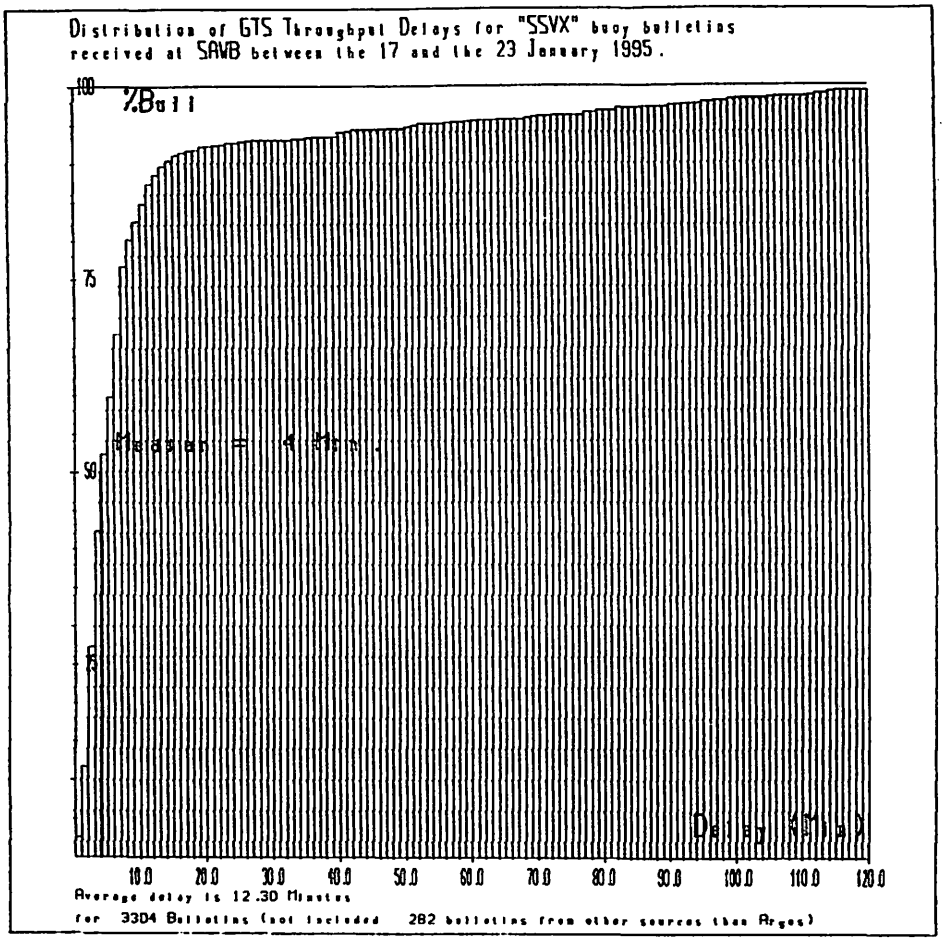


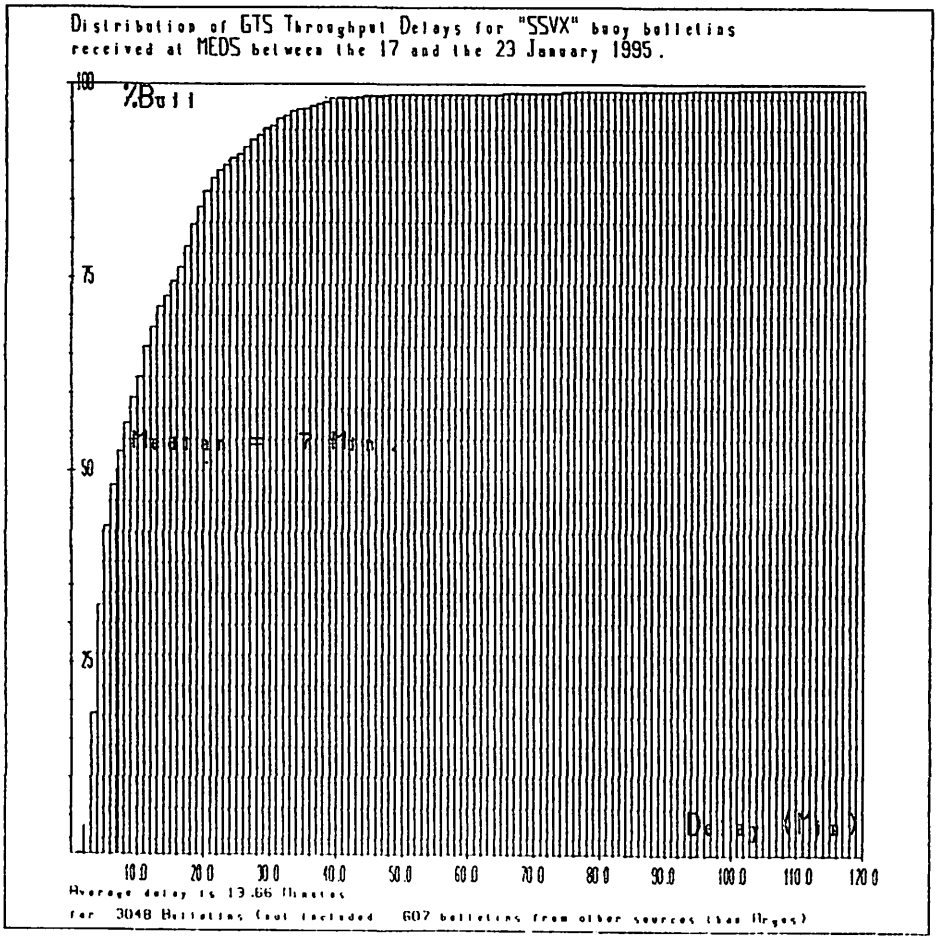

Distribution of GTS Throughput Delays for "SSVX" buoy bulletins
received at SMN between the 17 and the 23 January 1995.
%Bull
100
75
50
25
Median = 2 Min.
Delay (Min)
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
Average delay is 8.29 Minutes
for 2112 Bulletins (not included 119 bulletins from other sources than Argos)


Distribution of GTS Throughput Delays for "SSVX" buoy bulletins
received at LFPW between the 17 and the 23 January 1995.
%Bull
100
75
50
25
Median = 3 Min.
Delay (Min)
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
Average delay is 8.23 Minutes
for 3266 Bulletins (not included 490 bulletins from other sources than Argos)


Distribution of GTS Throughput Delays for "SSVX" buoy bulletins
received at BOM between the 17 and the 23 January 1995.
%Bull
100
75
50
25
Median = 4 Min.
Delay (Min)
10.0 20.0 30.0 40.0 50.0 60.0 70.0 80.0 90.0 100.0 110.0 120.0
Average delay is 8.40 Minutes
for 3479 Bulletins (not included 584 bulletins from other sources than Argos)


Distribution of GTS Throughput Delays for "SSVX" buoy bulletins
received at UKMO between the 17 and the 23 January 1995.
%Bull
100
75
50
25
Median = 0 Min.
Delay (Min)
10.0 20.0 30.0 40.0 50.0 60.0 70.0 80.0 90.0 100.0 110.0 120.0
Average delay is 7.78 Minutes
for 2989 Bulletins (not included 422 bulletins from other sources than Argos)

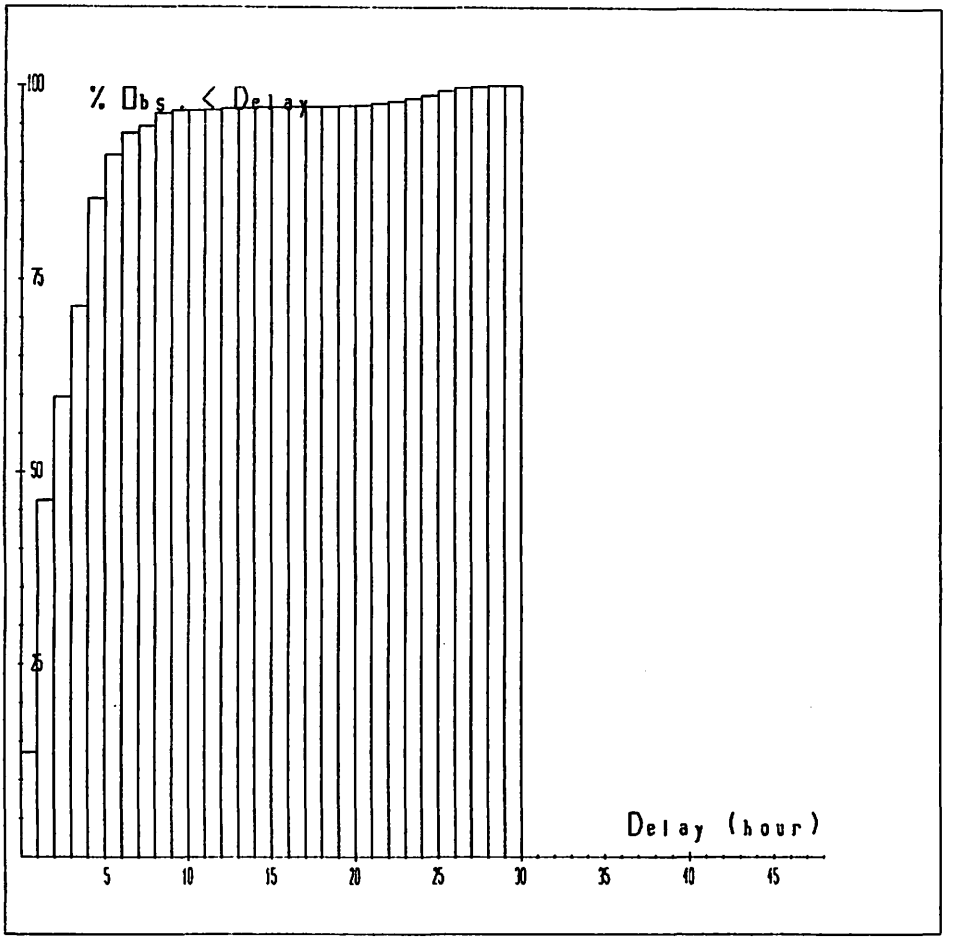

Distribution of GTS Throughput Delays for "SSVX" buoy bulletins
received at SAVB between the 17 and the 23 January 1995.
%Bull
100
75
50
25
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
Average delay is 12.30 Minutes
for 3304 Bulletins (not included 282 bulletins from other sources than Argos)


Distribution of GTS Throughput Delays for "SSVX" buoy bulletins
received at MEDS between the 17 and the 23 January 1995.
%Bull
100
75
50
25
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
Average delay is 13.66 Minutes
for 3048 Bulletins (not included 607 bulletins from other sources than Argos)

Annex B : Delays before insertion on GTS

Data processed in Toulouse during the period 21 and 22 May 1995.

Total of On-board, orbital, Argos acquisition, Argos data processing, and GTS data processing delays (i.e. Insertion time - Observation time).



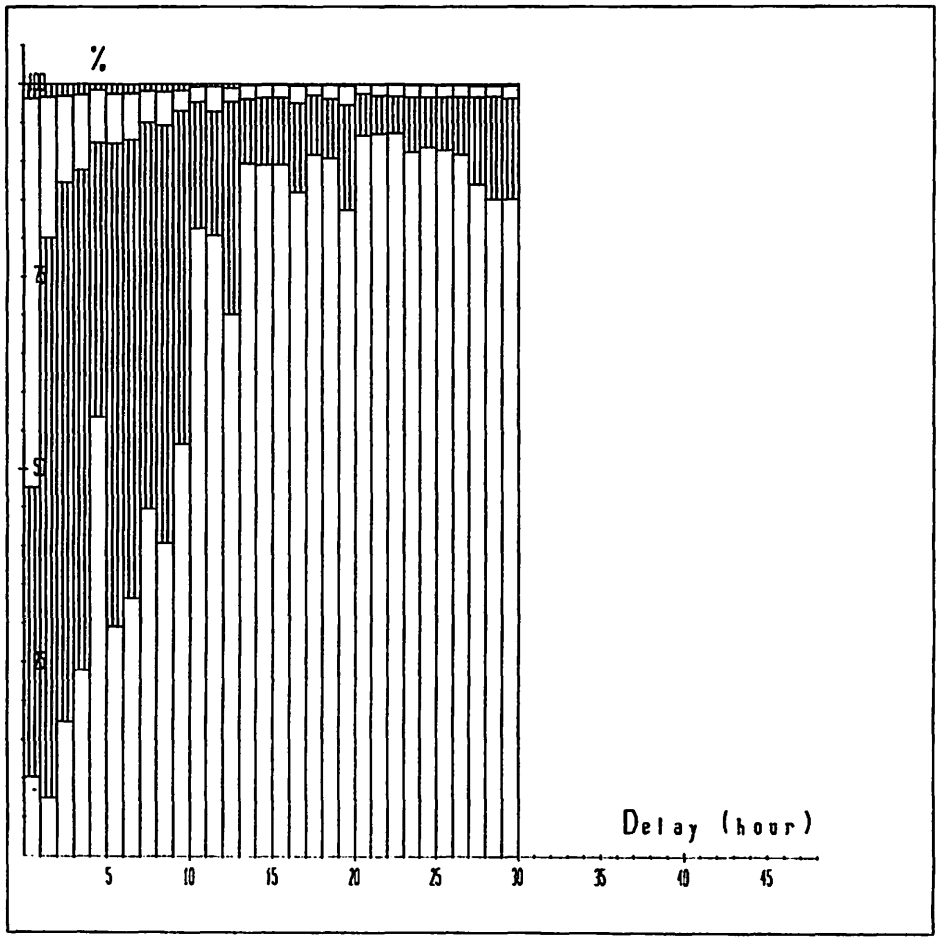
Annex C : Breakdown of delays before insertion on GTS

Data processed in Toulouse during the period 21 and 22 May 1995.

For each delay period of one hour, delays are broken down in

-1- Top : GTS data processing delays
-2- Below : Argos data processing delays
-3- Below : Orbital and Argos Acquisition delays
-4- Bottom : Onboard data processing delays

The sum of these delays makes 100% : they explain 100% of the delay period.



ANNEX XII

NATIONAL FOCAL POINTS FOR THE DATA BUOY CO-OPERATION PANEL

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ANNEX XIII

FINANCIAL STATEMENTS PROVIDED BY WMO AND IOC

World Meteorological Organization

Data Buoy Co-operation Panel
Account as at 31 December 1995

	US$	US$
Balance from 1993		30,580
Contributions Paid for Current Biennium	272,483	
less: Received in 1993	22,650	249,833
Total Funds Available		280,413
Obligations Incurred		
Technical Co-ordinator	226,148	
Prep Meeting South Atlantic Buoy System	4,750	
First planning meeting Baltic observing system	1,094	
Experts	0	
Chairman's travel	18,040	
Reports	9,032	
Administration direct	0	
		259,064
Balance of Fund	US $	21,349
Represented by.		
Cash at Bank		21,799
Unliquidated obligations		450
	US $	21,349

Contributions	Received In 1993	Received 1994/95		
	1994	1994	1995	US $ Total
Australia		12,500	12,500	25,000
Canada	18,000		15,000	33,000
France			29,494	29,494
Greece		4,200	2,100	6,300
Iceland	1,500		1,500	3,000
Ireland		1,409	1,480	2,889
Netherlands	1,575	1,575		3,150
New Zealand			500	500
Norway	1,575		1,575	3,150
UK		15,000	15,000	30,000
USA		68,000	68,000	136,000
TOTAL	22,650	102,684	147,149	272,483

Financial Statement by IOC for the year 1 June 1994 to 31 May 1995

(all amounts in US $ unless otherwise specified)

BALANCE (from previous year)			**$ 20 419**
FUNDS TRANSFERRED FROM WMO (relevant to the period)			
90 000	(27.04.94)		
15 000	(15.09.94)		**$ 105 000**
FF 77 000	(03.03.95)		**FF 77 000**
EXPENDITURES			
Technical Co-ordinator's employment:			
- Salary:		62 575	
- Allowances:		17 276	
- Relocation (yearly provision):		3 260	**$ 83 111**
Technical Co-ordinator's missions:			
- Copenhagen/Kiel/Hamburg/Helsinki (14-24 June 1994):		4 186	
- Buenos Aires/Wellington/Melbourne/Hobart (3-13 October 1994):		7 765	
- La Jolla (1-9 November 1994):		1 272	
- Silver Spring (4-12 February 1995):		2 807	
- Bergen (27-28 February 1995):		2 460	
- Reading (27-29 March 1995) *[funded by COSNA]*		-	
- Landover (4-6 April 1995):		2 840	
- New Orleans (9-11 May 1995):		2 424	**$ 23 754**
Contract with CLS/Service Argos:			**FF 77 000**
BALANCE (at 1 June 1995)			**$ 18 554**