INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
(of UNESCO)

WORLD METEOROLOGICAL ORGANIZATION

DATA BUOY CO-OPERATION PANEL

Tenth session

(La Jolla, 1 to 4 November 1994)

FINAL REPORT

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GENERAL SUMMARY OF THE WORK OF THE SESSION

1. ORGANIZATION OF THE SESSION (agenda item 1)

1.1 Opening of the session (agenda item 1.1)

1.1.1 The tenth session of the Data Buoy Co-operation Panel (DBCP) was opened by the chairman of the panel, Mr D. Painting, at 10.00 a.m. on Tuesday 1 November 1994 in the conference room of the NOAA South-West Fisheries Science Center, La Jolla, California, USA. After welcoming participants, Mr Painting introduced the Deputy Director of the Center, Dr. R. Neal.

1.1.2 Dr. Neal welcomed all participants in the session to La Jolla and to the center. He noted that although the center was not directly represented at the meeting, it was nevertheless an active user of drifting buoy data, and therefore very appreciative of the work of the panel in support of all buoy data users. He concluded by assuring the panel of the full support of the center and its staff for the meeting, and wished all participants a very profitable and enjoyable stay in La Jolla.

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

1.2 Adoption of the agenda (agenda item 1.2)

1.2.1 The panel adopted unchanged the provisional agenda. This final session agenda is given in Annex II. It was noted that a half-day joint session of the panel and the WOCE/TOGA Surface Velocity Programme would take place on Thursday morning 3 November 1994, the agenda for which is given in Annex III. The panel agreed that the results of this joint session should be recorded in the final meeting report under agenda items 4.1 and 6.4, as appropriate.

1.3 Working arrangements (agenda item 1.3)

1.3.1 Under this agenda item the panel decided on its hours of work and other relevant arrangements for the session. The list of documents for the session was introduced by the Secretariats.

2. REPORTS (agenda item 2)

2.1 Report by the chairman of the Data Buoy Co-operation Panel (agenda item 2.1)

2.1.1 The chairman reported that good progress was made in the planned activities of the panel for the past year, especially through the efforts of the technical co-ordinator and the Secretariats of WMO and IOC.

2.1.2 Two new buoy programmes were implemented during the intersessional period, both of which were expected to be approved as 'action groups' of the panel at the tenth session. The programmes were:

(a) The International Programme for Antarctic Buoys (IPAB);

(b) The International South Atlantic Buoy Programme (ISABP).

2.1.3 The chairman had personally represented the panel in both planning meetings and the inaugural meeting of the ISABP (Buenos Aires, December 1993 and October 1994) and participated in a Workshop on a System of Meteorological and Oceanographic Buoys in the Baltic Sea (June 1994,

Stockholm). In addition the chairman reported on the work of the panel to the meeting of the Co-ordinating Group of the COSNA (CGC) in Geneva (August 1994).

2.1.4 As well as the successes in establishing operational programmes reported above, the chairman regretted that little progress had been possible with the proposed Indian Ocean project owing to organizational difficulties and changed funding priorities; however the chairman stressed that the establishment of a viable programme for this important data- sparse area remained a significant goal for the panel in the future.

2.1.5 With regard to other aspects of the future work of the panel, the chairman noted that new technology in data communications and instrumentation would give panel members new challenges and opportunities to improve their programmes at reduced cost. The panel was therefore urged to ensure that its future programme reflected these new prospects, to the benefit of the meteorological and oceanographic agencies and to the community at large.

2.1.6 The panel expressed its appreciation to the chairman for his report, and for his actions on behalf of the panel. Discussion on issues raised is recorded under relevant agenda items.

2.2 Report by the technical co-ordinator (agenda item 2.2)

2.2.1 The technical co-ordinator presented his activities during the last intersessional period. He was employed by UNESCO and based in Toulouse, France. Compared to the previous intersessional period, he indicated that he had spent substantially less time working on the new GTS sub-system and that he had used the extra time for monitoring, user assistance and quality control activities, working therefore closer to the users. During this past period he had attended DBCP action group meetings, such as EGOS and IABP, and also the first and second preparatory meetings for an International South Atlantic Buoy Programme and the first meeting of the International Programme for Antarctic Buoys. He had also visited a few institutions or agencies in Germany and the USA. As usual, he had routinely monitored the DBCP quality control bulletin board and forwarded any proposal for buoy status change to the owners of the buoys.

2.2.2 As far as GTS distribution of the data was concerned, for many drifting buoy programmes the technical co-ordinator studied the Argos message formats in detail and made sure that the GTS distribution could be realized. He also presented the new data availability index maps (GTS), produced on a monthly basis by Meteo-France, as a function of geophysical variables. He stressed that these maps could be useful to identify data-sparse areas and help define deployment strategies. Partly due to the DBCP activities since its creation, it was shown that the quantity and quality of air pressure data distributed on the GTS increased substantially (see figures 6 and 7 of Annex IV). In September 1994 1246 drifting buoys were reporting via Argos, 47% of which were distributed on the GTS. The technical co-ordinator also wrote software for the GTS sub-system including the new **BUOY code** which was implemented on 2 November 1994.

2.2.3 Regarding the low cost barometer drifter development programme, the technical co-ordinator continued liaising with the Global Drifter Center at Scripps Institution of Oceanography, principal investigators involved in the field tests, and wrote an article on the subject for inclusion in the 1993 DBCP Annual Report. He spent some time on specific studies for the DBCP action groups (e.g. possible implementation of a LUT in the South Atlantic region).

2.2.4 The technical co-ordinator assisted in updating the *WMO Guide to data collection and location services using Service Argos*. A draft version was available at the panel session for review and possible amendments. Finally the technical co-ordinator informed the panel that he was approached by the Ukrainian Academy of Sciences regarding possible co-operation with the DBCP or panel members. The

Academy had experience in instrumentation and had the capability of manufacturing Lagrangian drifters. The DBCP recognized the importance of such opportunities of co-operation with the eastern European countries and encouraged panel members to contact the Academy with a view to establishing bi-lateral co-operation.

2.2.5 The full report of the technical co-ordinator is given in Annex IV. The panel expressed its appreciation to the technical co-ordinator for his substantial achievements on behalf of the panel. Discussion on various issues raised is recorded under later agenda items.

2.3 Report by the Secretariats (agenda item 2.3)

2.3.1 The representative of the WMO Secretariat reported to the session that the major activity of the WMO Secretariat during the past year in support of the panel had continued to be concerned with the management of the panel's funds and related administrative support. Details of this are discussed under agenda item 3. In addition, the WMO Secretariat had also undertaken a variety of other administrative and technical tasks in support of the work of the panel, or of data buoy programmes generally. In particular, the report of the DBCP had been submitted to the forty-sixth session of the WMO Executive Council, which had expressed its continuing high appreciation for the work of the panel, and also urged as many WMO Members as possible to support the DBCP, both financially and in other ways. In addition, WMO Secretariat activities during the past year included maintenance of various lists (buoy identifier numbers, national focal points, logistic support focal points); support for the formation of the ISABP; liaison with other organizations and bodies (especially WCRP, GCOS and SCOR); preparation of material for the WWW monthly newsletter, WMO Bulletin, etc; liaison with CBS on code matters.

2.3.2 The representative of the IOC Secretariat reported that the IOC Assembly, at its seventeenth session (March 1993), had decided that "*the agenda of the Executive Council [of IOC] should be restricted primarily to those issues concerning the programme implementation of the Commission requiring decisions or management actions.*" For that reason, there had been no agenda item devoted to the panel during the twenty-seventh session of the IOC Executive Council (Paris, July 1994). One of the key activities of the IOC Secretariat relating to the DBCP lay with the management of the employment and missions of the technical co-ordinator of the panel, recruited since June 1993 as a "*UNESCO funds-in-trust expert*" (see agenda item 3). No new progress was reported with regard to the study of the legal aspects of ODAS.

2.4 Reports by the action groups of the panel (agenda item 2.4)

International Arctic Buoy Programme (IABP)

2.4.1 No formal report from the IABP was available at the meeting. It was noted, however, that the IABP had continued to operate satisfactorily during the past year; that close to be desired buoy network was being maintained in the Arctic Ocean; that the fourth annual meeting of the IABP had taken place in Helsinki in June 1994; and that the IABP had prepared and published a small brochure, which gave an excellent description of the programme as well as a current status report. The panel requested the chairman and Secretariats to ensure that a brief report on the IABP was available for inclusion in the DBCP 1994 Annual Report.

European Group on Ocean Stations (EGOS)

2.4.2 The Icelandic delegate, Mr F. Sigurdsson, vice-chairman of EGOS, gave an oral report on its activities and on the status of drifting and moored buoys in the EGOS area of concern during the past year. Full details were included in the written report on EGOS, available in the session documentation, and a brief summary status report would be included, as usual, in the DBCP Annual Report for 1994. In

summary, Mr Sigurdsson noted that the operational status of the EGOS programme had remained relatively stable over the past two years, and that plans were to at least maintain this level of activity in future years. This status involved some 15-20 drifting buoys and seven moored buoys in operation at any one time. In addition to EGOS, there were also other contributors to drifting buoys in the North Atlantic, with EGOS providing 55-60% of the total, France 25-30% and other operators 10-15%. The quality of EGOS buoy data remained high, and the maintenance of three LUTs important for EGOS operations. He then reported on some tests undertaken with buoy air temperature measurements, which indicated a bias in these measurements which varied from 2-4° C in strong sunlight, to zero at night. Further tests would be undertaken to assess if this bias could be reduced through improved radiation shielding of the thermometer. The panel further noted in this regard that the IABP was undertaking a similar experiment in the Arctic, to assess the possibilities for new designs for air temperature measurement. The panel requested that the results of the EGOS tests should be made available to the IABP. Finally, the panel was pleased to note that the LUTs located in Oslo and Sondre Stromfjord were likely to continue in operation for the foreseeable future.

3. FINANCIAL AND ADMINISTRATIVE MATTERS (agenda item 3)

3.1 Financial situation (agenda item 3.1)

3.1.1 The panel considered the financial statements provided by WMO and IOC as follows:

(a) Finalized WMO account 1992-1993;

(b) Finalized IOC account June 1993 - May 1994;

(c) Interim WMO account to 30 September 1994;

(d) Provisional WMO statement of estimated income and expenditure to 31 May 1995.

These statements are reproduced in Annex V.

3.1.2 The panel noted the proposal of the Secretariats that the cost of the panel's publications (e.g. Annual Report, Guide to the GTS processing sub-system, Guide to data collection and location services using Service Argos) should henceforth be covered from the panel's own funds, rather than the Secretariats' regular budgets, as in the past. It approved this proposal on the basis that a special DBCP cover (including the DBCP logo) should be used for the publications, which should in future form part of a special DBCP publication series. The chairman was requested to assist the Secretariats in the design of a suitable series cover.

3.1.3 The panel accepted and approved the various statements, noting that an operating surplus of US$9650.- for the year 1994-1995 was expected, and that this should be transferred to the 1995-1996 budget, as in the past.

3.2 Review of contracts (agenda item 3.2)

3.2.1 The panel reviewed and approved the terms of the IOC/UNESCO employment contract for the technical co-ordinator, as well as of the contract between IOC/UNESCO and CLS/Service Argos for logistic support. The panel took this opportunity to place on record its gratitude to CLS/Service Argos for accepting to sign the contract only when the last financial contribution reaches the Secretariats, and to officially thank them for their kind understanding of the situation.

3.2.2 As for future arrangements for the technical co-ordinator's logistic support, the panel expressed the view that it should endeavour to find the most convenient, as well as the least costly, arrangement. In this respect, it welcomed the offer by Mr F. Gerard to explore informally the possibility and conditions for the technical co-ordinator to be hosted by Meteo-France, in Toulouse, and to report to the panel chairman on this topic before 1 April 1995. Elements to be taken into account would be, in addition to cost issues, the technical co-ordinator's scope of action and relationship to CLS/Service Argos (including access to files, etc.). In so doing, the panel wished to emphasize that the present arrangements were satisfactory, and that it was well aware that a significant part of the cost of the technical co-ordinator's logistic support was presently supported by CLS/Service Argos, for which it expressed its thanks.

3.3 Employment status of the technical co-ordinator and commitments for future funding (agenda item 3.3)

3.3.1 The panel recalled the agreement made with Mr Charpentier at the eighth session of the panel, that he would be willing to remain as technical co-ordinator, located in Toulouse and employed by IOC/UNESCO, until at least 31 May 1996. It therefore decided to continue the existing arrangements for the next financial period, 1 June 1995 to 31 May 1996, subject to the availability of funds. With regard to future years (beyond May 1996) and bearing in mind the long lead-time required to recruit a new technical co-ordinator, the panel noted the agreement of Mr Charpentier to inform the chairman, by the end of December 1994, whether or not he may wish to continue as technical co-ordinator beyond 31 May 1996. In the event of a decision to continue on the part of Mr Charpentier, it was agreed by the panel that it would retain him as technical co-ordinator, subject to the availability of funds.

3.3.2 The panel then reviewed draft estimates provided by UNESCO for the cost of the technical co-ordinator's contract for 1995-1996 and 1996-1997, which are reproduced in Annex VI. It noted the uncertainties inherent in these estimates, and therefore agreed that it should budget a total of US$90,000.- for the technical co-ordinator's employment contract for 1995-1996.

3.3.3 The panel further agreed that it should include in the 1995-1996 expenditure budget:

(a) US$15,000.- for official travel for the technical co-ordinator (unchanged from 1994-1995);

(b) US$15,000.- to cover a logistic support contract of FF79,000.- with CLS/Service Argos, representing a 2.5% inflation-related increase on the 1994-1995 contract, taking into account also possible US$-FF exchange rate fluctuations;

(c) US$10,000.- for travel of the chairman on panel business;

(d) US$5,000.- for panel publications;

(e) US$9,000.- for sundry expenditures and for contingencies such as unexpected cost increases and unfavourable exchange rate fluctuations.

The table of projected expenditures for 1995-1996 is given in Annex VII A.

3.3.4 In recalling the expected carry-forward from 1994-1995 of around US$9,650.-, the panel noted that a total of US$134,650.- would be required to be recouped from Member country contributions in 1995-1996 to cover the estimated expenditures. The table of estimated income for 1995-1996 is given in Annex VII B.

3.3.5 On the basis of provisional offers of contributions made by representatives at the session, and of other information available, the panel established a draft table of contributions for 1995-1996, which is given in Annex VIII. It was noted that the contributions from most contributing Member countries remained unchanged from those for 1993-1994 and 1994-1995, with the decrease in the Canadian contribution being balanced by a new and very welcome contribution from South Africa.

3.3.6 In this context also, the panel re-emphasized the importance of additional Member countries participating actively in the panel's work and contributing financially to its support, if all present and potential projects were to be successfully implemented. It noted with appreciation the participation of representatives from both Brazil and China in the present meeting, as well as their offer to investigate possibilities for financial contributions, and urged all existing panel Member countries, and the Secretariat, to continue their efforts to convince potential new Members of the value and importance of participating actively in the work of the panel.

4. RELATIONSHIP WITH INTERNATIONAL PROGRAMMES/ORGANIZATIONS (agenda item 4)

4.1 World Climate Research Programme (WCRP) (agenda item 4.1)

4.1.1 The Director of the ITPO reported to the panel that, although TOGA would end on 31 December 1994, it was expected that the USA (NOAA) would continue to fund the Tropical Atmosphere Ocean (TAO) array of moored buoys for the foreseeable future. The full array of 69 moorings would be in place in December 1994. Ship-time support west of the date-line continued to be an area of great concern. Japan's commitment to 50 days per year of ship-time for ten years was a great asset in this regard. However, in spite of the most strenuous efforts, the prospects of sufficient ship-time by other countries for maintaining the array west of the date-line in 1995 were disappointing - it would very probably be necessary to reduce the size of the array west of the date-line in 1995 because of the shortfall of about 30 days of ship-time. A major re-design of the Atlas mooring used in the TAO array was being carried out at PMEL aimed at exploiting developments in technology since the 1970s. Vandalism in the Western Pacific continued to be a problem. The TAO Implementation Panel would be sponsored from 1 January 1995 jointly by the CLIVAR SSG and by the JPO for GCOS.

4.1.2 The panel thanked the Director of the ITPO for his report, and expressed its appreciation for the continuation of the TAO array after the end of TOGA. It further noted the initiation of a new WCRP programme, CLIVAR (Climate Variability and Predictability), which would have a 15-year lifespan and would certainly require the deployment of both drifting and moored buoys to support its observing networks.

4.1.3 During the joint DBCP/SVP session, the panel was presented with a status report on existing and planned SVP deployments, a summary tabulation of which is given in Annex VIX. With regard to the future organizational status of the SVP, the following was noted:

(a) With the end of TOGA in December 1994, the SVP was likely in future to come under the scientific umbrella of the SSGs for WOCE and CLIVAR, with scientific requirements coming also from GCOS and GOOS;

(b) The Global Drifter Centre was likely to be transferred from Scripps to NOAA/AOML, to manage the drifter element of CLIVAR/GOALS.

At the same time, the SVP had indicated its strong desire to co-operate much more closely in the future with the DBCP, in particular in the areas of co-ordinated scientific/operational deployments, based primarily on the use of the SVP barometer drifter (see section 6.4); in the technical development of drifting buoys; and in scientific assessments of buoys, buoy data and their applications.

4.1.4 The panel expressed its appreciation and support for this approach from the SVP. Appropriate follow-up actions are recorded under agenda item 6.4.

4.2 World Weather Watch (WWW) (agenda item 4.2)

4.2.1 The panel recalled its request, made at the ninth session of the DBCP, to be kept informed of developments within WMO with regard to future arrangements for the exchange of meteorological and related environmental data. In this regard, it noted with interest the four resolutions on the subject adopted by the forty-sixth session of the WMO Executive Council, in particular Resolution 20 (EC-XLVI) - WMO policy on the exchange of meteorological and related data and products - , which defines a fundamental principle of WMO concerning data exchange, and Resolution 21 (EC-XLVI) - Proposed new practice for the exchange of meteorological and related data and products -. The panel noted with appreciation that, in the latter resolution, all available *in situ* marine data were recommended to be included in the proposed Tier 1 (data exchanged without any restrictions as to use). It noted further that this was a fundamental guiding principle for its own activities, one which had been applied with some success, since the amount of buoy data exchanged on the GTS had tripled in the ten years of the panel's existence.

4.2.2 The panel noted the ongoing work by CBS in support of WMO considerations of this important issue, as well as the decisions likely to be made by Twelfth World Meteorological Congress (June 1995) on the subject. It offered to contribute to the CBS work, within its field of competence and as required, and also requested the Secretariats to report to the eleventh session of the DBCP on the outcome of the Congress discussions.

4.3 Integrated Global Ocean Services System (IGOSS) and International Oceanographic Data and Information Exchange (IODE) (agenda item 4.3)

4.3.1 The panel was presented with the reports of the IGOSS Specialized Oceanographic Center (SOC) and the IODE Responsible National Oceanographic Data Centre (RNODC) for drifting buoys, which are reproduced as Annexes X and XI, respectively. It noted with appreciation the new products issued by the SOC (and already introduced by the technical co-ordinator in his report) relating to the "mean monthly data availability indices" for various variables.

4.3.2 With regard to RNODC figures of buoy data taken from the GTS, some discrepancies were noted as compared to similar figures provided by the technical co-ordinator in his report, as was the case at the ninth session of the DBCP (see paragraph 4.3.1 of the DBCP-IX final report). The panel requested that the technical co-ordinator and the RNODC for drifting buoys try to reach a common approach to this problem of statistical presentation. Finally, MEDS were requested to include in their report for the DBCP Annual Report a full list of their services and charges, together with access addresses etc.

4.4 Global Ocean-Observing System (GOOS) and Global Climate Observing System (GCOS) (agenda item 4.4)

4.4.1 The panel was presented with the main outcome of the first planning session of the IOC-WMO-UNEP Committee for GOOS (I-GOOS) (Melbourne, Australia, April 1994) and of the first session of the IOC-WMO-ICSU Joint Scientific and Technical Committee for GOOS (J-GOOS) (Nantes, France, May 1994). It expressed satisfaction that I-GOOS had already recognized the panel, and its action group activities such as ISABP, as one of the primary initial mechanisms for supporting the implementation of GOOS. In fact, such implementation had to make much use of existing systems such as the panel, which reiterated its willigness to be receptive to any GOOS requirements within its field of competence. The panel considered the wording used on this topic at its ninth session was still valid (see final report of the session, paragraph 4.4.3).

4.4.2 In addition, the view was expressed that it might be useful for the panel to be better known within the GOOS community. To that end, it decided to include within its programme of work (see item 8) the preparation of a possible presentation to the second session of I-GOOS of its aims, its work, its actual operational achievements and its possibilities for responding to various kinds of requirements regarding data buoys.

4.4.3 The panel noted with interest recent developments under GCOS, including in particular the work of the GCOS Atmospheric Observation Panel and the OOSDP. It was pleased to learn that GCOS had enthusiastically welcomed the panel's initiative in the establishment of the ISABP, and would almost certainly support similar initiatives in other ocean basins. The panel agreed that it would be useful if it could make a detailed presentation on its work to a future session of the JSTC for GCOS (similar to that proposed to GOOS in paragraph 4.4.2 above). It therefore requested its chairman to liaise with the JPO for GCOS, with a view to organizing such a presentation. Finally, it was agreed that the panel should continue to monitor GCOS requirements, and to respond to (and even anticipate) these at an appropriate time.

5. REPORT ON CURRENT AND PLANNED BUOY PROGRAMMES (agenda item 5)

5.1 The panel noted that written reports were received from Australia, Canada, China, France, Greece, Iceland, India, Japan, Korea, Netherlands, New Zealand, South Africa, Sweden, United Kingdom, USA and EGOS. The panel requested that these reports, as well as others received in the standard format, should be included as usual as annexes to its Annual Report.

6. CO-ORDINATION ACTIVITIES (agenda item 6)

6.1 Quality control of buoy data (agenda item 6.1)

6.1.1 The panel recalled that deferred-time quality control guidelines were implemented on 1 January 1992 by the DBCP in order to rationalize and speed up the status change process for buoys reporting bad data on the GTS. These were based on an electronic bulletin board, where principal meteorological or oceanographic centres responsible for GTS buoy data quality control (PMOC) could deposit status change proposals. The proposals were them forwarded by the technical co-ordinator to the owner of the buoys, or designated principal GTS co-ordinator (PGC), who could in turn request Service Argos to implement the required change. The technical co-ordinator showed that the guidelines had been very effective since implementation. For the period July 1993 to June 1994, for a total of 1267 buoys that reported on the GTS, 517 status change proposals were posted by the various PMOCs and these led to actual status modifications for 181 buoys. The following meteorological centres were presently acting as PMOC: BOM (Australia), ECMWF, IMO, CMM (France), JMA (Japan), MS (New Zealand), NDBC (USA), OPC (USA) and MO (United Kingdom). The South African Weather Bureau offered to act as a PMOC. The DBCP thanked South Africa for its kind offer and appreciated the inputs that its participation would provide to the QC guidelines, especially for the International South Atlantic Buoy Programme buoys.

6.1.2 The technical co-ordinator reported on a study for possible alternatives to the existing Omnet service for the electronic bulletin board. It was noted that Omnet would stop before the end of 1994 and that a switch was now necessary. Two solutions were discussed:

(a) An Internet distribution list;

(b) An Internet dedicated server based on World-Wide Web Mosaic software.

The panel considered that the two solutions could actually co-exist for slightly different goals, at least in the beginning. Based on the survey by the technical co-ordinator among the various actors, and because the distribution list would be simple and fast to implement, the panel decided to implement this solution as from 1 December 1994, and amended the guidelines accordingly (see Annex XII). The technical co-ordinator was requested by the panel to co-ordinate this implementation. The panel also thanked the Icelandic Meteorological Office for its kind offer to run the distribution list on their computers.

6.1.3 At the same time, the panel recognized the potential benefits of establishing a DBCP Internet server. A server could be used to exchange documentation, information, lists of WMO and Argos numbers, even graphics and buoy trajectories among interested buoy users. The NOAA National Ocean Service offered to establish such a server on a trial basis and to report to the DBCP at the next panel session. The Internet ftp address of the server was **dbcp@nos.noaa.gov** and access was already possible although no information was presently available on the system. The DBCP was pleased to hear of the NOAA/NOS initative, and thanked NOAA/NOS for its offer. The technical co-ordinator was requested to work in conjunction with NOS for designing and developing the server on a trial basis and to report at the next panel session.

6.1.4 As the RNODC for drifting buoys, the Marine Environmental Data Service (Canada) offered to provide an archival system for the quality control bulletin board. Old quality control messages could be made available on the Internet and to the user community by request to MEDS. Messages could be retrieved by WMO buoy numbers and/or by time period.

6.2 Code matters (agenda item 6.2)

6.2.1 The panel noted with appreciation that the new **BUOY code** had been successfully implemented by Argos at 0001 UTC on 2 November 1994. It urged all those inserting buoy data on the GTS, including in particular LUT operators and moored buoy deployers, to comply with the specifications and application of this code. No further modifications to BUOY were proposed.

6.2.2 With regard to the encoding of buoy data in BUFR, it was noted that there was not yet a strong requirement expressed by CBS for such encoding, but that this requirement would almost certainly appear in the next one-two years. The panel recognized the complexities and cost of incorporating a BUFR encode module in the Argos GTS processing sub-system. It therefore requested the technical co-ordinator to prepare an analysis of the technical and costing aspects of implementing BUFR in Argos, for presentation to the eleventh session of the DBCP.

6.3 New Argos GTS processing sub-system (agenda item 6.3)

6.3.1 The technical co-ordinator presented the new Argos GTS processing sub-system and the historical background concerning its design, development and implementation. Phase 2 was implemented in September 1993, so the operational system could be monitored during the entire intersessional period. Only minor problems were reported and the DBCP considered this issue as a real success as far as improving the quantity and quality of buoy data distributed on the GTS. Having a separate data processing scheme from the standard Argos system had made it easier for the technical co-ordinator to get authorization for GTS distribution, since when required the PI could still receive the raw data from Service Argos while processed data were distributed on the GTS.

6.3.2 A few improvements had also been incorporated in the system since Phase 2 was implemented: class zero locations could now be disseminated on the GTS, if requested (at no additional cost), pressure could be reduced to sea level or a geopotential can be calculated for remote stations deployed on land, GPS positions encoded in the Argos message could be handled provided that the

proposed CLS standard was followed, the new **BUOY code** had replaced the DRIFTER code, and finally a set of tools to monitor the system added.

6.3.3 Concerning the promotion of the system in order to potentially increase the number of buoys reporting on the GTS, the DBCP decided that a package of various documents should be distributed to all buoy users and to any new Argos buoy user. The list of documents included a letter from the chairman of the DBCP containing relevant information on WMO data policy, the DBCP Guide to data collection and location services using Service Argos, the GTS sub-system reference guide and the GTS technical file (see Annex XVIII, task 6).

6.3.4 The Australian Bureau of Meteorology requested DBCP support for CLS/Service Argos to collect and process the Australian region S-band LUT data stream for distribution on the GTS. Since the introduction of the new GTS processing chain, distribution of Australian LUT data had been limited to the Australian and New Zealand Meteorological Services. Preliminary discussions with CLS/Service Argos indicated that implementation would be technically straight forward, but there would be a one-time software development cost (estimate US$16,000.-). A similar proposal would also be relevant to the International South Atlantic Buoy Programme. The panel instructed the technical co-ordinator to investigate the feasibility and funding options, and to report back to the chairman by 1 April 1995 to enable a decision to be taken on whether or not to proceed prior to the next session of the DBCP.

6.4 Combined meteorological/oceanographic drifting buoys (agenda item 6.4)

6.4.1 The technical co-ordinator reported on the recent field test deployments of low-cost barometer drifters. Two Canadian drifters were deployed in October 1993 and failed shortly after deployment. The French buoy deployed in October 1993 was still working and producing good pressure measurements. The two United Kingdom buoys produced acceptable data but one buoy failed three months after deployment. The USA buoys worked well. New design changes were later proposed by the Global Drifter Center and commercial production began. Forty-four barometer drifters had consequently been deployed in September 1994 by the USA (23 in the South Atlantic), South Africa (17 in the South Atlantic) and France (three in the North Atlantic). Some of the buoys purchased by France and the USA were experiencing transmitter stability problems (11) probably not related to the design of the buoy. These buoys were produced by Technocean, Clear Water Consultants, and Metocean at a cost each of approximately US$4,500.-. In addition, similar buoys are available from TURO. Annex XIII contains details of the addresses of all these companies.

6.4.2 The panel stressed that this device addressed both meteorological and oceanographic communities' requirements. For meteorologists, it was equipped with a barometer and sea surface temperature sensor; synoptic data were available; data could be disseminated on the GTS; it stayed in an ocean area longer because it was drogued; and, based on global figures for the standard SVP drifter, the estimated half-life was of the order of 300 days. For oceanographers, it was a good Lagrangian drifter; it was equipped with an SST sensor; in extra-tropical regions, having a pressure sensor would lead to a good wind field analysis provided that an optimal array of buoys was deployed, this wind field in turn could be used to remove part of the wind stress from the buoy trajectories for obtaining surface velocities accurate to 1 cm/s; half-life was around 300 days; and hourly pressure measurements were available.

6.4.3 The panel agreed that it had therefore become possible to consider common meteorological and oceanographic buoy programmes based on this technology. Since resources would be shared, such programmes would be very cost-effective and lead to homogeneous data series. In addition, if the data were distributed on the GTS drifters deployed in data-sparse areas would be very likely to improve numerical weather predictions. For oceanographers, if scientific interpolated series of data were freely available for the research community (for example at the Global Drifter Center) they would definitely help

in improving the knowledge of the physics of the oceans. In the context of such a co-operation, low-cost barometer drifter programmes would be in the best interests of the general public.

6.4.4 In this context, the panel considered a draft proposal, prepared by the technical co-ordinator and CLS/Service Argos, for a co-operation incentive to be applied to the Argos Joint Tariff Agreement. Details of this are given in Annex XIV. It agreed that such an incentive, although complicated to apply in practice, was nevertheless worthwhile in concept. It therefore requested the chairman of the DBCP to put the proposal before the forthcoming fourteenth meeting of the Joint Argos Tariff Agreement. In addition, the panel requested the chairman of the ISABP to consider implementing the incentive (if agreed by the JTA meeting), on a trial basis as a part of the ISABP.

Co-operation with the SVP

6.4.5 The panel expressed its appreciation of and general support for the proposals for closer co-operation between the SVP and the DBCP which were put forward during the joint session (see paragraph 4.1.3 above). In response to these proposals, the panel agreed on the following:

(a) To establish a DBCP Sub-group on Technical Developments, comprising the panel chairman and vice-chairman, P. Blouch (France), G. Jones (Australia), P. Le Roux (South Africa) and D. Meldrum (United Kingdom), plus any other interested panel members. This sub-group would work directly with relevant SVP experts, including in particular those in Scripps, with an initial task being to finalize the development and testing of the SVP barometer drifter. Following this, the sub-group should begin to consider other areas of buoy technology development, such as the incorporation of an air temperature sensor into the SVP-B drifter. The sub-group should report to each panel session, as well as to sessions of the SVP;

(b) As from the eleventh session of the DBCP, to incorporate scientific/technical presentations as an agenda item, and to allow if possible at least one half-day for such presentations. Scientists involved in buoy programmes should be actively encouraged to participate in future DBCP sessions and to present their work under this agenda item. Such presentations would enhance dialogue between scientific and operational agencies concerned with ocean data buoys, and also help to expand and design the scope of the work of the panel;

(c) To develop mechanisms for direct collaboration between the research and operational communities in planning buoy deployment strategies, in particular based on the SVP-B drifter. Such mechanisms should include initially the regional action groups, but may eventually include the formation of a special SVP/DBCP Sub-group on Buoy Deployment Strategy, centered on the Global Drifter Centre.

6.4.6 The panel reiterated the large potential value to both the research and operational communities in undertaking collaborative buoy deployments using the SVP-B drifter (see paragraph 6.4.2 above). It also noted the potential cost benefits to be achieved by using a reduced buoy transmission duty cycle (e.g. the one-third cycle used by SVP), provided this had no adverse effects on data availability for operational purposes. To further assess this potential, it requested the technical co-ordinator, together with the WMO Secretariat, to prepare a proposal for consideration by a national Meteorological Service, for the implementation of a specific network impact study. This study would aim to quantify the relative impact on meteorological analyses of having a certain number of SVP-B buoys with full duty cycle, as compared to a greater number of such buoys but with reduced duty cycle. If possible, the results of such a study should be available for consideration by the eleventh session of the DBCP.

6.5 Formation of other action groups (agenda item 6.5)

International Programme for Antarctic Buoys (IPAB)

6.5.1 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 on the GTS. At its second meeting (Helsinki, June 1994), the IPAB had agreed to apply to be an action group of the DBCP, and its chairman had subsequently written to the chairman of the DBCP in this regard.

6.5.2 The panel accepted with pleasure this application by the IPAB. It also supported the recommendation by the IPAB that ice beacons should report on the GTS.

International South Atlantic Buoy Programme (ISABP)

6.5.3 The panel noted with satisfaction that, following its own initiative at the eighth session of the DBCP, preparatory work for an ISABP had been brought to a successful conclusion, the programme had been formally established, and it had held its first meeting in Buenos Aires in October 1994. It further noted that more than 50 buoys were already deployed under the programme, with this number expected to rise to over 70 in 1995. The panel congratulated the participants in the ISABP for their efforts and achievements, and accepted with pleasure the application tabled at the meeting by the chairman of the ISABP to become an action group.

6.5.4 The panel approved the request by the ISABP for the support of the DBCP technical co-ordinator to investigate and analyze possible GTS delays in the return of bulletins of buoy data to countries surrounding the South Atlantic. It also agreed that he should continue to support the investigations by the ISABP into the possibilities for implementing LUTs in the region.

Possible Baltic Buoy Programme

6.5.5 The panel noted with interest the results of a meeting convened by SMHI (Norrkoping, June 1994) to assess requirements for a possible international network of moored buoys in the Baltic Sea. It noted that no follow-up actions to this meeting had yet been proposed, but agreed that it should continue to support this regional initiative, as and when required, within the limits of its resources.

Possible Indian Ocean Programme

6.5.6 The panel noted with regret that no further steps were being taken, for the moment, for the implementation of a drifting buoy programme as part of the South-west Indian Ocean Tropical Cyclone Project. At the same time, it was recognized that there was considerable interest in many countries (and many individual institutions) in undertaking drifting buoy deployments in the currently data-sparse Indian Ocean, in support of both research and operational applications. In particular, WOCE was planning the deployment of a large number of SVP drifters in the region which, if equipped also with barometers, could make a significant contribution to the WWW and to GCOS.

6.5.7 The panel agreed that it may be an appropriate time for it to take an initiative in the Indian Ocean, similar to that which had recently been so successful in the South Atlantic. It therefore requested its chairman to write to all potentially concerned institutions and agencies, seeking expressions of interest in the possible formation of an International Programme of Buoys in the Indian Ocean (IPBIO). If sufficient interest was offered, the chairman was authorized to convene, if possible with the assistance of the Secretariats, a first preparatory meeting for such a programme during the second half of 1995.

Definition of action groups of the panel

6.5.8 In response to a question from the chairman of one of the action groups of the panel concerning the definition of an action group, the session developed some general guidelines. These guidelines are set out in Annex XV. The panel noted that these guidelines were not intended to provide a rigid definition of an action group, but that a significant factor in the definition was the requirement for an action group to support the objectives of the panel through its own buoy programme. The chairman was requested to distribute these guidelines to existing and potential future action groups.

6.6 Other co-ordination activities (agenda item 6.6)

Directions in satellite communication systems

6.6.1 While recognizing that Argos would remain the system of choice for many data buoy operators for some time to come, the panel considered that developments in other satellite communication technologies needed to be monitored regularly and their usefulness assessed. Of particular interest were the numerous Low Earth Orbit (LEO) systems currently being introduced, many of which would offer two-way communication and enhanced data throughput rates (see, for example, Annex XVI, which summarizes a selection of such future systems). The panel noted, however, that the substantial efforts by CLS/Service Argos to promote timely and accurate distribution of operational data to end users through the GTS and other channels were unlikely to be matched at an early stage by other LEO operators. The representative of CLS/Service Argos was also able to indicate in this context that future plans for CLS/Service Argos included the provision of two-way communications and increased data collection rates.

6.6.2 The panel requested its vice-chairman, Mr M. Szabados, and Mr D. Meldrum (United Kingdom), to keep it informed of relevant technical developments in communications technology, so that it might continue to meet its objectives in promoting the efficient collection and exchange of buoy data (see Annex XVIII, task 18). It also requested CLS/Service Argos to bear in mind the possibility of being invited to adapt its extensive processing and data distribution infrastructure to the handling of buoy data collected by other satellite systems.

7. PUBLICATIONS (agenda item 7)

7.1 Under this agenda item, the panel recalled its decision to issue all future publications under its own name and logo, viz as a DBCP series, as agreed when discussing finances (see agenda item 3.1). It then reviewed the status of the following publications:

Guide to data collection and location services using Service Argos

7.2 The panel had before it a draft revised version of the guide, prepared by the NDBC of the USA, the technical co-ordinator and CLS/Service Argos. It agreed that all comments regarding this draft should be sent to the chairman before 1 December 1994 in order for the final version of the guide, which will be the first publication in the DBCP series, to be made available for publication by WMO in early 1995.

Annual Report 1994

7.3 The panel agreed that the 1994 Annual Report should have the same basic format as in previous years. It noted that this year's report would be produced by WMO and that the cut-off date for contributions would be the end of November 1994, especially for national reports. As far as technical reports are concerned, the panel agreed to include the already published *Monitoring a data assimilation*

system for the impact of observations, by R.S. Seaman, Australian Bureau of Meteorological Research Centre, with the necessary acknowledgements. It further encouraged the inclusion of other reports on technical developments in the Annual Report.

Guide on the Argos GTS processing sub-system

7.4 The panel requested the technical co-ordinator to finalize the guide as soon as possible for, again, publication by WMO in the DBCP series.

Manual on the low-cost Lagrangian barometer drifter construction

7.5 The panel approved that the technical co-ordinator should travel to La Jolla in early 1995 to begin preparation, jointly with the Global Drifter Center, of this manual. It noted the kind offer of the chairman to assist with technical drawings, and expressed the desire that the manual be finalized and published in the DBCP series by mid-1995 at the latest.

8. REVIEW OF THE PANEL'S OPERATING PROCEDURES AND OF THE TECHNICAL CO-ORDINATOR'S TASKS (agenda item 8)

8.1 The panel first reviewed its operating procedures as agreed at its previous session. It had not noted any need to amend them and therefore decided to retain them for the next intersessional period. The panel's operating procedures are reproduced in Annex XVII.

8.2 The panel next reviewed its workplan as adopted at its ninth session. In the light of discussions under previous agenda items, of achievements during the past intersessional period and of future expected developments, it decided to modify and/or eliminate some items listed in the workplan and to introduce a few new ones that would, *inter alia*, take care of the adoption of two new action groups, of the work relating to the low-cost barometer drifters and to the Internet server. The revised action plan is given in Annex XVIII.

9. ELECTION OF THE CHAIRMAN AND THE VICE-CHAIRMAN OF THE PANEL (agenda item 9)

9.1 The panel unanimously re-elected Mr D. Painting and Mr M. Szabados as its chairman and vice-chairman respectively, to hold office until the end of its next session.

10. DATE AND PLACE OF THE NEXT SESSION (agenda item 10)

10.1 The panel welcomed the kind offer by South Africa to host the panel's eleventh session. Subject to agreement by the fourteenth meeting on the Argos Joint Tariff Agreement, it decided to hold its eleventh session from Tuesday 17 October 1995 (mid-day) to Friday 20 October 1995, in Pretoria, Republic of South Africa, leaving one-and-a-half days (Monday 16 October to Tuesday 17 October 1995 mid-day) for the second session of the ISABP Programme Committee.

11. CLOSURE OF THE SESSION (agenda item 11)

11.1 In closing the session the chairman, Mr D. Painting, expressed his considerable appreciation to all the members of the panel for their continuing support for and work on behalf of the DBCP, both during the intersessional period and also at the meeting itself. This support had contributed substantially to its obvious success. Mr Painting also offered his thanks to the Director and staff of the NOAA South West Fisheries Science Center, especially Mr S. Cook, for the excellent facilities and other support provided for the session. Finally, Mr Painting thanked the Secretariats, including the secretarial staff, for their continuing support for the panel and its members.

11.2 Ms E. Horton, Naval Oceanographic Office, USA, expressed her appreciation and that of her agency to the chairman, panel members and technical co-ordinator for their efforts on behalf of all drifting buoy users, in particular in the area of buoy quality control.

11.3 The tenth session of the Data Buoy Co-operation Panel closed at 11.30 hours on Friday, 4 November 1994.

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AGENDA

1. ORGANIZATION OF THE SESSION

   1.1 Opening of the session
   1.2 Adoption of the agenda
   1.3 Working arrangements

2. REPORTS

   2.1 Report by the chairman of the Data Buoy Co-operation Panel
   2.2 Report by the technical co-ordinator
   2.3 Report by the Secretariats
   2.4 Reports by the action groups of the Panel

3. FINANCIAL AND ADMINISTRATIVE MATTERS

   3.1 Financial situation
   3.2 Review of contracts
   3.3 Employment status of the technical co-ordinator and commitments for future funding

4. RELATIONSHIP WITH INTERNATIONAL PROGRAMMES/ORGANIZATIONS

   4.1 World Climate Research Programme (WCRP)
   4.2 World Weather Watch (WWW)
   4.3 Integrated Global Ocean Services System (IGOSS) and International Oceanographic Data and Information Exchange (IODE)
   4.4 Global Ocean-Observing System (GOOS) and Global Climate Observing System (GCOS)

5. REPORT ON CURRENT AND PLANNED BUOY PROGRAMMES

6. CO-ORDINATION ACTIVITIES

   6.1 Quality control of buoy data
   6.2 Code matters
   6.3 New Argos GTS processing sub-system
   6.4 Combined meteorological/oceanographic drifting buoys
   6.5 Formation of other action groups
   6.6 Other co-ordination activities

7. PUBLICATIONS

8. REVIEW OF THE PANEL'S OPERATING PROCEDURES AND OF THE TECHNICAL CO-ORDINATOR'S TASKS

9. ELECTION OF THE CHAIRMAN AND THE VICE-CHAIRMAN OF THE PANEL

10. DATE AND PLACE OF THE NEXT SESSION

11. CLOSURE OF THE SESSION

AGENDA
OF THE JOINT SESSION OF THE SURFACE VELOCITY PROGRAMME / DATA BUOY CO-OPERATION PANEL

Joint session I - Technical issues

- United Kingdom (D. Painting) and Australia (G. Jones) drifter programme updates
- Status of the Pacific, North Atlantic and Indian Oceans drifter arrays (L. Sombardier)
- Status of Southern Oceans and planning for the South Atlantic drifter arrays (M. Szabados)
- North Atlantic / Semaphore experiments (P. Blouch)
- Technical progress / barometer drifters (A. Sybrandy)
- NPS barometer drifters (W. Nuss)
- South Africa barometer drifters (P. LeRoux)
- Technical progress / GPS positioning (M. Bushnell)

Joint session II - Plans for the global drifter programme

- Discussion of roles of CLIVAR and GCOS in future scientific drifter studies (J. Marsh / P. Niiler)
- Discussion of the role of DBCP in global operational drifter deployments (D. Painting)
- The global drifter programme: co-operation between meteorologists and oceanographers (E. Charpentier)

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REPORT BY THE TECHNICAL CO-ORDINATOR OF THE DBCP

1. Introduction

This report covers the period 1 October 1993 to 30 September 1994. During this period the Technical Co-ordinator (TC) of the Data Buoy Co-operation Panel (DBCP) was based in Toulouse at CLS, Service Argos, and was employed by the United Nations Educational, Scientific and Cultural Organization (UNESCO). The time the TC DBCP spent on his tasks could be estimated as following:

Topic	days	%
Monitoring, Quality Control, Bulletin board	45	17.3
User assistance	40	15.4
Travel, Missions and preparation	33	12.7
Vacation, holidays	32	12.3
GTS Sub-System	19	7.3
TC monthly report, stats., regular letters (e.g. WMO list)	12	4.6
Combined Oceano-Meteo drifting buoys	10	3.9
Requests for GTS	10	3.9
BUOY.QC on INTERNET	8	3.1
WMO Guide, misc. publications (articles in Argos bull...)	8	3.1
Miscellaneous DBCP	7	2.7
TC Tools	5	1.9
AWS in SYNOP and Ships in SHIP	5	1.9
Action Groups	5	1.9
Anemo. Heights, misc. rationalization	4	1.5
GOOS status report	4	1.5
DB Quarterly report	4	1.5
Index maps	3	1.1
Argos monthly report	3	1.1
Misc. Administrative	2	0.8
GTS codes	1	0.4
Total (52 weeks) :	260	100%

The following paragraphs describe in detail the various activities of the TC DBCP during the period.

2. Missions, Visits, Meetings

2.1) DBCP-9. 19-22 October 1993, attend DBCP-9 session in Athens.

2.2) JTA-13. 25-27 October 1993, attend JTA-13 session in Athens.

2.3) EGOS. 7-8 December 1993, attend the EGOS Technical Sub-group and Management Committee meetings in Paris.

2.4) ISABP. 13-15 December 1993, attend the preparatory meeting for an International South Atlantic Buoy Program in Buenos Aires.

The meeting was particularly successful since all the participants in the meeting supported the establishment of a formal ISABP and indicated their

willingness to become participants in the programme. An interim Steering Committee was established immediately for taking care of various tasks, including the deployment of up to 60 buoys in the region in 1994. The meeting adopted a draft programme proposal for further consideration by the interim Steering Committee and the second preparatory meeting. I presented the Argos system in detail and also the new GTS data processing sub-system. The issue of implementing an LUT in the region, the data being transferred in real time towards the Argos Global Processing Centres, was discussed.

2.5) NOAA/NOS. 16 May 1994, meeting with Mike Szabados and Terry Bryan at the NOAA National Ocean Service, Silver Spring. We had discussions regarding the low cost barometer drifter, quality control guidelines (Omnet vs. INTERNET), incentive for cooperation between oceanographers and meteorologist, and the South Atlantic International Buoy Program.

2.6) NDBC. 17-18 May 1994, meetings with Eric Meindl, Ray Canada, Mike Burdette at the NOAA National Data Buoy Center, Mississippi. I also met with Deborah Bird and Burr Loomis of the Naval Oceanographic Office. I did a presentation regarding the Argos GTS sub-system at an Argos Regional Conference held at the NDBC at the same time.

2.7) EGOS. 14-15 June 1994, attend the EGOS Technical Sub-group and Management Committee meetings in Copenhagen.

2.8) Germany. 16-17 June 1994, Kiel and Hamburg.

IFM Kiel, Prof W. Krauss,
IFM Hamburg, Prof Quadfasel,
Meteorological Institute, Hamburg, Prof Hoeber,
BSH Hamburg, Dieter Kohnke

2.9) IPAB. 20-22 June 1994, Helsinki: International Program for Antarctic Buoys. See also paragraph 10.3.

2.10) IABP. 22-24 June 1994, Helsinki: International Arctic Buoy Program. See also paragraph 10.2.

3. Monitoring

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

3.1. To check the BUOY.QC bulletin board on Omnet, and to read status change proposals as stated by Principal Meteorological or Oceanographic Centres responsible for buoy data quality control (PMOC). For rationalization purposes, all the proposals are stored and archived in a data base.

3.2. Contact PGCs. After normally waiting 7 days for each proposal, the TC DBCP contacts the Principal GTS Coordinator (PGC), and then suggests him to implement the proposed change. The PGC should normally contact

Service Argos and/or Local User Terminal (LUT) operators and request implementation of the proposed change. In case the PGC disagrees, the TC DBCP immediately deposits a denial message on the bulletin board.

3.3. Check back. To check Argos files and/or GTS data in order to ascertain whether suggested modifications have actually been implemented or not.

3.4. Feed back. Possibly to deposit feed back information on the bulletin board on behalf of Service Argos for sensors actually recalibrated.

3.5. Specific problems. To resolve specific problems related to GTS for given buoys, such as looking carefully at the data and the transfer functions. For example, I could be investigating why no or only a few messages are received at Meteorological Centers...

3.6. TC DBCP files. To update TC files: list of the operational platforms and programs (on GTS or not), new programs, WMO numbers, monitoring statistics...

3.7. The new Argos localization algorithms implemented the 1 June 94 now permit to obtain a usable location for the stations transmitting with unstable oscillators. A few TOGA buoys are concerned. The quality of the location (>1km) remains however acceptable for meteorological purposes.

4. User assistance

As usual, the TC DBCP answered specific questions and resolved specific problems as needed or requested by users.

4.1. Principal Investigators (PI):

4.1.1. In order to facilitate GTS distribution of certain buoys, the TC DBCP obtained WMO numbers on behalf of Principal Investigators, and studyed in detail Argos message formats and transfer functions of the platforms and their sensors.

4.1.2. At several occasions, PIs requested the TC DBCP to look at specific problems regarding one of their buoys.

4.2. Local User Terminals (LUT): From time to time, LUT operators asked the TC DBCP to provide them with the transfer functions used with specific platforms so that they can also report to the GTS via their LUT.

4.3. Meteorological Centers contacted the TC DBCP when they needed information on given platforms drifting in an area which they are interested in.

4.4. Focal point. Directly or through the BUOY.QC bulletin board, the TC DBCP acted as a focal point between the Meteorological Centres and the Principal Investigators when a specific action was needed on a buoy reporting to the GTS (e.g. remove the data from the GTS, recalibrate a sensor...).

4.5. Investigate various data loss problems.

5. Drifting Buoy Quarterly Report

As for the previous intercessional periods the Drifting Buoy Quarterly Report was issued , and distributed widely by CLS, Service Argos.

6. Global Telecommunication System (GTS)

6.1. Status for drifting buoys reporting onto the GTS:

In July 1991, 718 buoys were operational, 264 of these reporting on GTS (i.e. 36.8%).

In July 1992, 1162 buoys were operational, 474 of these reporting on GTS (i.e. 40.8%).

In early August 1993, 1269 buoys were operational, 548 of these reporting on GTS (i.e. 43.2%).

In early September 1994, 1246 buoys were operational, 587 of these reporting on GTS (i.e. 47.1%). See figures 2 and 3.

Compared to last year, the total number of buoys operational decreased but the number of these reporting on GTS increased.

New Météo-France data availability index maps:

Météo-France kindly agreed to produce Data Availability Index Maps on a monthly basis in order to identify the data sparse ocean area for each kind of geo-physical variable and therefore to assist the various data buoy programmes in adjusting deployment strategies. They are now producing the maps routinely.

A first set of these maps was produced for February 1994. The August 1994 set is shown in figure 1.

Each map takes the Marsden squares area into account, includes SHIP and DRIFTER reports and works for a single geophysical variable only. Maps are produced for Air Pressure, Air Temperature, Sea Surface Temperature and Wind. The top number printed in each square is an index which is representative of how the requirements (WWW, WCRP, or GOOS) are met: An index of 100 means that an average of 8 observations per day per 500 kM * 500 kM area has been received from the square during the month. In addition, the percentage of DRIFTER reports from the total of SHIP plus DRIFTER reports received is printed below the index number in each square. In order not to give too much weight to drifting buoys reporting very often every day, DRIFTER reports in excess of 8 per day per buoy are not counted.

For example, if we consider Air Pressure, we knew that the requirements were well met for the North Atlantic Ocean, but it was not obvious that 20% to 60% of the data came from data buoys. For wind, we can easily see the impact of the ATLAS moored buoys in the equatorial Pacific Ocean, whereas the Equatorial Atlantic and Indian ocean still lack of such data.

Although not the basic purpose of the maps, the various existing data buoy programmes providing GTS users with Air Pressure or Wind data appear clearly (EGOS, IABP, ATLAS, Southern Hemisphere TOGA buoy programme, New Zealand, South Africa) and tend to appear as "data available islands" surrounded by data sparse areas. This tends to highlight the relative importance of these programmes. I believe that the maps should be widely distributed and advertised and particularly included in the DBCP annual report. The action groups of the DBCP should receive the maps monthly.

6.2. GTS bulletin headers:

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

See Table 1 for a complete list of GTS bulletin headers used to date.

6.3. Quality Control.

The work of the TC DBCP concerning Drifting Buoy data Quality Control was related to the following topics:

- Actually monitor the bulletin board, and contact PGCs accordingly.

While the Technical Coordinator was in mission or in vacation the following PMOCs could replace him very effectively on a rotating basis:

- The Centre de Météorologie Marine (CMM), Brest.
- The Ocean Products Center (OPC).
- The National Data Buoy Center (NDBC).

I also worked on the possibility to switch the BUOY.QC bulletin board from Omnet to INTERNET as proposed at DBCP-IX.

See the annex regarding Quality Control for details.

6.4. Non-standard wind sensor heights:

A list of drifting buoys making wing measurements and reporting on GTS using the DRIFTER code was prepared in August 1994 and later published in the WWW Operational Newsletter. This list is kept up to date by the Technical Coordinator and can be issued regularly. The list includes the WMO and Argos ID numbers, the height of the anemometers and whether or not a correction to 10 meters is applyed.

6.5. Land stations reporting in SYNOP. The TC DBCP spent substantial efforts to convince owners of Argos land stations (e.g. Antarctica) to make these

report on GTS using the adequate code format (i.e. SYNOP). 7 of these stations are presently doing so.

6.6. Non-standard air pressure measurements for stations in altitude.

Since it was not possible to convince every owner of Argos land station to use SYNOP, some of the stations continued to report in DRIFTER format (5 stations).

Hence the list of fixed stations reporting Air Pressure data at station level using the DRIFTER code was also prepared in August 1994 for publication in a following issue of the WWW operational newsletter. This list includes the WMO, and Argos ID numbers, the Position and Altitude of the stations and whether or not Air Pressure is reduced to sea level.

6.7. New buoys on GTS. I studied in details the Argos message format of buoys for which it was not possible to make them report on GTS with the older Argos GTS system. The new GTS sub-system now permits to process the stations. In addition many buoys can now transmit the back hour and the synoptic data on GTS. The volume of GTS reports distributed from Service Argos has therefore increased substantially since the implementations of the new GTS sub-system (see also the MEDS diagrams).

6.8. BUOY code. There was a controversy regarding how to recognize BUOY reports from DRIFTER reports when BUOY will replace DRIFTER (3 Nov 94). I spent some time on the issue and proposed solutions. It was finally decided to use the symbolic letter $M_iM_iM_jM_j$=ZZYY for the BUOY code (we have $M_iM_iM_jM_j$=ZZXX for DRIFTER). I wrote and tested a new "BUOY" encoding module for the GTS sub-system.

7. Combined Meteorological and Oceanographic Drifting Buoys

The work of the Technical Coordinator concerning combined Meteorological and Oceanographic Drifting Buoys is mostly related to the following topics:

- Follow the development and tests on an air pressure port mounted on SVP drifters. These are being operated by the Global Drifter Center at Scripps Institution of Oceanography, La Jolla, California.

- Liaise with Principal Investigators of Meteorological Services participating in the second field-test (winter 93/94) of SVP drifters equipped with barometers (Atmospheric Environment Service (AES), Bureau Of Meteorology (BOM), United Kingdom Meteorological Office (UKMO), Centre de Météorologie Marine (CMM) of Météo-France).

- Write an article on the subject for inclusion in the 1993 DBCP annual report.

- Work in conjunction with the established working group on a proposal for a Meteo/Oceano Cooperation tariff incentive.

- As requested by the Panel at its ninth session, I compiled the list of current drifting buoy programmes (sorted by country), both

operational and research, together with PIs or other relevant contact information. I sent the list to the WMO Secretariat for circulation to the NFPs.

See the annex regarding Combined Meteorological/Oceanographic Drifting Buoys for details.

8. New Argos GTS Sub-System

The work of the Technical Coordinator concerning the New Argos GTS Sub-System is mostly related to the following topics:

- Monitor the system and look for possible problems.
- Make sure the problems are corrected.
- Monitor the ATLAS buoys.
- Write a dedicate software module for Pressure Reduction to Sea Level and Geopotential computation.
- Update the GTS Sub-system Reference Guide.
- Make sure that position data encoded in the Argos message (e.g. GPS) can be processed by the GTS sub-system provided that it follows the standard proposed by CLS, Service Argos. At this occasion, I drew specifications for processing any kind of location data encoded in the Argos message. These specifications were sent to Digital Equipment Corporation for development cost estimates. The Chairman of the DBCP eventually decided to use the proposed CLS format basically because developments were much less expensive.
- The sources of the application were moved to a new environment.
- Update the GTS sub-system to keep compatibility with the new Argos location algorithms as well as the proposed Argos GPS format.
- Training of the Argos User Guidance Office.
- Per IPAB recommendation, change the Gross Error limits for SST (now -1.8 C to +45.0 C).
- Work on a dedicated GTS Technical File.
- Development, test and implementation of the new BUOY code. Development of an automatic procedure to switch from DRIFTER to BUOY on the 3 November at 00:00 UTC.
- Development of new tools to access the system and make modifications on the description data base. For example, calibration coefficients can now be implemented through a file.

Problems encountered thus far were:

- Disk Crash in Landover in December 1993.

- The automatic application which updates the description data bases between the two Global Processing Centers did not work properly. I had to spend some time to identify the bugs and propose solutions to correct them.

- Bad location disseminated by mistake the 15 June 1994.

All these problems are corrected.

See the annex regarding the Argos GTS sub-system for details.

9. TC statistics and graphs.

9.1. Active drifting buoys. Using Argos files and data provided by LUT operators, I computed on a monthly basis, by country and by organization, graphs showing the distribution of active GTS and non-GTS drifting buoys. It is particularly useful to see the evolution of the total number of drifting buoys deployed by the various countries involved, and the percentage of these reporting to the GTS. See figures 2 and 3.

9.2. Quality of air pressure. I Computed on a monthly basis, the graph showing the distribution of the RMS (of Observation minus First Guess Field) of Air Pressure data according to ECMWF monthly monitoring statistics. This graph, which uses 6 months of data, gives a good estimate of the quality of the drifting buoy Air Pressure data. The graph is included in the TC monthly report. See figure 4.

9.3. Air pressure from drifting buoy life time. I Computed the graphs showing the distribution of life times of Air Pressure measurements, using the ECMWF monthly monitoring statistics. See figure 5.

10. Action Groups. Regional actions.

10.1) EGOS: I attended the EGOS Management Committee and Technical Sub-group meetings and particularly assisted the program in the following topics:

- Deployment of buoys west of Greenland, deployment strategy and longevity of buoys;

- Liaise with Thor Kvinge (EGOS Technical Secretariat) regarding QC issues;

- Air Pressure Tendency not consistent with Air Pressure values 3 hours apart. The cause of the problem was finally identified.

10.2) IABP: I attended the fourth annual meeting of the International Arctic Buoy Program in Helsinki, 20-22 June 1994. I assisted the Program in the following topics:

- GTS bulletin headers, GTS distribution of the data towards Moscow;

- Quality Control in conjunction with the Principal Investigators;

- Double check the Program status map issued by Roger Colony.

10.3) IPAB: I attended the launching meeting on an International Program for Antarctic Buoys in Helsinki, 22-24 June 1994. I particularly proposed assistance to any Principal Investigator interested in GTS distribution of the data. ,

10.4) ISABP (see also paragraph 2.4). I attended the first preparatory meeting for the implementation of an International South Atlantic Buoy Programme, and provided assistance in the following topics:

- Prepare the list of drifting buoy programmes operating in the area;

- Compute orbital delay simulations for buoys transmitting from the area;

- Study in conjunction with CLS, Service Argos the feasibility of installing an LUT in Buenos Aires and/or Cape Town;

- Assist the Servicio de Hydrographia Naval (Argentina) for implementing 4 of their buoys on GTS;

- Provide the Argentinean Meteorological Service with documentation on the Argos system as well as the list of drifting buoy manufacturers.

10.5) Ukrainian Academy of Sciences.

I received a letter from Prof. Eremeev of the Ukrainian Academy of Sciences in Crimea. He was proposing cooperation between his Academy and the DBCP and/or Service Argos. After enquiring further details, it appears that CLS, Service Argos is more competent than the DBCP for the kind of cooperation they are looking for. I therefore passed the issue to CLS. The DBCP could however advertise the possibility for the Ukrainian Academy of Sciences to make Lagrangian drifter hulls and cooperate with interested agencies on a bilateral basis.

11. Miscellaneous

11.1. Drifting Buoy Quarterly Report. I checked the Quarterly Report on Drifting Buoy and gave approval before CLS could send it to WMO and IOC.

11.2. Argos monthly status report. I checked the Argos monthly status report to WMO which was prepared by CLS, Service Argos.

11.3. TC DBCP files. I updated my files on a PC, using a data base management system (Paradox) and getting the data from Argos files, and various status reports. I kept up to date an history file on each Argos drifting buoy programme (contacts with PIs, PI authorizing GTS distribution, information on types of sensor installed, etc...).

11.4. WMO/Argos number cross reference list and PGC list. I issued, on a monthly basis, the WMO/Argos number cross reference list, and sent it to various Meteorological Centers and interested individuals. I provided MEDS with the list via INTERNET. The list also includes the WMO numbers managed by the Oslo and Edmonton Local User Terminals (LUT) and indicates for each WMO number, the Argos number, the drifting buoy owner, and the dates the WMO numbers have been introduced and removed from the system (Argos or LUT). Attached to it is also included the list of Principal GTS Coordinators (PGC) designated by Principal Investigators for asking Service Argos to implement status changes on buoys reporting onto the GTS.

11.5. TC DBCP bi-monthly report. I provided the Chairman of the DBCP as well as the WMO and IOC Secretariats with my bi-monthly report.

11.6. GOOS annual status report. I provided the IOC secretariat with documents and graphs for inclusion in the GOOS status report for 1993.

11.7. Documentation, assistance. I provided users with documentation or status reports concerning specific programs or experiments; I answered specific questions regarding the Argos System.

11.8. TC DBCP missions. I prepared the various missions or meetings I had to attend.

11.9. DBCP-X. I prepared specific documents and the TC report for the DBCP X session:

- Report of the Technical Coordinator;
- Report on drifting buoy data Quality Control;
- Report on Combined Meteorological/Oceanographic Drifting Buoys;
- Report on the New Argos GTS Sub-System.

11.10. WMO guide to Argos. I assisted updating the WMO guide on data collection and localization services using Service Argos. The formal 1988 version was scanned and could directly be edited in a computer format. I received and included comments from Eric Meindl (NDBC), Peter Dexter (WMO), Christian Ortega (CLS), and I updated the part related to the GTS sub-system. The updated draft version was finally sent to Eric Meindl for review. The draft version should be available at DBCP-X for final review and possible amendments. The official 1995 revised version of the guide will hopefully be published by WMO in early 1995.

11.11. Argos Bulletin. I wrote several articles regarding the Argos GTS sub-system for inclusion in the Argos bulletin.

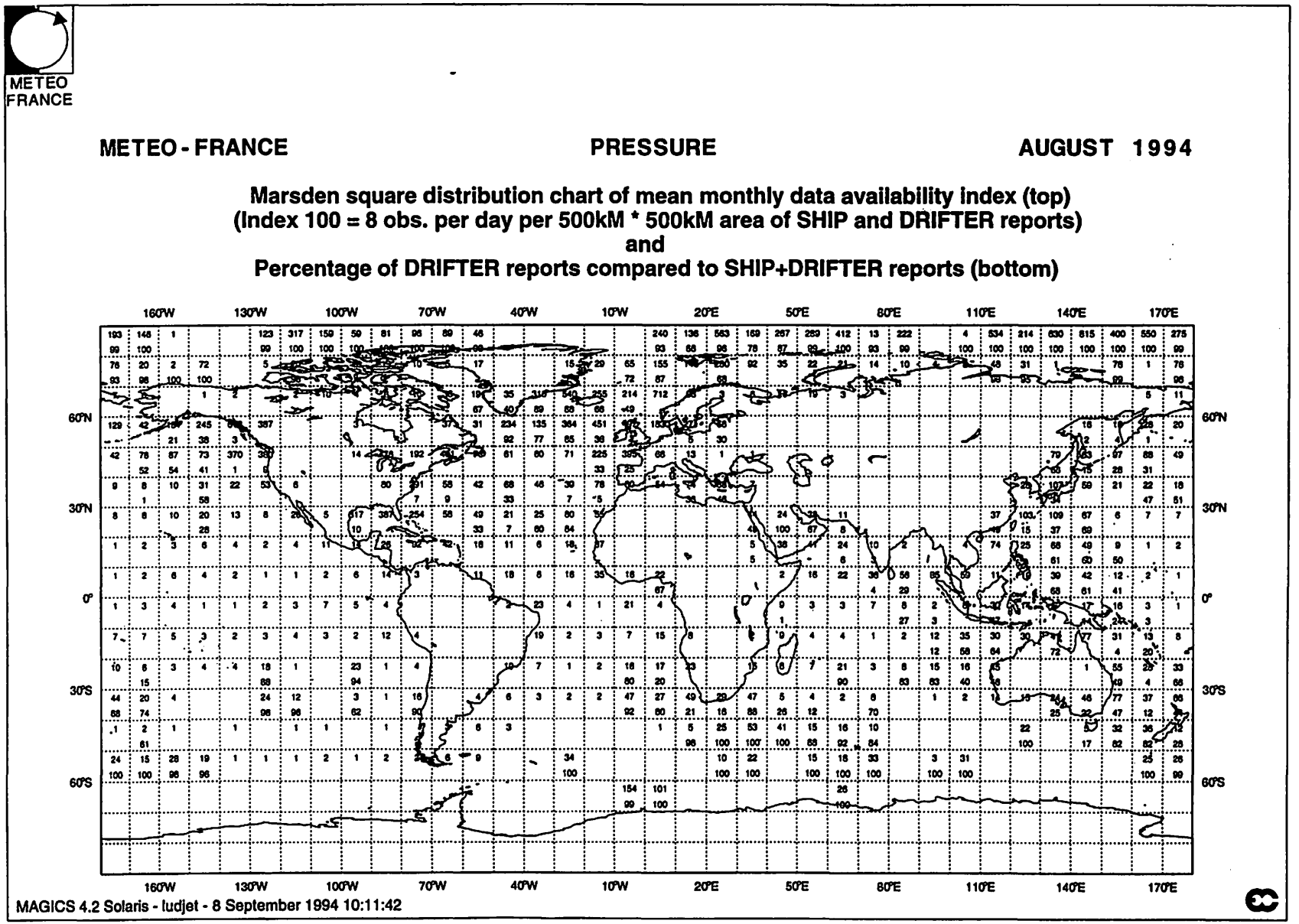
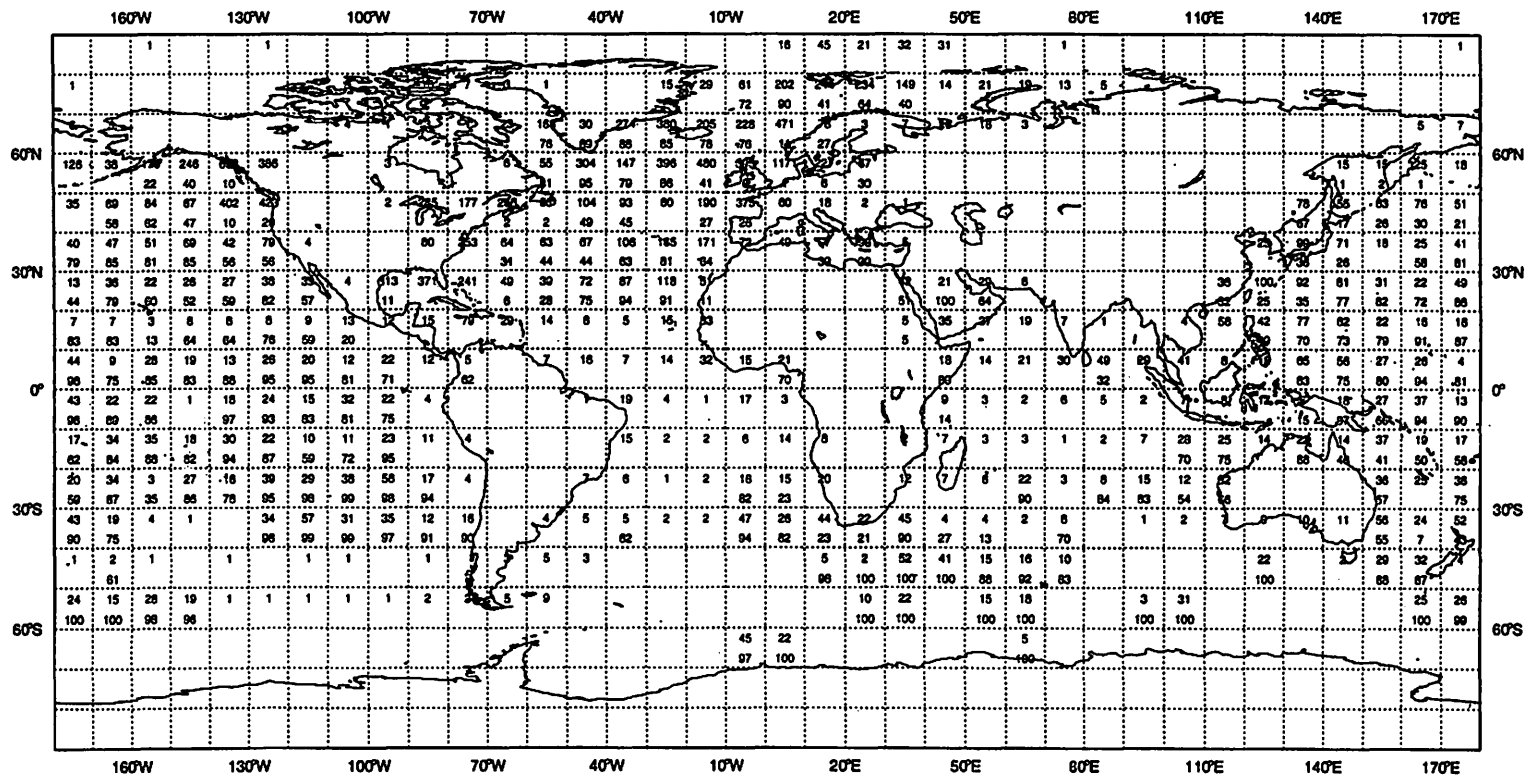


Figure 1. Météo France August 1994 data availability Index maps by geophysical variable for SHIP and DRIFTER GTS reports (Air Pressure, Air Temperature, Sea Surface Temperature, Wind)

METEO FRANCE

METEO-FRANCE **SEA SURFACE TEMPERATURE** **AUGUST 1994**

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

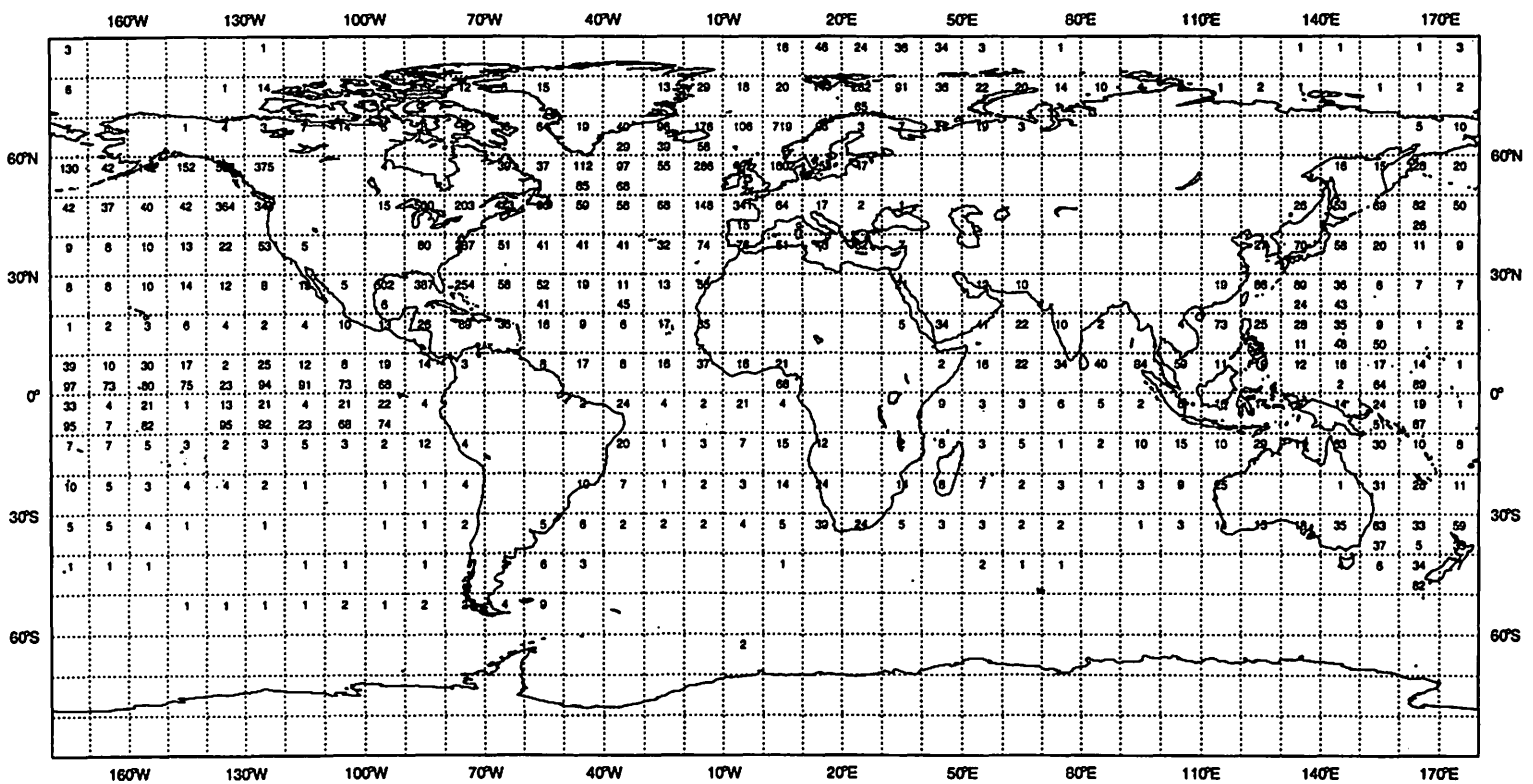


MAGICS 4.2 Solaris - ludjet - 8 September 1994 10:11:52

METEO FRANCE

METEO - FRANCE **WIND** **AUGUST 1994**

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

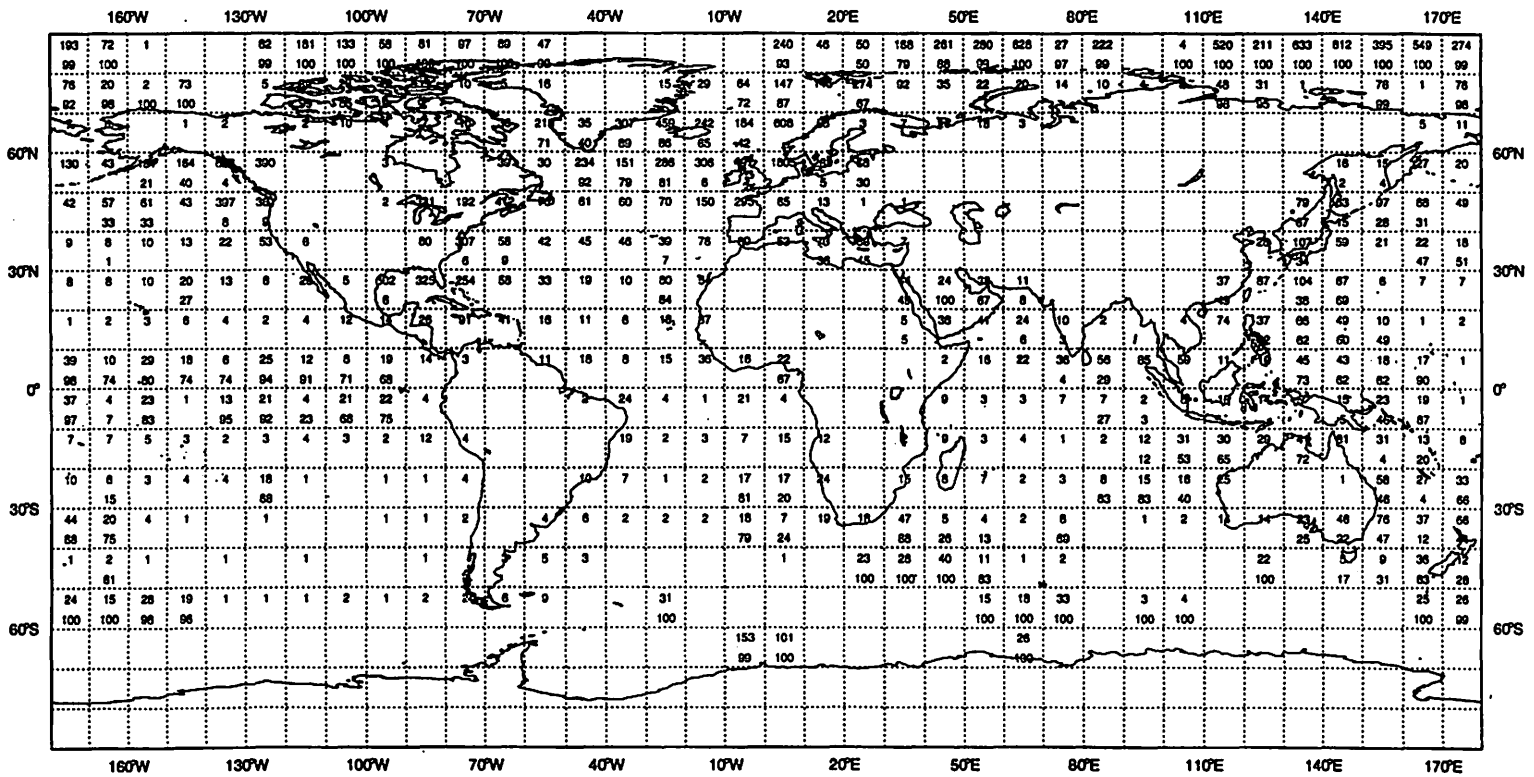


MAGICS 4.2 Solaris - ludjet - 8 September 1994 10:12:02

METEO FRANCE

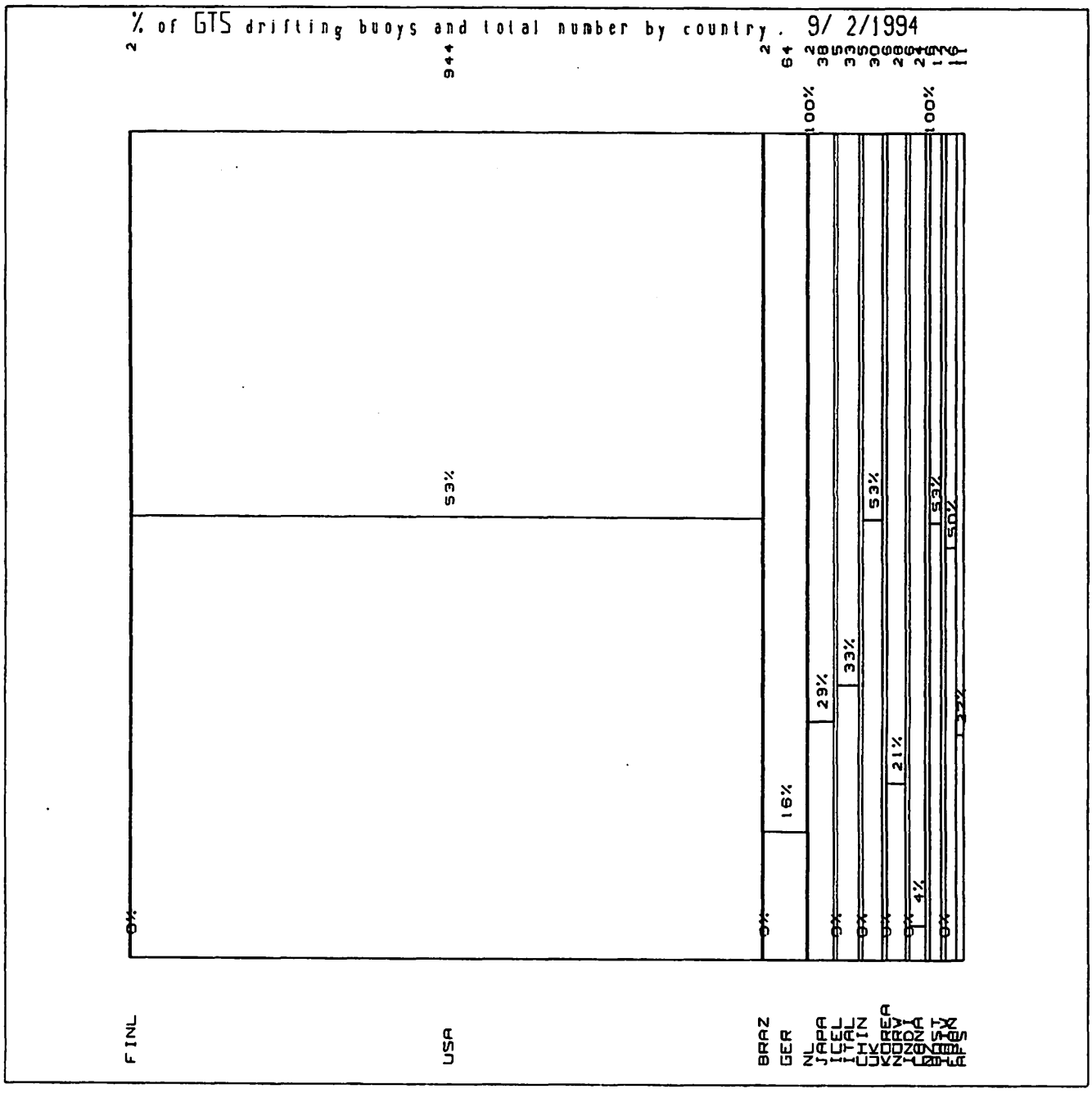
METEO - FRANCE **TEMPERATURE** **AUGUST 1994**

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



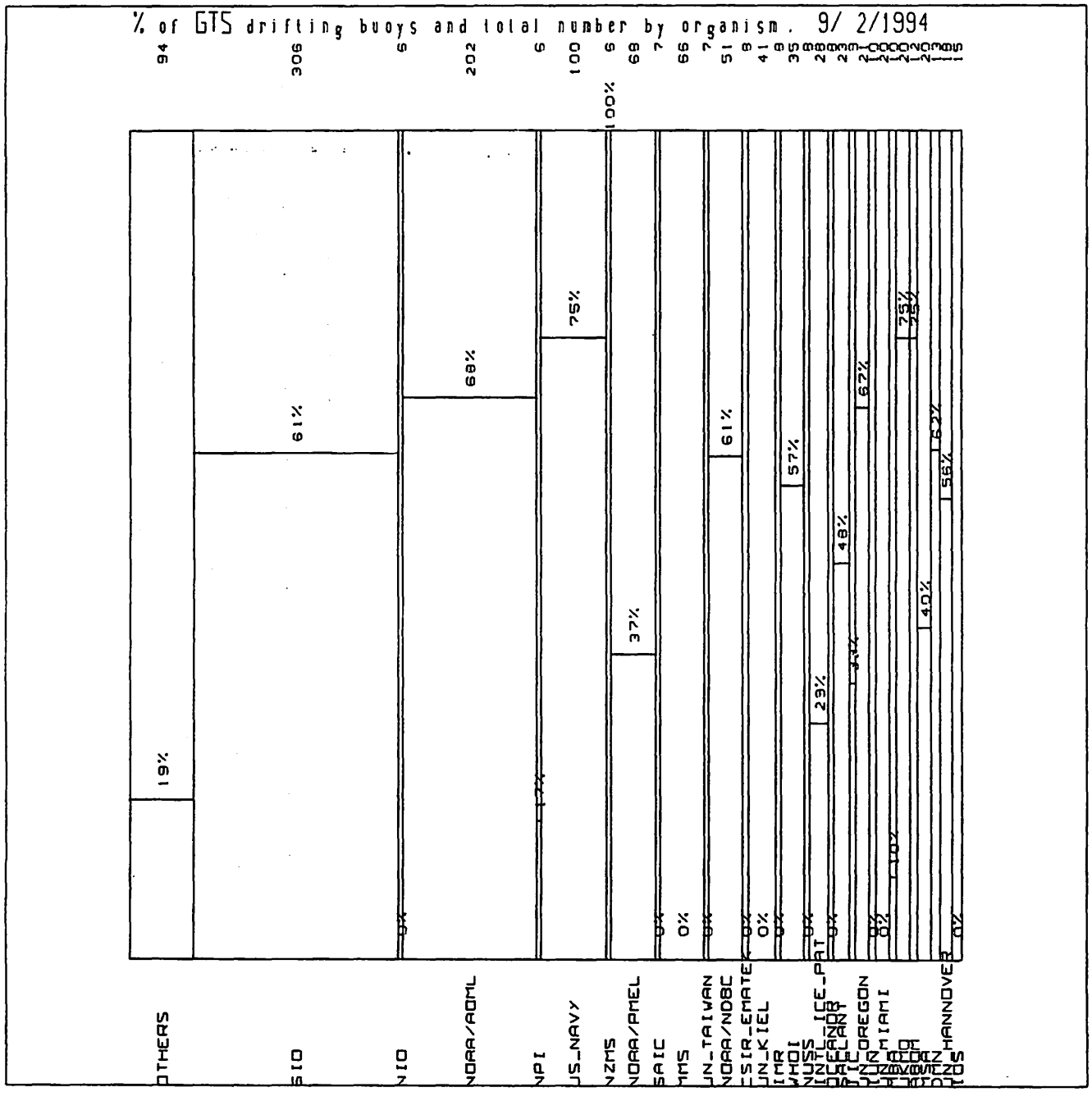
MAGICS 4.2 Solaris - ludjet - 8 September 1994 10:12:13

Figure 2. Distribution of GTS and non-GTS platforms by country:



Total number of drifting buoys: 1246
Total number of drifting buoys reporting to the GTS: 587= 47.1%

Figure 3. Distribution of GTS and non-GTS platforms by organization:



Total number of drifting buoys: 1246
Total number of drifting buoys reporting to the GTS: 587= 47.1%

Figure 4. Distribution of RMS (Obs. - First Guess Field. for Air Pressure data:

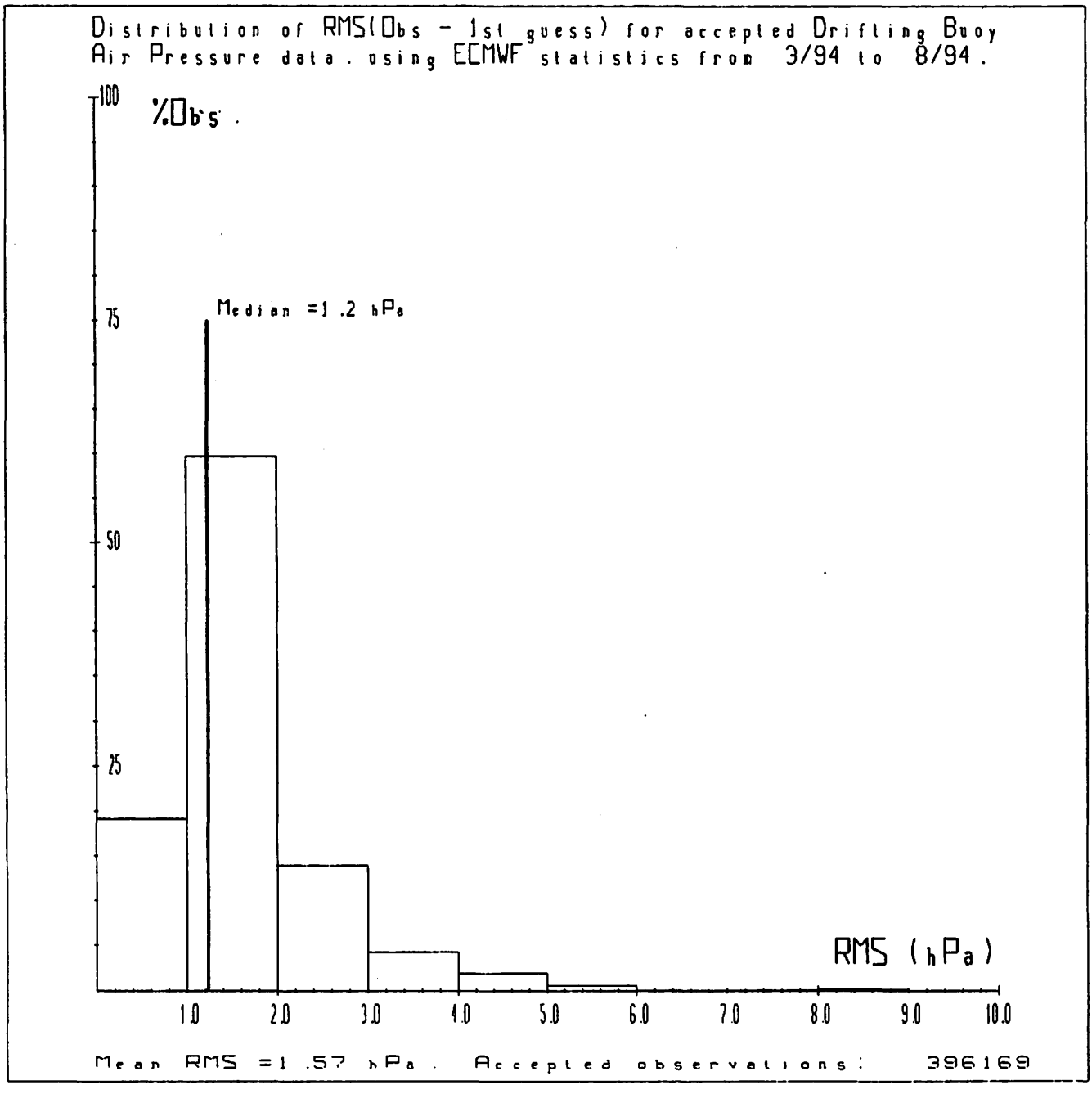


Figure 5. Distribution of the Life Time of the Air Pressure sensor:

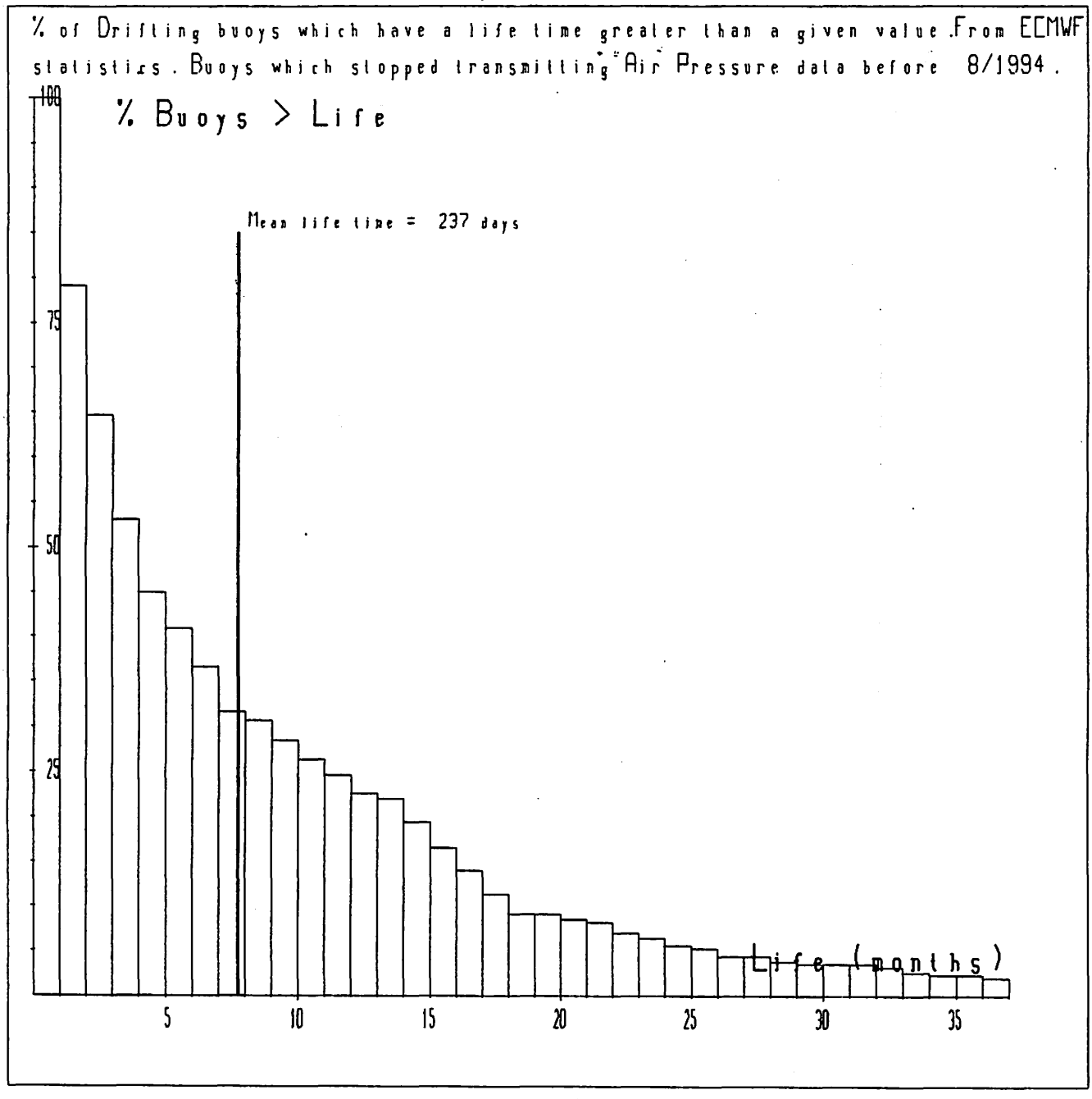


Table 1. List of GTS bulletin headers being used for drifting buoy data.

$T_1T_2A_1A_2ii$	Approximate region of deployment or Programme
USGPC (Service Argos Inc., Landover, USA):	
SSVX04 KARS	North Atlantic Ocean;
SSVX06 KARS	Northern Hemisphere;
SSVX10 KARS	Southern Hemisphere;
SSVX12 KARS	Arctic Ocean;
SSVX14 KARS	Antarctic area;
SSVX16 KARS	Specific experiments. Buoys from various ocean area;
SSVX40 KARS	ATLAS moored buoys in the Equatorial Pacific Ocean;
SSVX96 KARS	Specific experiment conducted by the NDBC.
QC by NDBC (Mississippi, USA) based on data from the USGPC:	
SSVX02 KWBC	Southern Hemisphere;
SSVX08 KWBC	Northern Hemisphere.
JIC (Washington-DC, USA) based on data received from the USGPC:	
SSVX18 KWBC	Arctic Ocean.
FRGPC, (CLS, Service Argos, Toulouse, France):	
SSVX01 LFPW	North Atlantic Ocean;
SSVX03 LFPW	Southern Hemisphere;
SSVX05 LFPW	Northern Hemisphere;
SSVX07 LFPW	Arctic Ocean;
SSVX09 LFPW	Antarctic area;

CMM (Brest, France) based on data received from the FRGPC:

SSVX51 LFPW North Atlantic Ocean;
SSVX55 LFPW Equatorial Pacific Ocean.

Oslo LUT (NMI, Oslo, Norway):

SSVX01 ENMI North Atlantic Ocean (for the EGOS Programme);

Sondre Stromfjord LUT (DMI, Greenland):

SSVX01 BGSF North Atlantic Ocean (for the EGOS programme);

Halifax LUT (Environment Canada):

SSVX01 CWHX North-West Atlantic Ocean.

Edmonton LUT (Environment Canada):

SSVX02 CWEG Arctic Ocean;
SSVX03 CWEG Hudson Bay;
SSVX04 CWEG NorthEast Pacific Ocean.

Figure 6

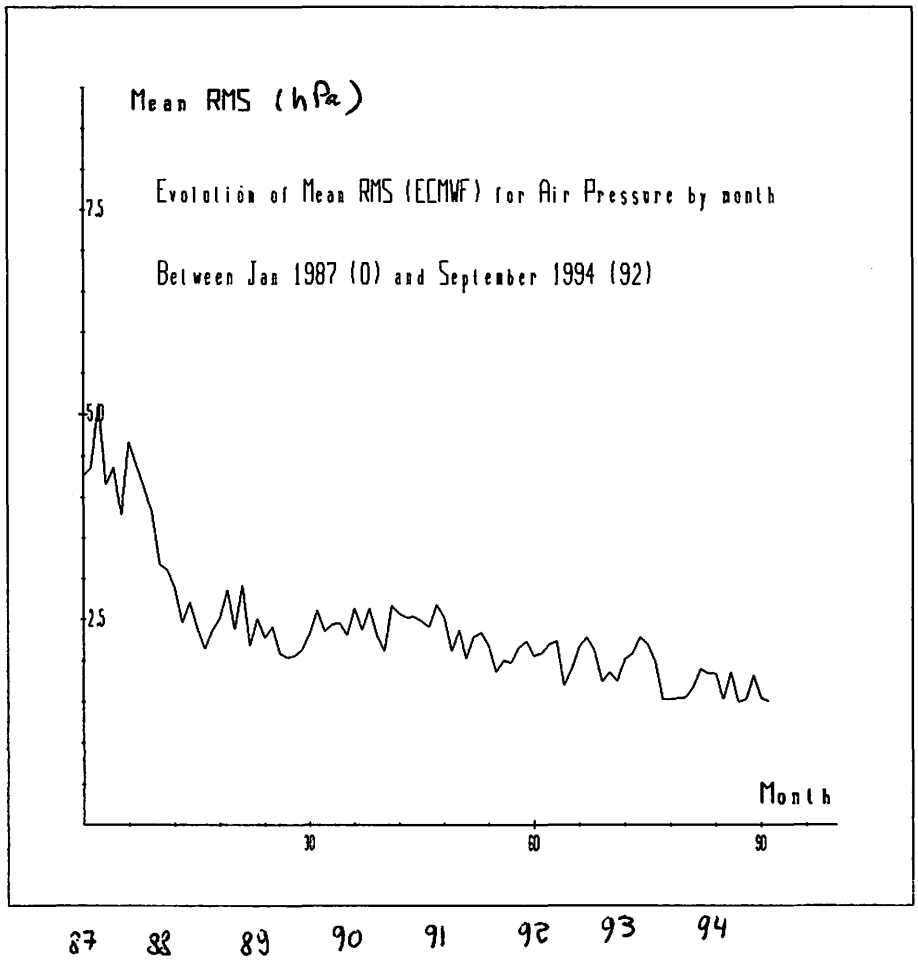
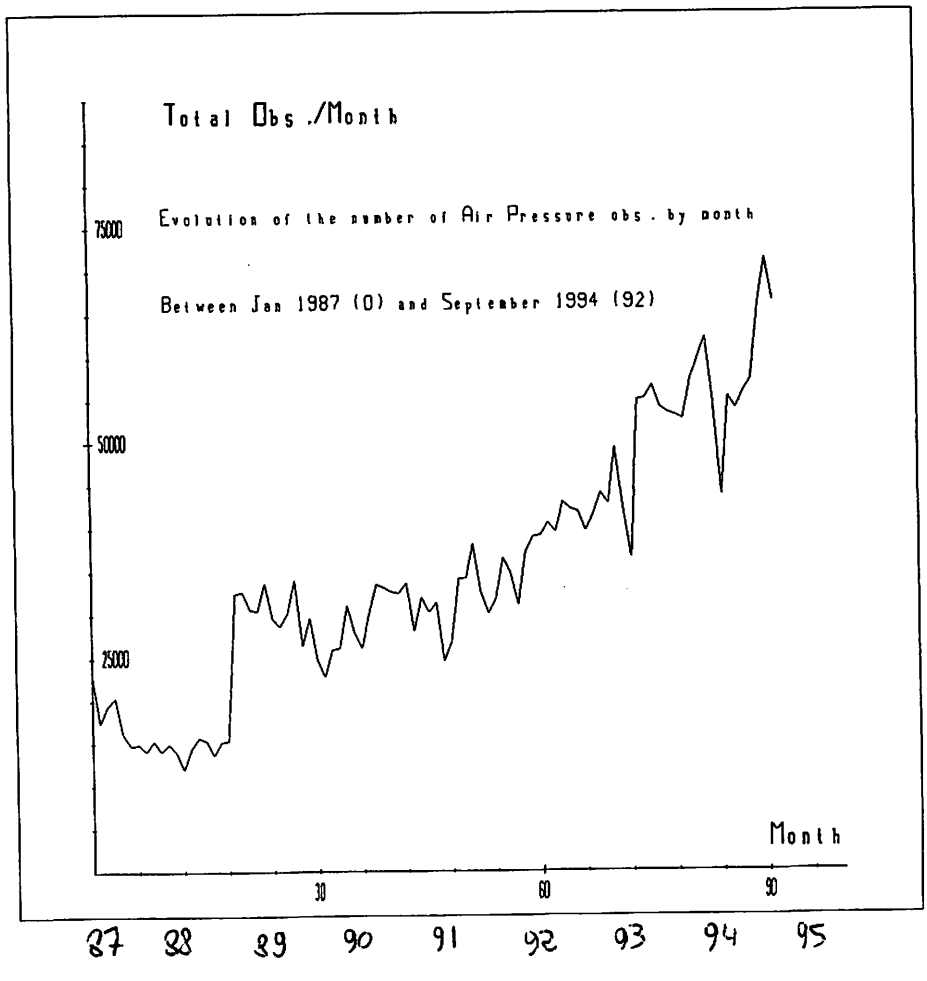


Figure 7



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FINANCIAL STATEMENTS PROVIDED BY WMO AND IOC

Statement by WMO for biennium 1992-1993

	US$	US$
Balance from 1991	6,585	
Contributions received for prior biennium	15,000	
Contributions received for 1992/1993	246,048	
Contributions received for 1994	22,650	
Total		290,283
Obligations Incurred		
UCAR	89,109	
Technical Co-ordinator	117,342	
Service Argos	14,500	
Prep Meeting South Atlantic Buoy System	8,489	
Experts	1,035	
Travel	29,259	
DBCP Ties	(961)	
Administration direct	930	259,703
Balance of Fund	US $	30,580

Represented by.	
Cash at Bank	31,755
less: Unliquidated Obligations	1,175
US $	30,580

Contributions received for prior years		
Canada	US $	15,000

Contributions received	for 1992/1993			for 1994
	1992	1993	Total	1994
Australia	11,000	12,500	23,500	
Canada	16,500	18,000	34,500	18,000
France	11,513	13,028	24,541	
Greece	2,100		2,100	
Iceland	2,100	2,100	4,200	1,500
Ireland	499	516	1,015	
Netherlands	1,575	1,575	3,150	1,575
Norway	1,575	1,575	3,150	1,575
UK	11,000	15,000	26,000	
USA	55,000	68,000	123,000	
GTS Chain Fund		892	892	
TOTAL	112,862	133,186	246,048	22,650

Statement by IOC for the year 1 June 1993 to 31 May 1994

Period : 1 June 1993 - 31 May 1994

FUNDS TRANSFERRED FROM WMO :

104 500	(28.04.93)	
10 000	(15.07.93)	
5 000	(08.11.93)	$ 119 500
75 000 FF	(08.11.93)	75 000 FF

EXPENDITURES

Technical Co-ordinator's employment:			
- Salary:		54 771	
- Allowances:		19 039	
- Relocation:		18 105	91 915
Technical Co-ordinator's missions:			
- Athens (18-29 October 1993):		2 375	
- Paris (6-8 December 1993):		813	
- Buenos Aires (11-18 December 1993)[1]:		-	
- USA (14-20 May 1994):		3 914	7 106
	Total:		$ 99 021
Contract with CLS/Service Argos:			75 000 FF

BALANCE $ 20 419

[1] ***The mission to Buenos Aires was fully funded by CLS/Service Argos.***

Statement by WMO for the period 1 January 1994 to 30 September 1994

	US$	US$
Balance from 1993		30,580
Contributions Paid for Current Biennium	123,759	
less: Received in 1993	22,650	101,109
Total Funds Available		131,689
Obligations Incurred		
UCAR	0	
Technical Co-ordinator	90,000	
Service Argos	0	
Prep Meeting South Atlantic Buoy System	5,039	
First planning meeting Baltic observing system	1,094	
Experts	0	
Technical co-ordinator travel	15,000	
DBCP Ties	0	
Administration direct	0	111,133
Balance of Fund	US $	20,556
Represented by.		
Cash at Bank		21,652
less: Unliquidated Obligations		1,096
	US $	20,556

Contributions received for prior years

Contributions	Received In 1993	Received 1994/95		
	1994	1994	1995	US $ Total
Australia		12,500		12,500
Canada	18,000			18,000
France				0
Greece		4,200		4,200
Iceland	1,500			1,500
Ireland		1,409		1,409
Netherlands	1,575			1,575
Norway	1,575			1,575
UK		15,000		15,000
USA		68,000		68,000
TOTAL	22,650	101,109	0	123,759

Estimated income and expenditure until 31 May 1995

	US$	*FF*
Income		
Balance of fund from interim account	20,556.-	
Contribution from France 1994		75,000.-
TOTAL	20,556.-	75,000.-
Expenditure		
CLS/Service Argos contract		77,000.-
Publications	3,000.-	
Additional DBCP ties	1,536.-	
Additional travel of chairman	5,000.-	
TOTAL	9,536.-	77,000.-
Anticipated balance to transfer to 1995-1996 account	9,650.-	

UNESCO EMPLOYMENT COSTS FOR THE TECHNICAL CO-ORDINATOR

(Figures in US $)

$1 = 5.38 FF[1] (Sept. 1994)	1 June 1994/ 31 May 1995	1 June 1995/ 31 May 1996	1 June 1996/ 31 May 1997
Salary	59 000	64 000	69 000
Allowances	20 500	22 000	24 000
Relocation	-	?	?
TOTAL	79 500	86 000	93 000

[1] *As a reminder of the figures considered by the Panel in the past:*
in September 1993, the rate was $1 = 5.85 FF;
in July 1992, the rate was $1 = 5.18 FF.

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ESTIMATES OF EXPENDITURES AND INCOME FOR 1995-1996

A. Expenditures

	US dollars
IOC salary	90,000.-
Travel of the technical co-ordinator	15,000.-
CLS/Service Argos	15,000.-
WMO costs	300.-
Travel of chairman and publications	15,000.-
Contingencies	9,000.-
TOTAL	144,300.-

B. Income

Contributions	134,650.-
Carry-over 1994-1995	9,650.-
TOTAL	144,300.-

(**Note:** Official UN exchange rate in September 1994, $1 = FF 5.38)

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TABLE OF PROVISIONAL CONTRIBUTIONS 1995-1996

	1994-1995		1995-1996	
AUSTRALIA	12,500		12,500	
CANADA	18,000		15,000	
FRANCE	~ 15,000	(FF 75,000)	~ 15,000	(FF 75,000)
GREECE	2,200		2,200	
ICELAND	1,500		1,500	
IRELAND	1,500	(IR£1,000)	1,500	(IR£1,000)
NETHERLANDS	1,575		1,575	
NORWAY	1,575		1,575	
SOUTH AFRICA	-		3,000	
UNITED KINGDOM	15,000		15,000	
USA	68,000		68,000	
TOTAL	134,650		134,650	

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PLANNED SVP DRIFTER DEPLOYMENTS FOR WOCE

Ocean	Resolution	Array size	Active drifters October 1994	Plans for 1995
Equatorial Pacific 15N-15S	3° x 10°	160	138	145 (USA) 15 (Japan) **Total = 160**
Mid-latitude Pacific 15N-60N and 15S-35S	6° x 6°	182	201	135 (USA) 5 (Australia) 20 (Canada) 9 (Korea) 6 (Japan) **Total = 175**
North Atlantic 60N-20N	5° x 5°	60	138	99 (USA) 5 (United Kingdom) 5 (France) 20 (Iceland) **Total = 129**
Indian Ocean 10N-35S	5.5° x 5.5°	90	6	176 (USA) 6 (Japan) 20 (India) **Total = 202**
Southern Ocean 35S-60S	4° x 11°	180	43	168 (USA) 20 (South Africa) 4 (Argentina) **Total = 192**
South Atlantic 15S-35S	5.5° x 5.5°	60	15	15 (Brazil) **Total = 15**
Equatorial Atlantic 15N-15S	3° x 10°	60	0	45-50 (USA) **Total = 45-50**

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REPORT OF THE IGOSS SPECIALIZED OCEANOGRAPHIC CENTRE FOR DRIFTING BUOYS

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 1993.

Figure 5 shows the time evolution of waveobs reports since the 1st of January 1993.

Each month mapping position plot charts and Marsden square distribution are produced for Drifter and Ship and are sent to 70 users in the world. Figures 6, 7, 8, 9 show products for June 1994.

The SOC has increased its activities, Figures 10, 11, 12, 13 show Marsden square distribution chart of mean monthly data availability (top) and Percentage of Drifter reports compared to ship + drifter reports (bottom) for wind, pressure, air temperature, sea surface temperature for June 1994.

French SOC Representative

Joël POITEVIN

Omnet : J. POITEVIN

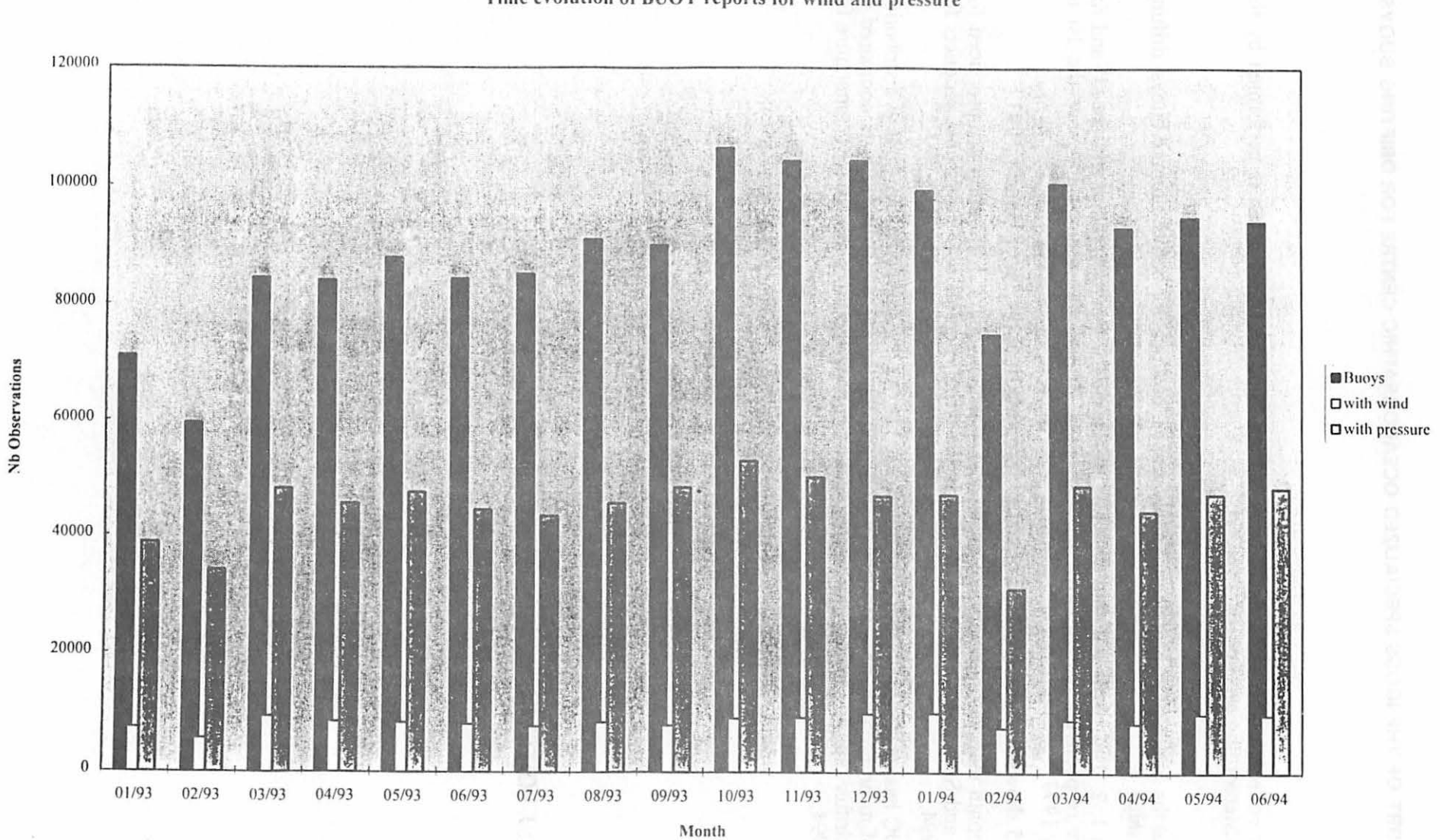

Time evolution of BUOY reports for wind and pressure
Nb Observations
120000
100000
80000
60000
40000
20000
0
01/93
02/93
03/93
04/93
05/93
06/93
07/93
08/93
09/93
10/93
11/93
12/93
01/94
02/94
03/94
04/94
05/94
06/94
Month
Buoys
with wind
with pressure

Figure 1

Time evolution of Moored BUOY reports for wind and pressure

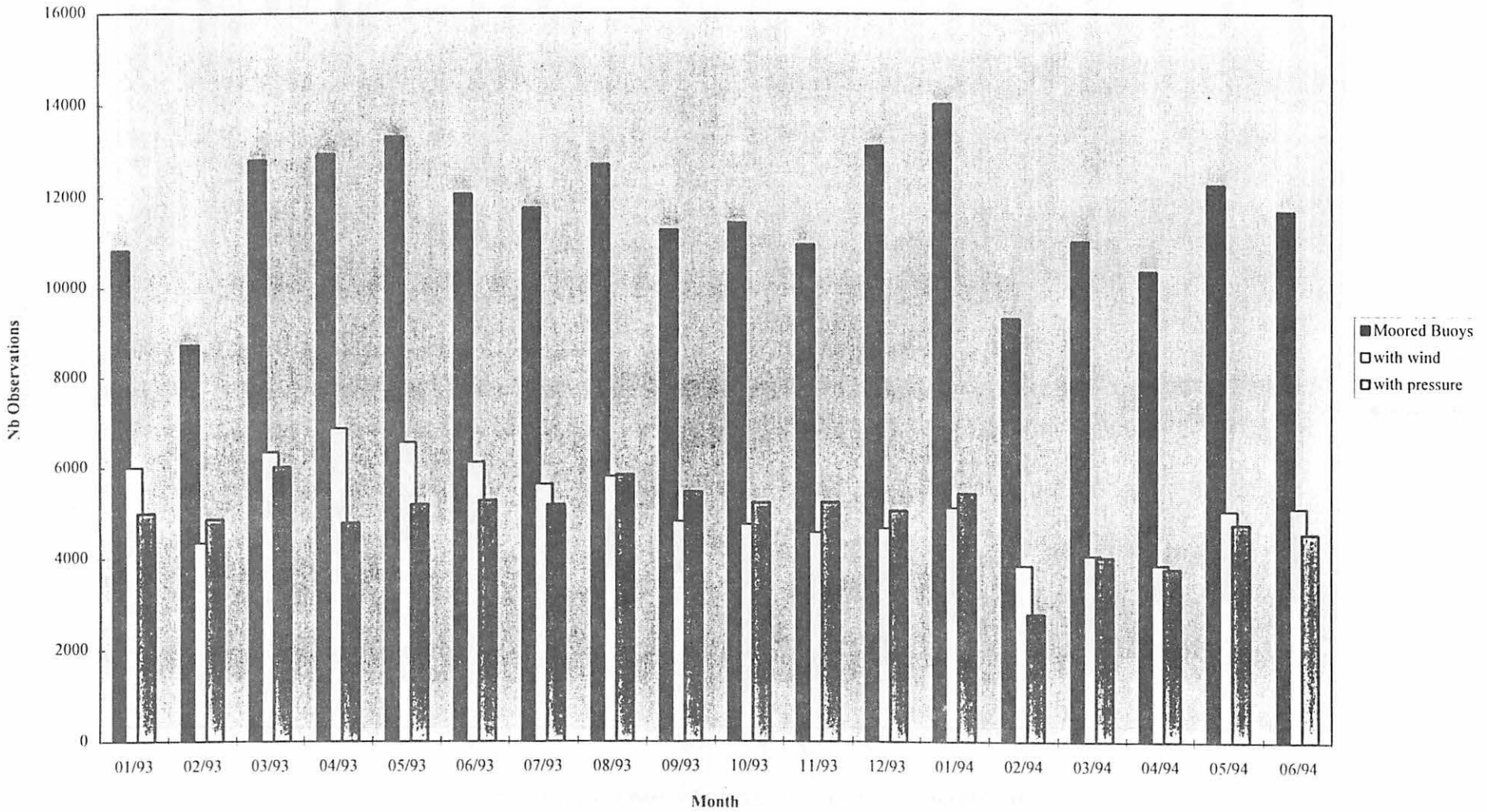


Figure 2

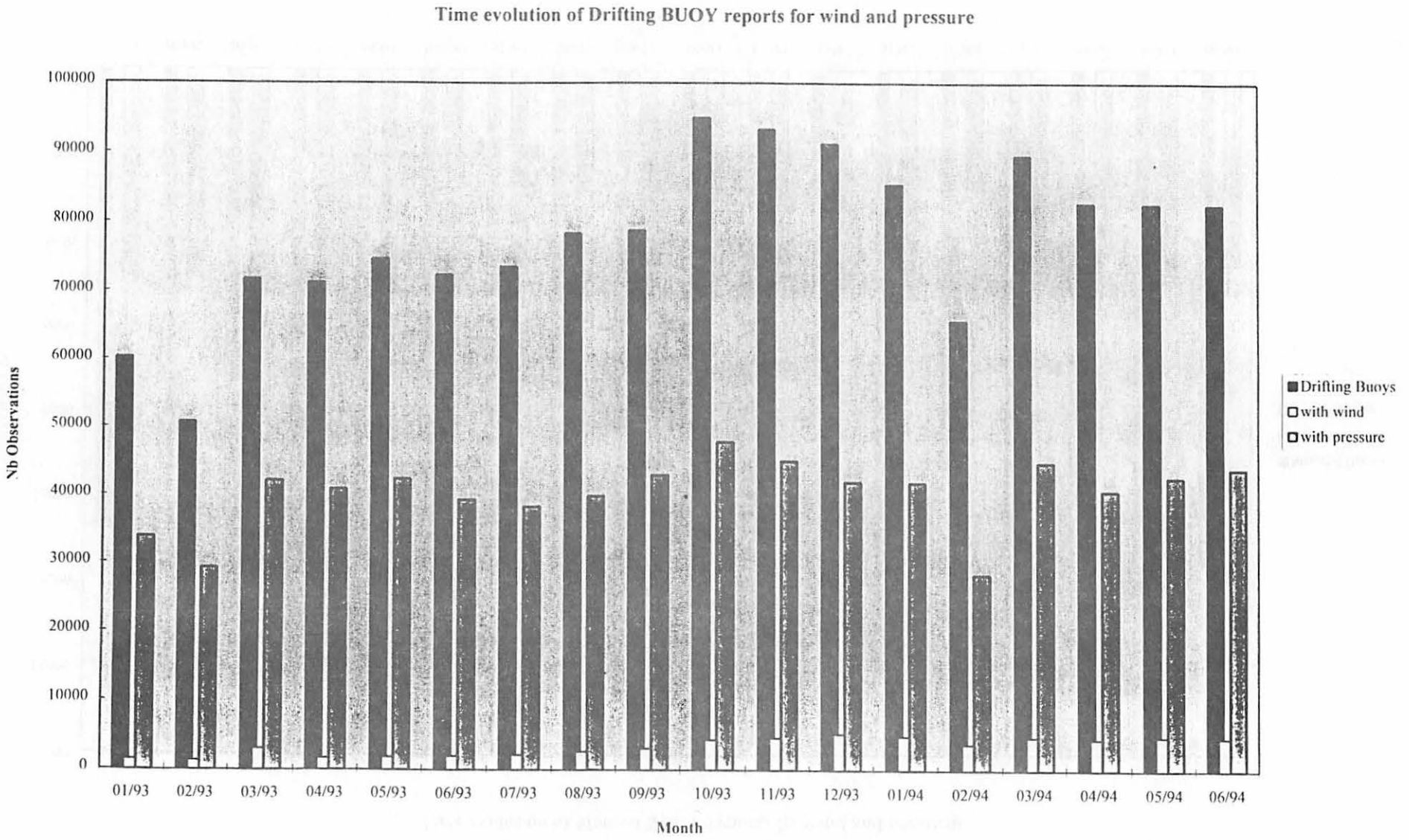

Time evolution of Drifting BUOY reports for wind and pressure
Nb Observations
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
01/93
02/93
03/93
04/93
05/93
06/93
07/93
08/93
09/93
10/93
11/93
12/93
01/94
02/94
03/94
04/94
05/94
06/94
Month
Drifting Buoys
with wind
with pressure

Figure 3

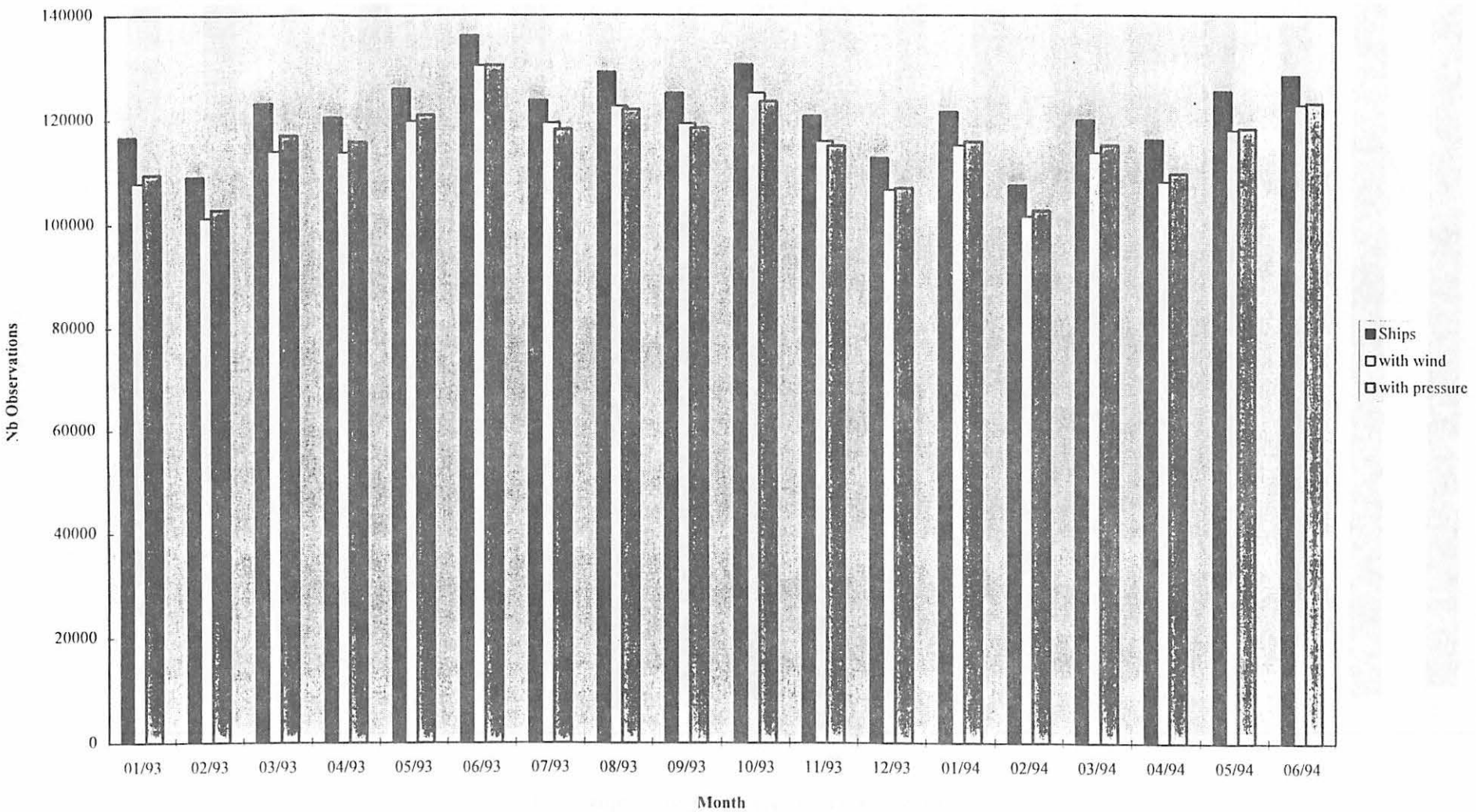

Time evolution of SHIP reports for wind and pressure
Nb Observations
140000
120000
100000
80000
60000
40000
20000
0
01/93
02/93
03/93
04/93
05/93
06/93
07/93
08/93
09/93
10/93
11/93
12/93
01/94
02/94
03/94
04/94
05/94
06/94
Month
Ships
with wind
with pressure

Figure 4

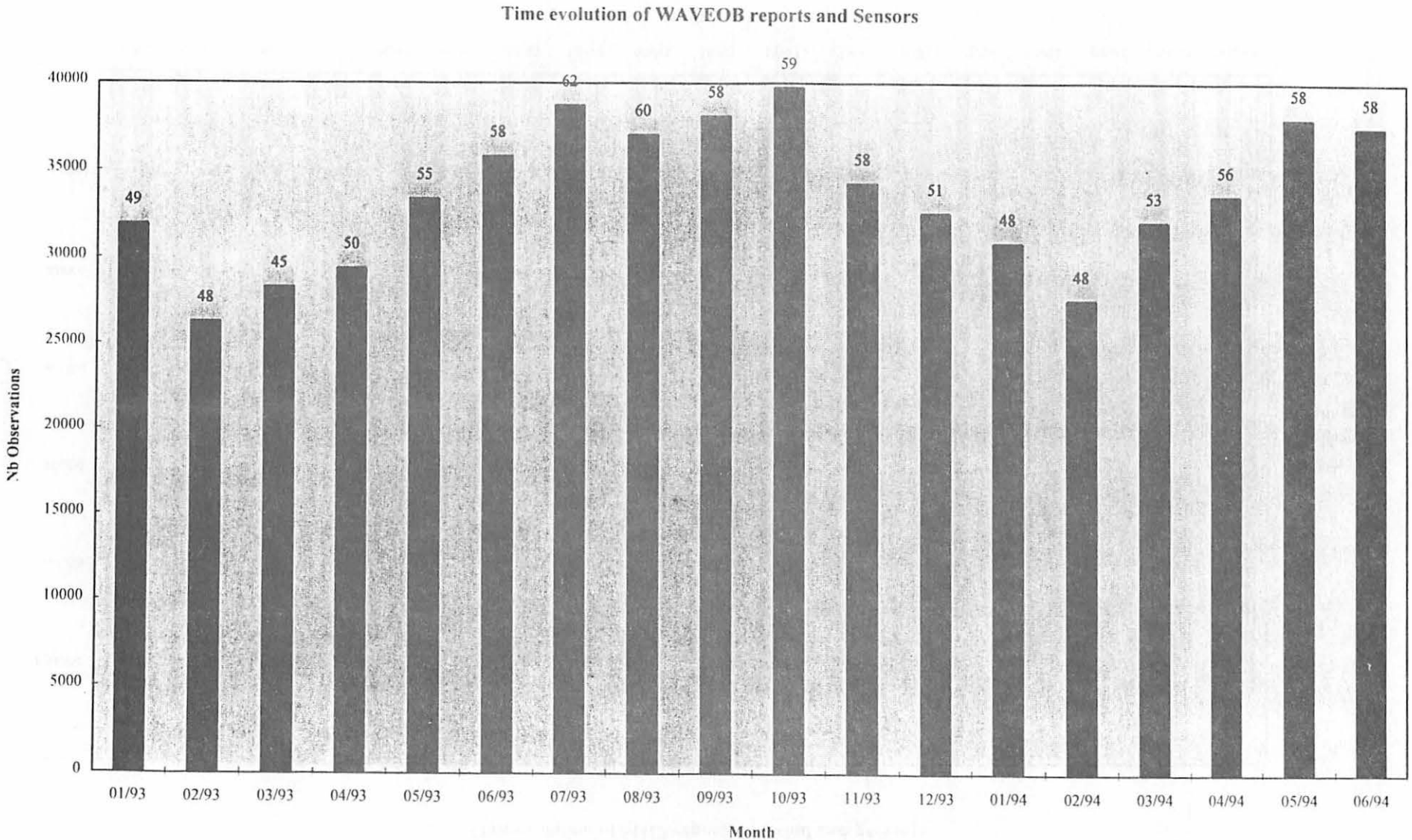

Time evolution of WAVEOB reports and Sensors
Nb Observations
40000
35000
30000
25000
20000
15000
10000
5000
0
49
48
45
50
55
58
62
60
58
59
58
51
48
48
53
56
58
58
01/93
02/93
03/93
04/93
05/93
06/93
07/93
08/93
09/93
10/93
11/93
12/93
01/94
02/94
03/94
04/94
05/94
06/94
Month

Figure 5

METEO-FRANCE/SMISO

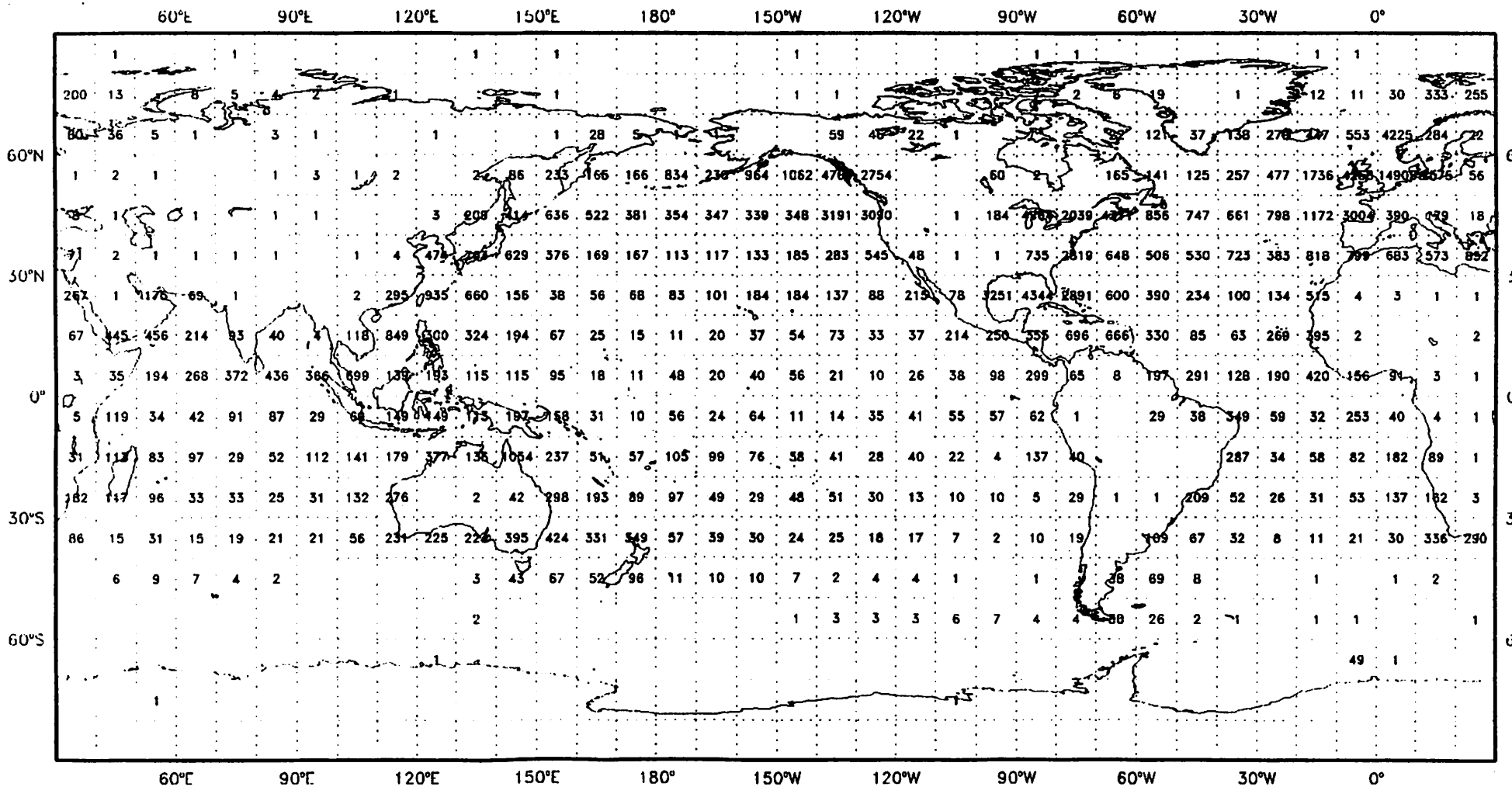
FRENCH MET OFFICE/IGOSS

Repartition par carre Marsden des observations recues en Juin 1994

Marsden square distribution chart of data received during June 1994

Messages : SHIP

Total : 128419



GICS 4.0 NOS/VE - SMISO23 15 July 1994 09:42:46

ANNEX X, p. 7

METEO-FRANCE/SMISO

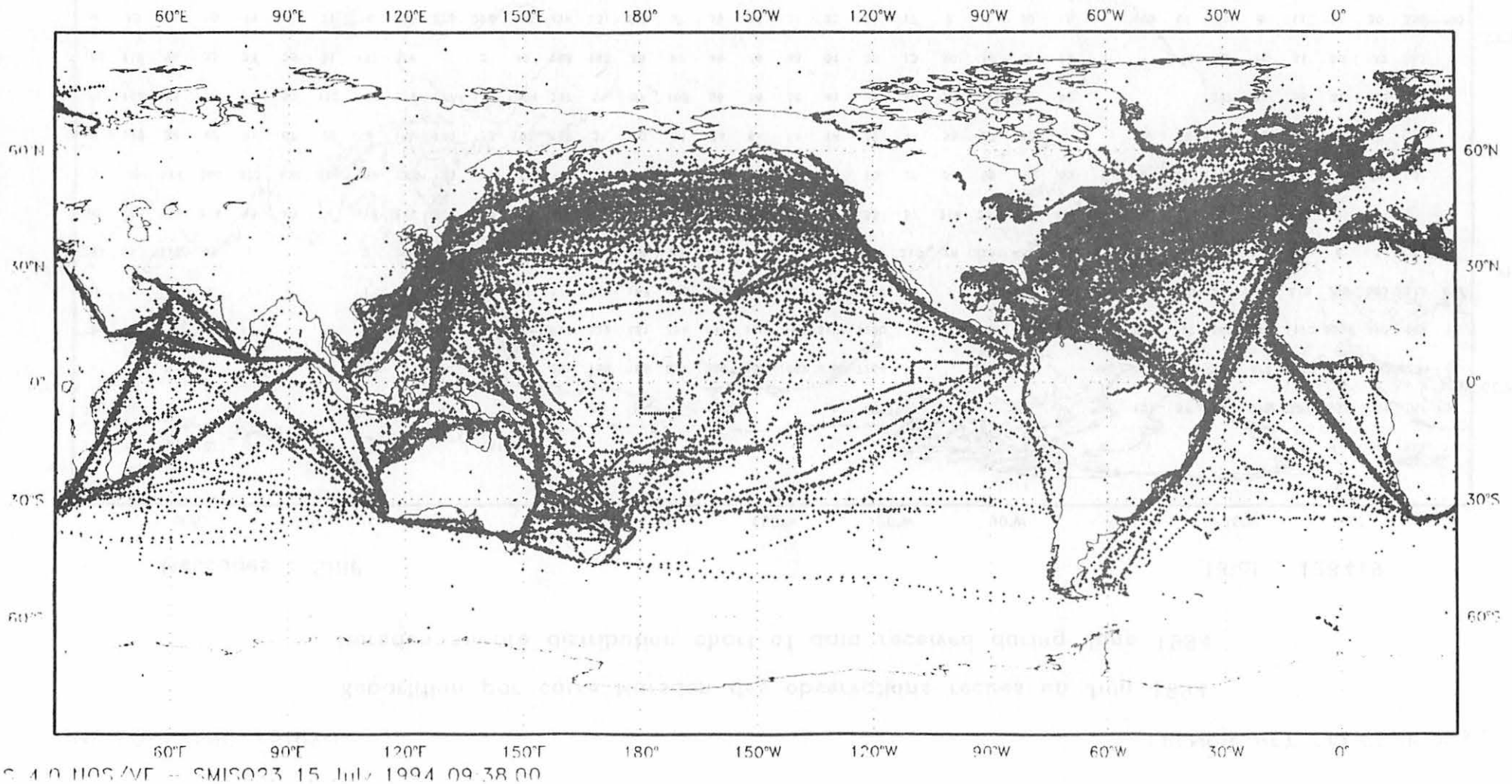
FRENCH MET OFFICE/IGOSS

Carte de pointage des observations recues en Juin 1994

Mapping position plot chart of data received during June 1994

Messages : SHIP

Total : 128419



C 4.0 HQS/VF -- SMIS023 15 Jul 1994 09:38:00

METEO-FRANCE/SMISO

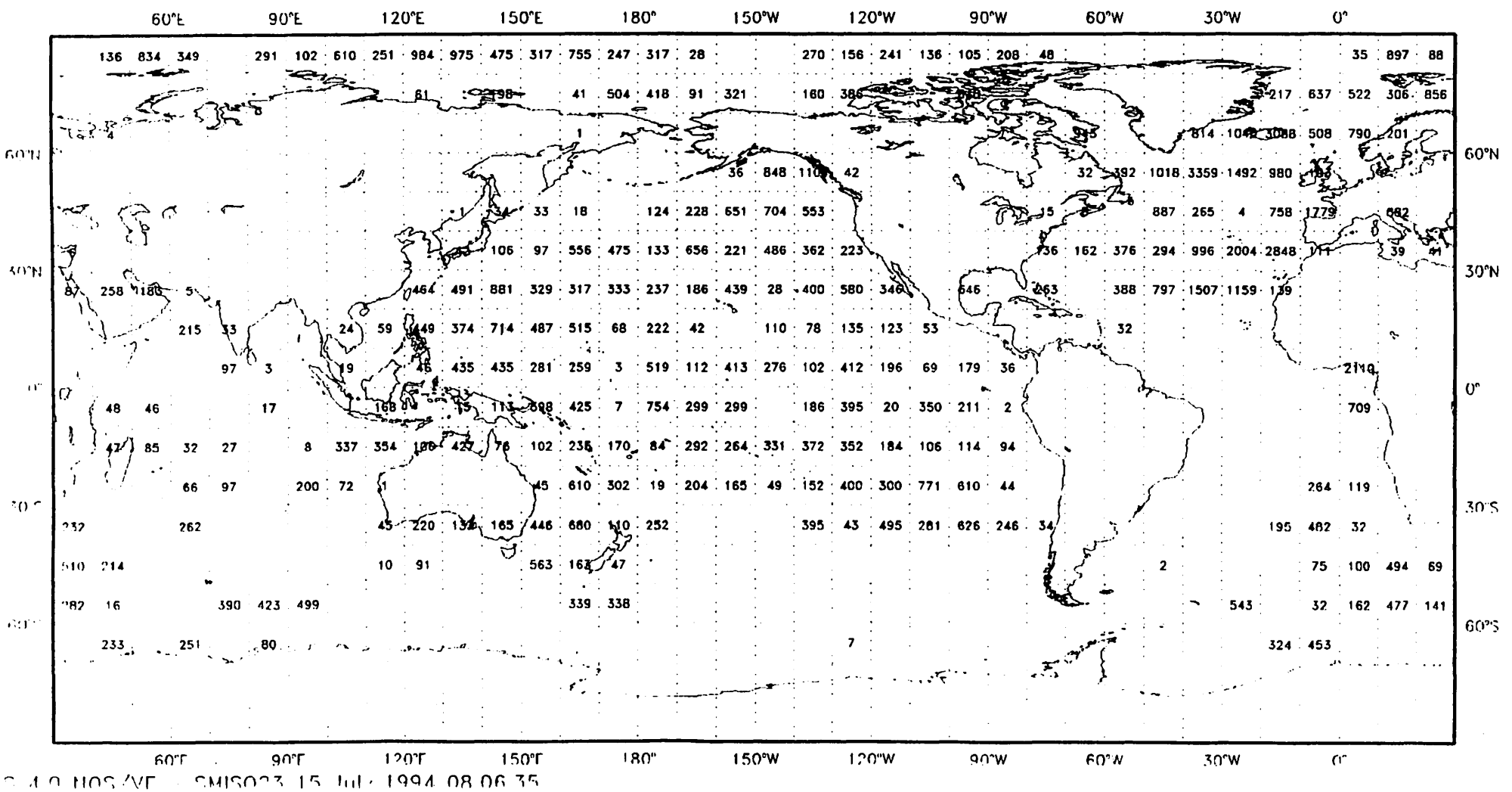
FRENCH MET OFFICE/IGOSS

Repartition par carre Marsden des observations recues en Juin 1994

Marsden square distribution chart of data received during June 1994

Messages : DRIFTER

Total : 94168



METEO-FRANCE/SMISO

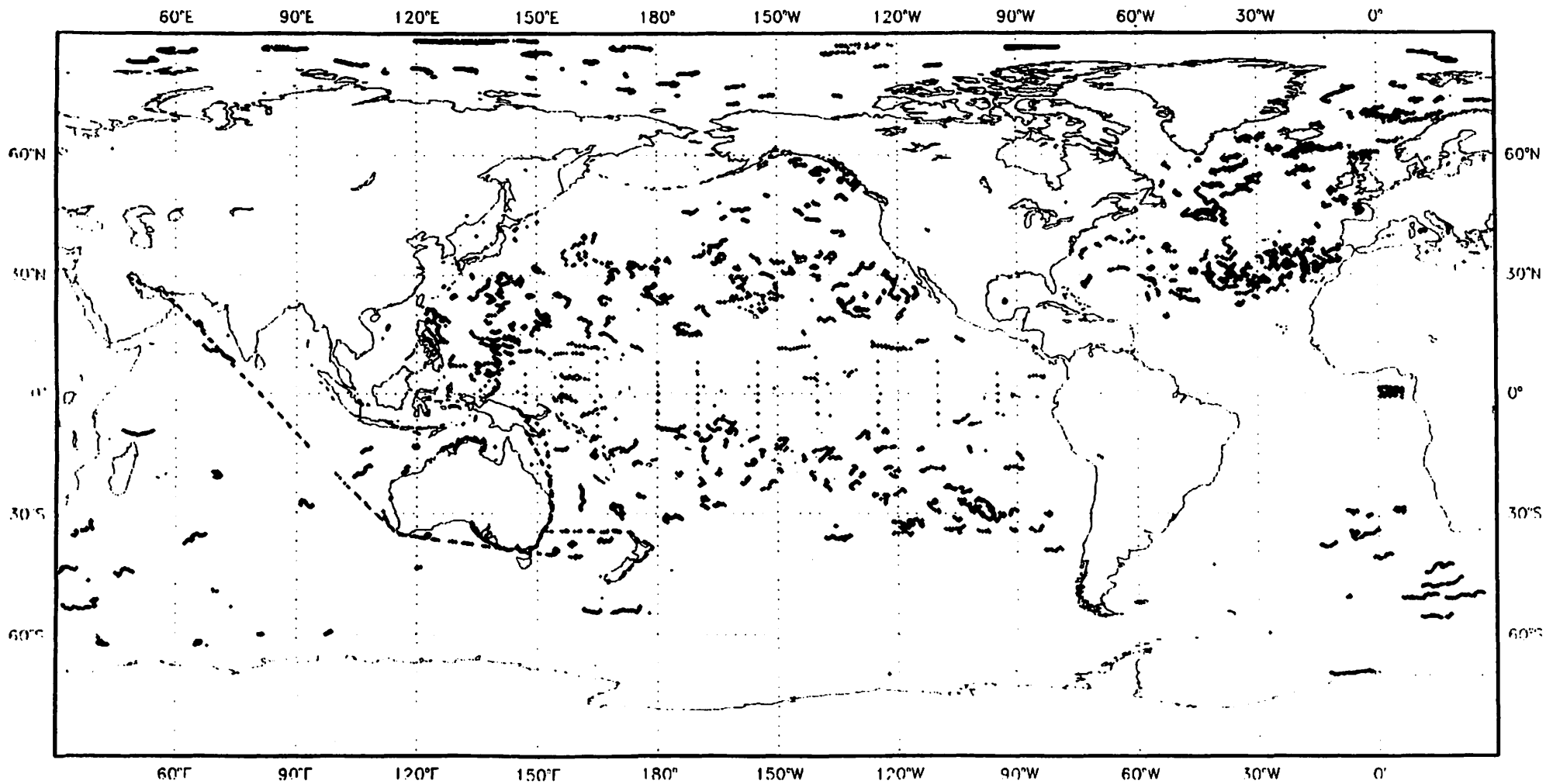
FRENCH MET OFFICE/IGOSS

Carte de pointage des observations recues en Juin 1994

Mapping position plot chart of data received during June 1994

Messages : DRIFTER

Total : 94168

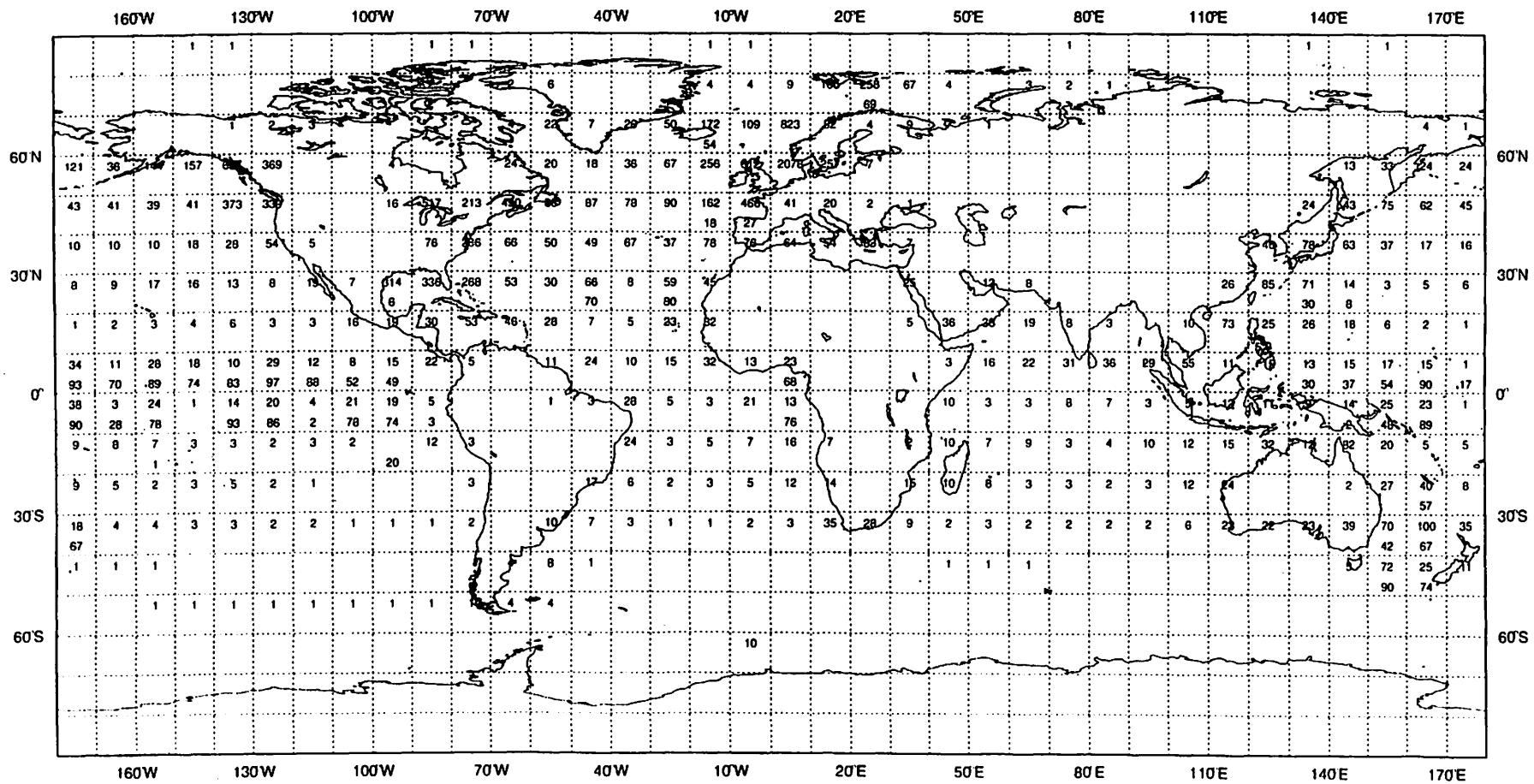


S 4.0 NOS/VF - SMISO23 15 July 1994 08:05:42

METEO FRANCE

METEO - FRANCE **WIND** **JUNE 1994**

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

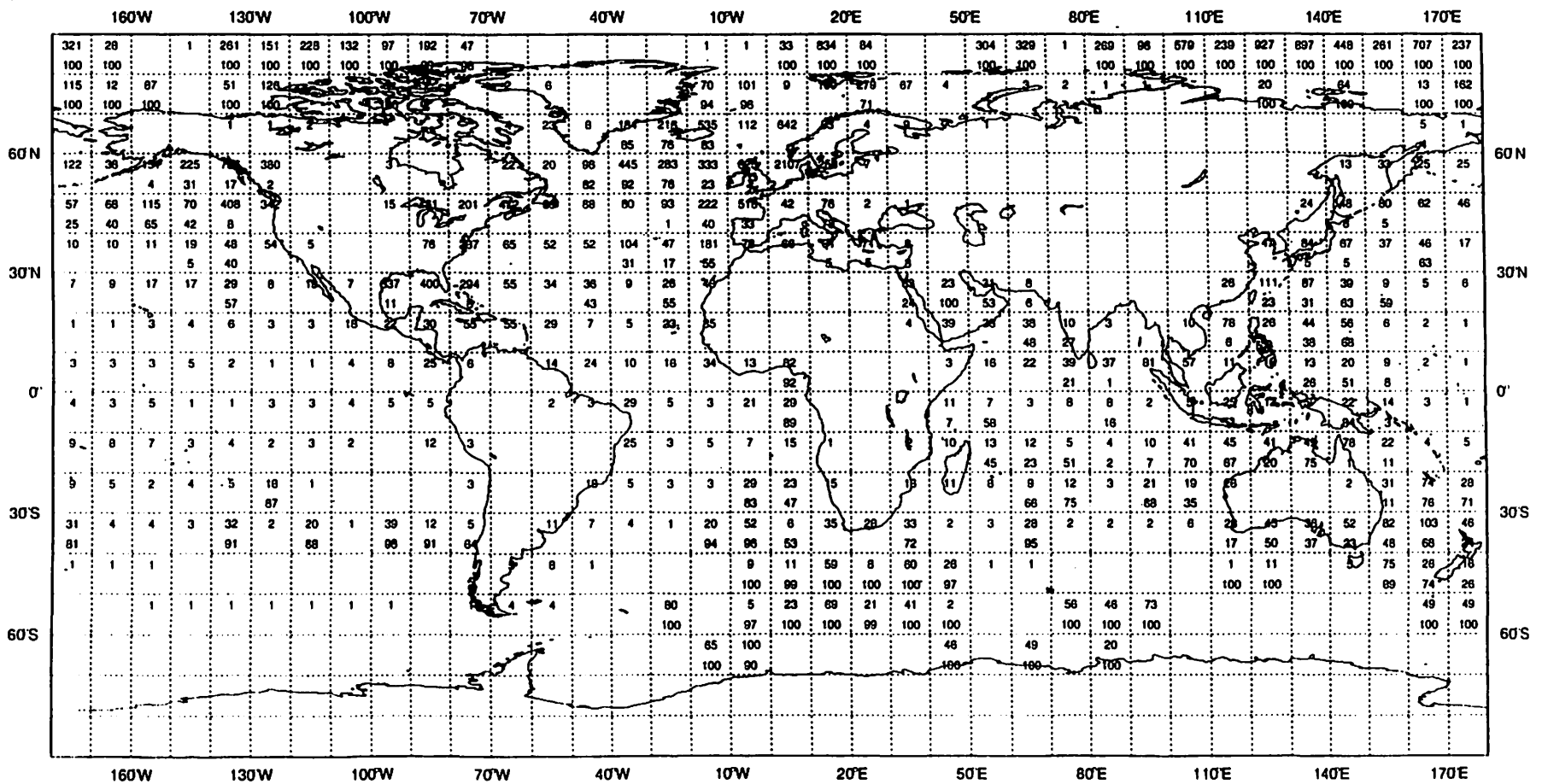


MAGICS 4.2 Solaris - ludjet - 4 July 1994 11:45:04

METEO FRANCE

METEO - FRANCE **PRESSURE** **JUNE 1994**

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

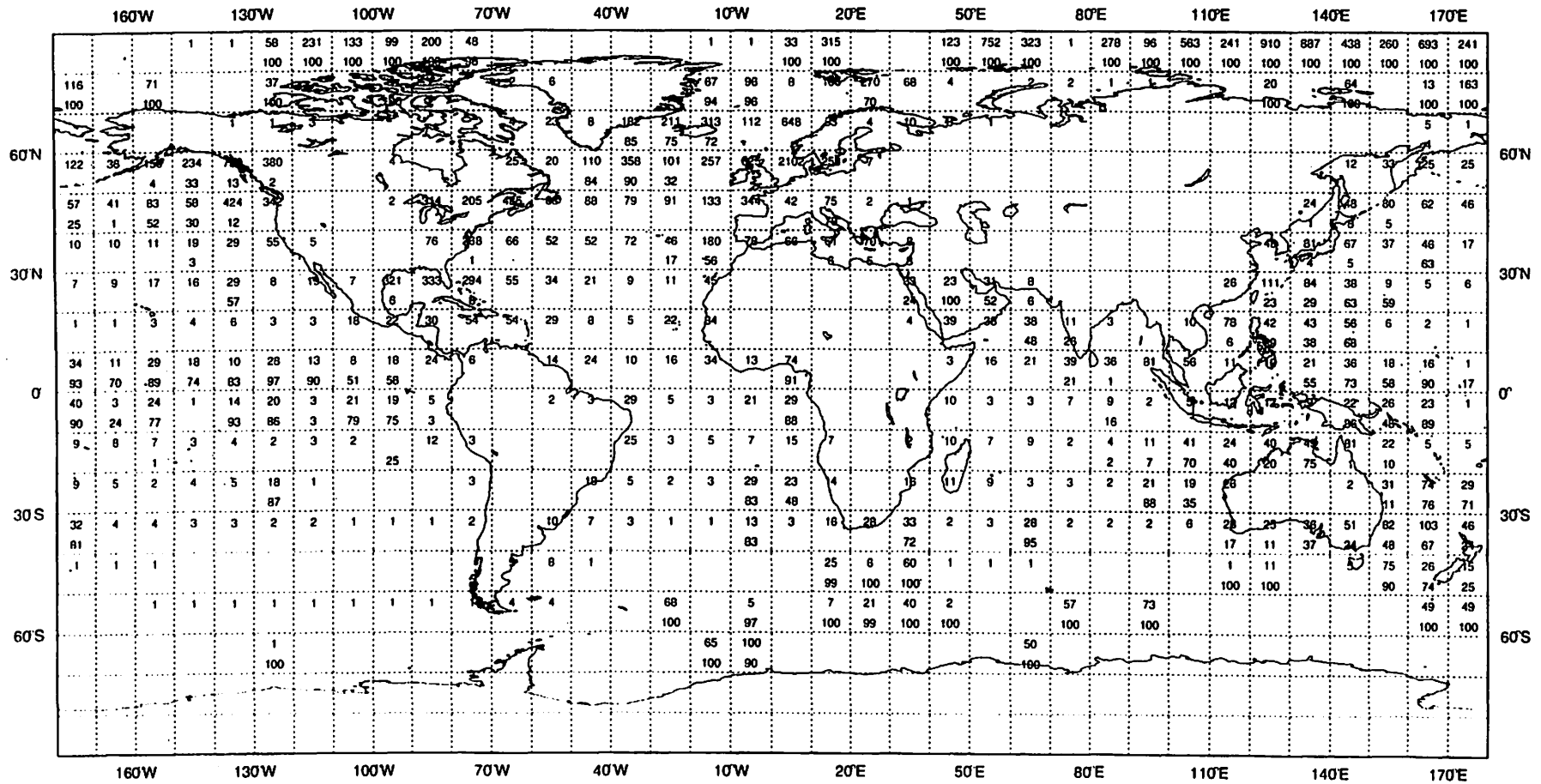


MAGICS 4.2 Solaris - ludjet - 4 July 1994 11:44:52

METEO FRANCE

METEO - FRANCE **TEMPERATURE** **JUNE 1994**

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

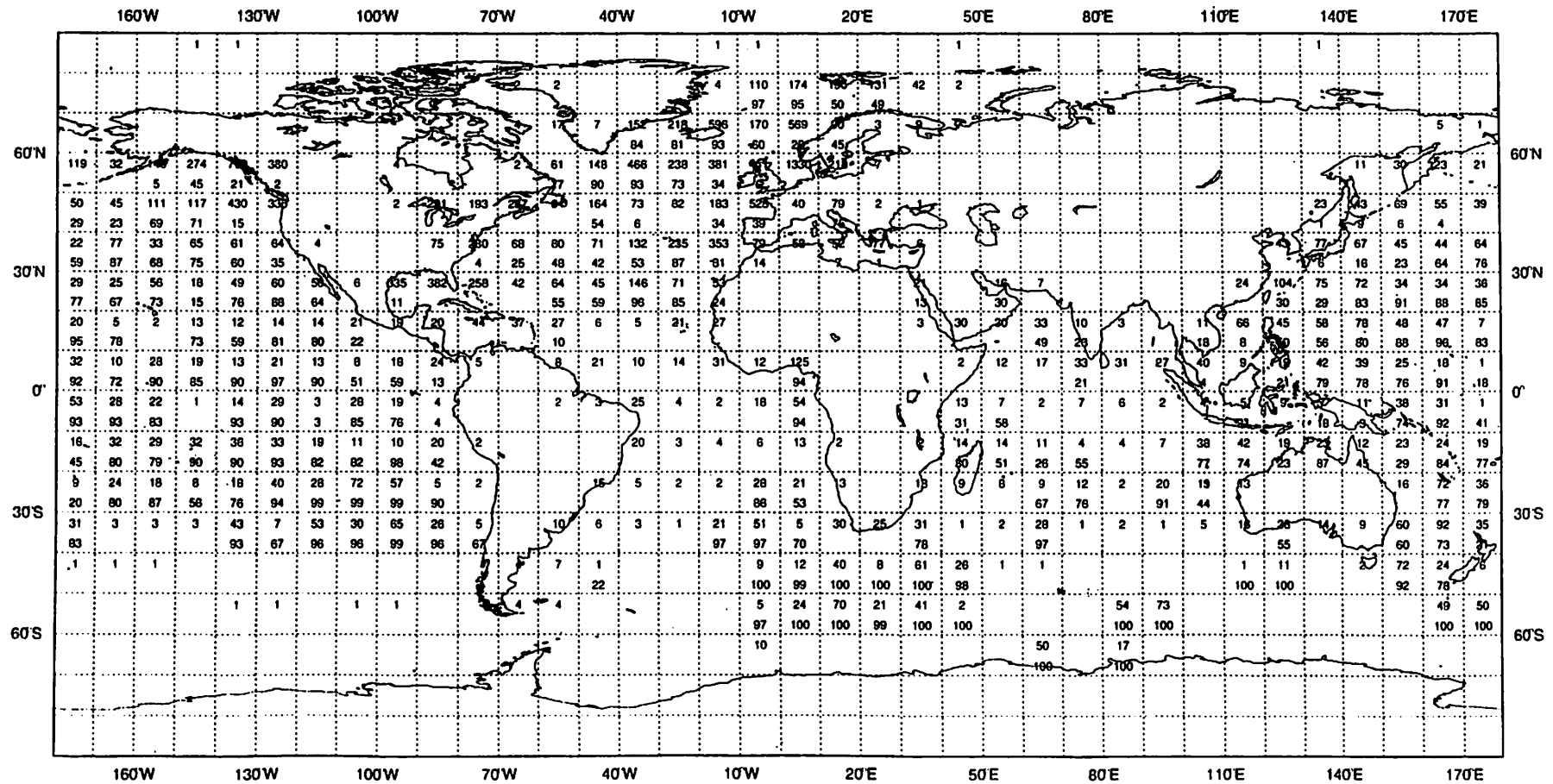


MAGICS 4.2 Solaris - ludjet - 4 July 1994 11:45:10

METEO FRANCE

METEO - FRANCE **SEA SURFACE TEMPERATURE** **JUNE 1994**

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



MAGICS 4.2 Solaris - ludjet - 4 July 1994 11:44:58

REPORT OF THE IODE RESPONSIBLE NATIONAL OCEANOGRAPHIC CENTRE FOR DRIFTING BUOYS

Introduction

The Marine Environmental Data Service (MEDS) in Canada became a Responsible National Oceanographic Data Centre (RNODC) for Drifting Buoy Data on behalf of the Intergovernmental Oceanographic Commission (IOC) and the World Meteorological Organization (WMO) in January 1986. The purpose of this report is to describe the activities of the RNODC-MEDS in acquiring and making drifting buoy data available to the scientific community during the last nineteen months (January 93 - July 94).

Data Flow

We show in the attached table 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 gives the number of operating drifting buoys according to Service ARGOS. The last column gives an estimate of the success by MEDS in acquiring the drifting buoy data. Figure 1 is an illustration of the same information as it displays on the right Y-axis the number of buoys for which MEDS receives the data (continuous line) while the left Y-axis illustrates the number of messages received each month (bar chart) by MEDS.

During this 19-month period, MEDS received a total of 1,846,818 messages transmitted from drifting buoy platforms sending their data through the GTS (an average of 97,201 messages per month). The average number of messages per month (95,731) for the first seven months in 1994 has decreased by 2.4 % from the 1993 monthly average, which shows that slightly less data are being recorded by drifting buoys.

The average number of buoys reporting on the GTS (according to ARGOS statistics) has decreased from 1137 in 1993 to 1096 in 1994, more than a 3 % drop. The percentage of data for which MEDS receives the data through the GTS has also decreased as shown by Figure 2 of this report. When compared to previous years, there is still a small upward trend but the last few months statistics indicate a below "normal" situation. Again, Principal Investigators are stongly encouraged to forward their buoy data onto the GTS.

The following table illustrates the increase (negative numbers indicate a decrease) for the last three years with regard to the traffic of messages on the GTS from Drifting Buoy as the second column indicates the increase or decrease of MEDS success in the acquisition of data through the GTS while the last column indicates a general decrease of Drifting Buoys floating on the Ocean, according again to Service ARGOS.

% ± Over Previous Year Year	Number of messages received by MEDS	Number of buoys for which MEDS received data	Number of operational buoys ARGOS
1992	43.3 %	56.8 %	42.2 %
1993	50.4%	22.0%	18.1 %
1994	-2.4 %	-11.9 %	-3.6 %

Historical Data Acquisition

Since the FGGE program and since January 1986 when MEDS became the RNODC for Drifting Buoy data, the archive has grown constantly. It now contains a total of 7,783,285 messages from 48,960 different buoy-months of which close to 80 % has passed MEDS critical quality control procedures.

Services

MEDS issues an annual report summarizing the data received and processed during the previous year and showing the locations of the buoys. The 1993 annual report has already been published and distributed. Every month, global maps are issued displaying the location for the buoys reporting over the GTS. In addition MEDS also deliver 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 1/2-inch). If the volume is too large, tje data can be copied onto Exabyte cartridge or can be transmitted through Internet via Anonymous FTP. 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 quaterly publication.

MEDS has completed the development and installation of a computer file containing information about the operators of the buoys as well as the program under which the buoy has been deployed. Other information, such as the program manager or organization and characteristics of the buoy are also kept if this information is made available to MEDS.

MEDS has developed an archiving mechanism for the Drifting Buoys Bulletin Board messages available each day on ScienceNet. 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.

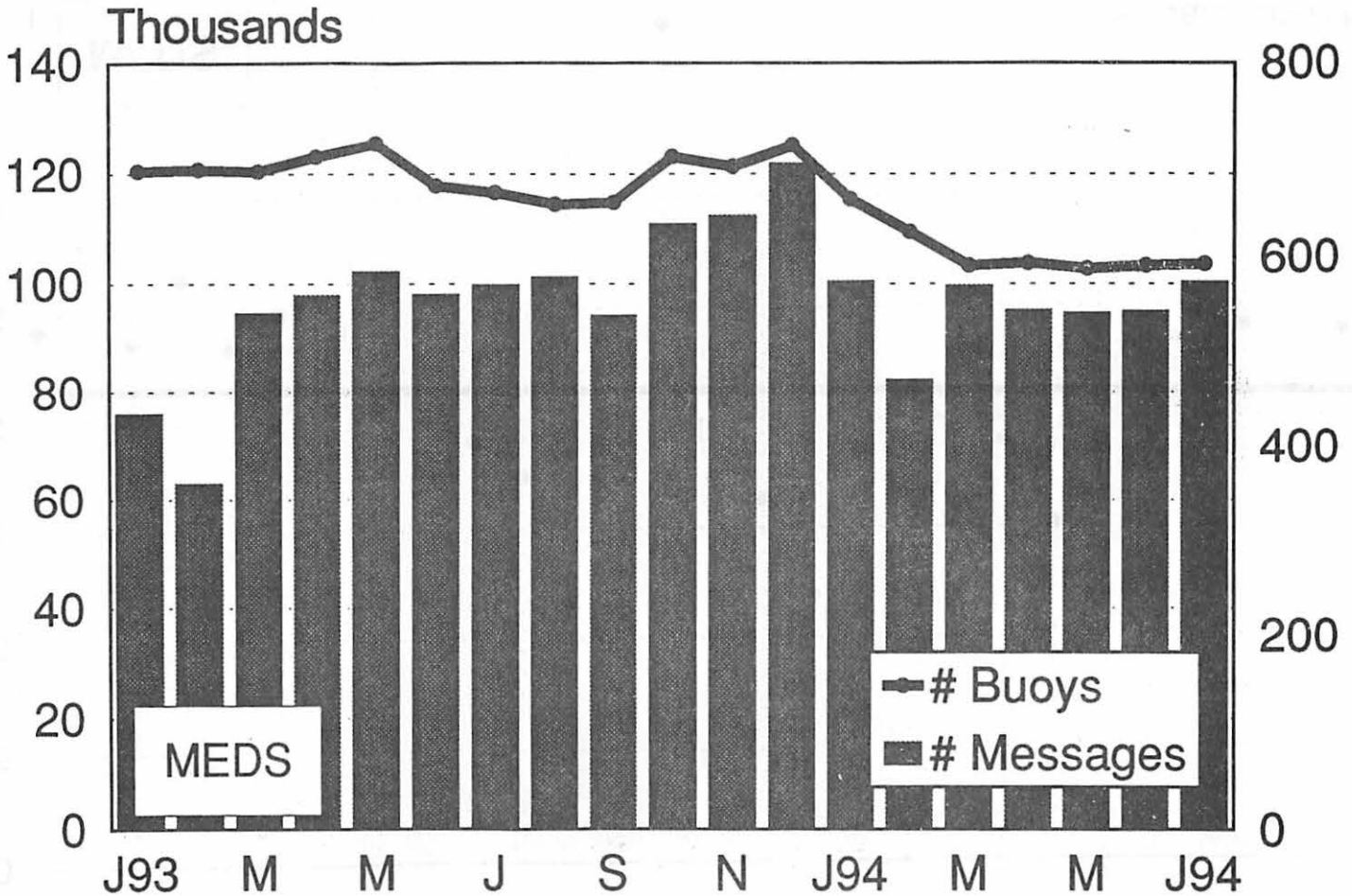
Table: Monthly statistics on number of buoys and number of messages received at MEDS from January 93 to July 94

Month/Year	# Messages received in MEDS	# Buoys reporting on GTS	# Buoys according to ARGOS	% received in MEDS
Jan 93	76,445	688	1,027	67.0
Feb 93	63,463	690	1,632	42.3
Mar 93	95,015	688	1,097	62.7
Apr 93	98,311	703	1,103	63.7
May 93	102,554	717	1,053	68.1
Jun 93	98,353	673	1,096	61.4
Jul 93	100,192	666	1,088	61.2
Aug 93	101,599	654	1,081	60.5
Sep 93	94,538	656	1,075	61.0
Oct 93	111,201	703	1,085	64.8
Nov 93	112,804	693	1,136	61.0
Dec 93	122,228	715	1,174	60.9
Jan 94	100,857	659	1,191	55.3
Feb 94	82,655	625	1,118	55.9
Mar 94	99,998	590	1,110	53.2
Apr 94	95,561	593	1,058	56.1
May 94	94,964	587	1,036	56.7
Jun 94	95,333	590	1,043	56.6
Jul 94	100,747	592	1,113	53.2

Report prepared by: Paul-André Bolduc
Marine Environmental Data Service
August 1994

RNODC for DRIFTING BUOYS

Number of Messages & Number of Buoys



10th DBCP Session, La Jolla, November 1994

FIGURE 1

RNODC for Drifting Buoys

% of Buoys Data received in MEDS through GTS

From January 1992 to July 1994

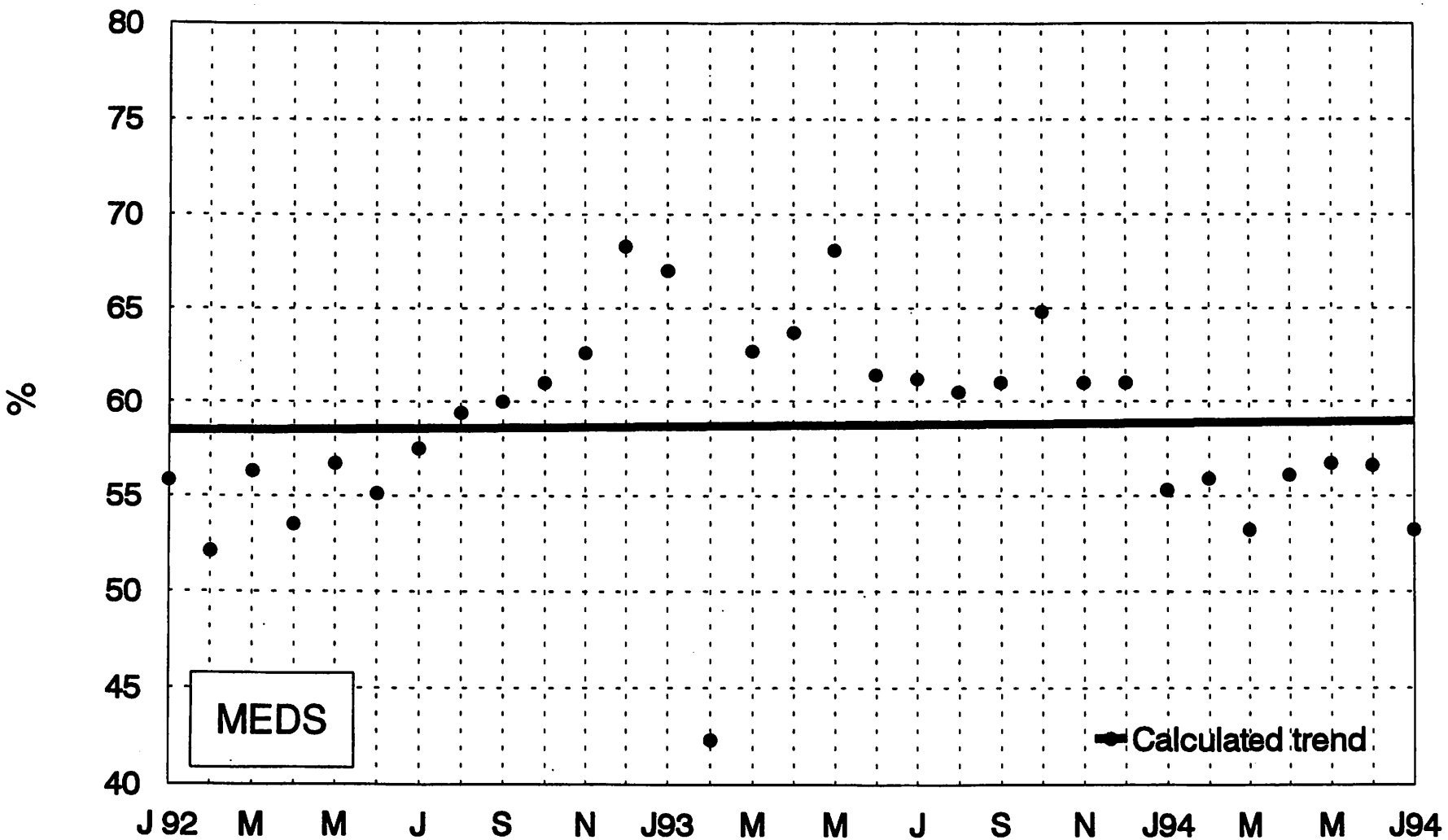


FIGURE 2

AMENDED 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, United Kingdom).

The participation of the following centres is desired for acting as PMOC:

- 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.

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. 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.

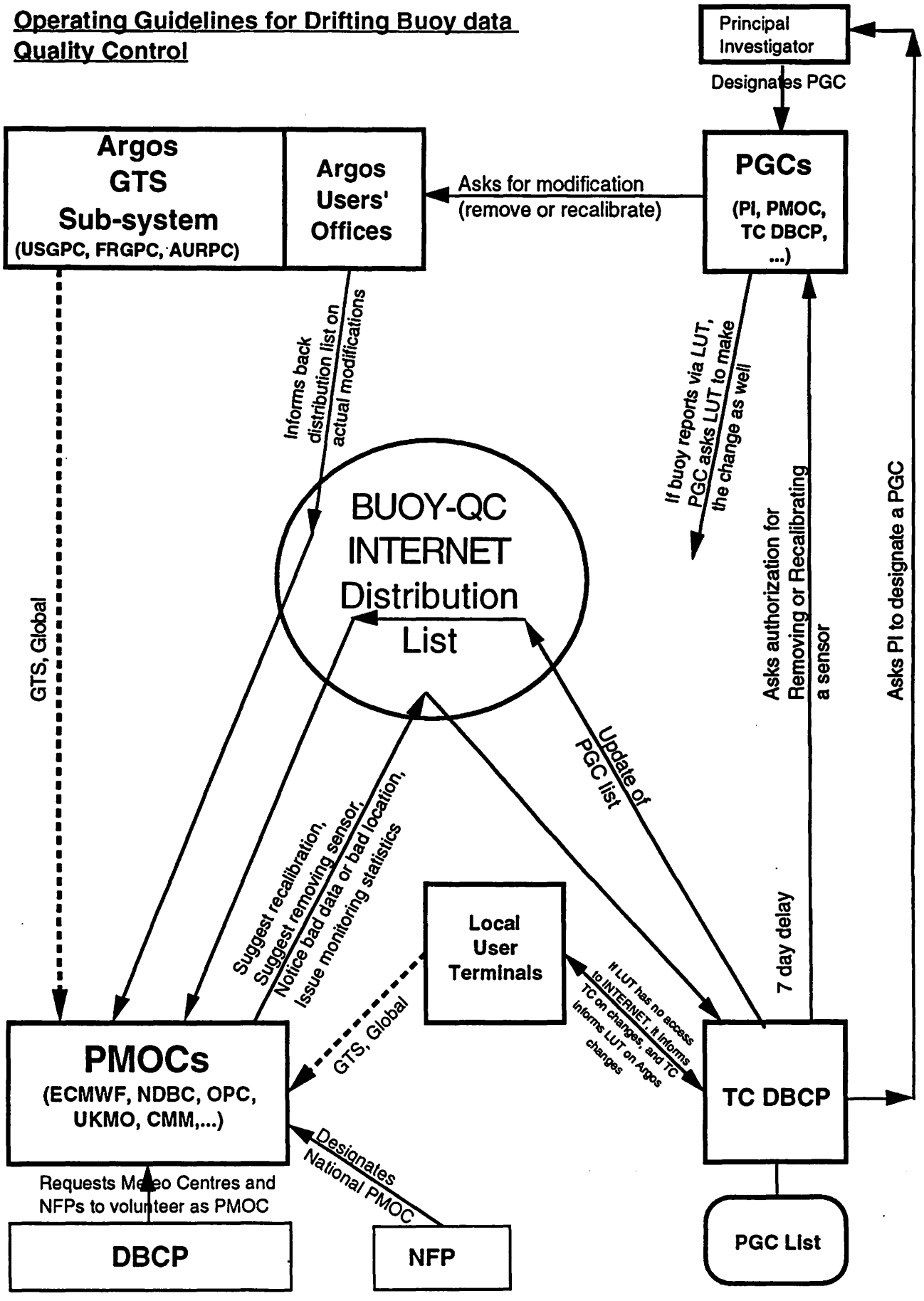
5. List of PGCs

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



ANNEX

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:

```
1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9
h A S K   t t t   w m o # # p p p   o v a l u e
```

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: Meteo France comments (2ASK) on NZMS proposal for recalibrating air pressure sensor of buoy 17804. Meteo 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:

```
1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
c c c c   t t t   w m o # # p p p   o v a l u e   y y m m d d h h m m
```

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 Meteo 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:

```
1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2
D E N I   t t t   w m o # # p p p   o v a l u e
```

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:

```
1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2
S T A T  c e n t e r  p p p  y e a r  m m  d d
```

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:

```
1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
W M O S   y e a r   m m
```

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:

```
1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
P G C S   y e a r   m m
```

Meaning:
The list of Principal GTS Cordinators (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:

```
1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
I N F O  s u b j e c t . . .
```

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 Modif. of the PGC list format

Message12: This message is to indicate a change in the format of the monthly PGC list. Details are given in the body text.

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PROPOSED CO-OPERATIVE INCENTIVE BETWEEN OCEANOGRAPHERS AND METEOROLOGISTS ON DRIFTING BUOY PROGRAMMES

Proposal:

The proposal is an incentive for oceanographers and meteorologists to collaborate on common drifting buoy programs in order to

-1- Be cost effective (data shared by and useful for both communities, data return dramatically increased for both communities).
-2- Have Rationalized programs (Standardized, certified and approved instruments, consistent and homogeneous data series).
-3- Have programs compatible with WWW, WOCE, TOGA, GOOS and GCOS.

The proposed conditions for obtaining a special say 5% discount on the Argos tariff are listed below (applicable on individual buoys or whole Argos programmes; to be defined later). For example, a person designated by GOOS, GCOS and CLS would provide Service Argos with the list of these individual buoys meeting the stated conditions.

Conditions for claiming the special discount rate (all listed conditions must be met):

-1 The platform must be a drifting buoy.

-2- For drifting buoys deployed outside the tropics: buoys must be Low Cost Barometer Lagrangian Drifters.

Requirements for the status of Low Cost Barometer Lagrangian Drifter:

* Holey Sock Drogue centered at 15 meters below the surface,
* Small spherical hull,
* Demonstrated half life time greater than 365 days (transmitting and drogue still attached) ,
* drag area ratio > 40,
* Drogue detector,
* Reliable and stable Sea Surface Temperature sensor (+/- 0.1 C, +/- 0.2 C per year)
* Reliable and stable Air Pressure sensors (+/- 1 hPa, +/- 1 hPa per year).
* Commercial cost lower than $5000.

-3- For drifting buoys deployed inside the tropics: Buoys must be Wind Meteorological Drifting Buoys or Standard SVP type Lagrangian Drifters.

Requirements for the status of Wind Meteorological Drifting Buoy:

* Demonstrated half life time greater than one year (transmitting and reliable wind sensors)
* Reliable and stable Sea Surface Temperature sensor (+/- 0.1 C, +/- 0.2 C per year)

* Reliable and stable Wind Speed Sensor (+/- 1 M/S over the period),
* Reliable and stable Wind direction Sensor (+/- 15 Degrees over the period).
* Optional: Air Temperature, Air Pressure and Air Pressure Tendency sensors.

Requirements for the status of Standard SVP type Lagrangian Drifters:

* Holey Sock Drogue centered at 15 meters below the surface,
* Small spherical hull,
* Demonstrated half life time greater than 365 days (transmitting and drogue still attached) ,
* drag area ratio > 40,
* Drogue detector,
* Reliable and stable Sea Surface Temperature sensor (+/- 0.1 C, +/- 0.2 C per year)

-4- Service Argos: Standard Service for Location and Data Collection (i.e. full on) during the whole buoy operational life-time (i.e. no switch to the "Limited Use Service after a given period),

-5- Authorization for GTS distribution of the data in real time from Service Argos,

-6- Raw data provided free of charge by the buoy owners to the Surface Velocity Programme (SVP) Data Assembly Center responsible for Scientific Data Quality Control (DAC, at NOAA/AOML, USA).

-7- Distribution of Research Quality data-base to MEDS within 6 months for Archive and possible distribution to others free of charge.

ACTION GROUPS OF THE DATA BUOY CO-OPERATION PANEL

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.

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SUMMARY OF FUTURE SATELITE 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 there will 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 kilograms makes them impractical for data buoy application.

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 on the order of 35,000 kilometers. MEO satellites are at an altitude of about 10,000 kilometers. LEO satellite orbits are on the order of 1000 kilometers or less. A large percentage of the recent commercial activity in MSS is focused on LEO satellites as a personnel communication tool. LEO satellites can be separated into Big LEO and Little LEO categories. Big LEO's will offer voice, fax, telex, paging, and data capability. Little LEO's will offer data capability only. Since the satellite foot print is dependent on the satellites' altitude, LEO and MEO systems require larger constellations than GEO satellites to achieve global coverage and avoid data delays. Less power is required for LEO and MEO satellite transmitters due to their lower orbit.

Some satellite communication systems will primarily focus on land masses and populated areas of the oceans. This suggests that some configurations may 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 serves as an extension and enhancement to existing networks. This service may include additional charges if data are channeled to local cellular or regular local or long-distance companies. While the technical capabilities for these new MSS exist, expect delays due to government licensing, company financing, and availability of launch vehicles. It is also important to consider the infrastructure necessary to disseminate on GTS the data received with these MSS.

Depending on the need of a data buoy program, some systems will offer enhanced data coverage and communication capability over existing methods. Potential advantages from these emerging MSS include two-way communication, more timely observations, and greater data volume.

Mobil Satellite Systems

System	Implementation	Orbit Type	Buoy Position	Message Type	Terminal size	Power (watts)	Unit Cost	Service Cost	Comments
ARGOS	Active	LEO	Doppler shift	data 32 bytes	handheld	1	$500-900	see JTA	with GPS & data collection only 50% potential cost saving
EYETEL	Planned 1995+	Little LEO	GPS required	data 60 bytes	handheld	5	$500-1,500	TBD	1 satellite 1995 5 satellites 1996+
Final Analysis	Planned 1995+	Little LEO	GPS required	data 128 bytes	handheld	10	$100-500 est.	$.25 per message service fee TBD	24 satellites 2000+
Globalstar	Planned 1997+	Big LEO	GPS required	voice/data no max.	handheld	1	$750 est.	$.30/min, monthly service fee TBD	48 satellites 1998+
INMARSAT C	Active	GEO	GPS required	data no max	5.5 kilograms	1 5	$4,000 avg.	$.28 per 32 bytes	
INMARSAT P	Planned 2000+	MEO	GPS required	voice/data no max.	handheld	1	TBD	TBD	
Iridium	Planned 1998+	Big LEO	GPS required	voice/data no max.	handheld	1	$3,000 est.	$3/min. +$50/mo service charge	66 satellites 1998+
Odyssey	Planned 1998+	MEO	GPS required	voice/data no max	handheld	1	$300 est.	$.65/min, monthly service fee TBD	12 satellites 1998+
ORBCOMM	Planned 1995+	Little LEO	Doppler shift	data no max.	handheld	5	$100-400 est.	$.25 + .007/byte + $30./month service charge	2 sattellite 1995+ 26 satellites 1996+ 36 satellites 1997+
Starsys	Planned 1996+	Little LEO	Doppler shift & ranging	data 27 bytes mult. messages	handheld	2	$50-200 est.	$25 reg.fee $6 monthly fee $.15/data msg. $.45/data+position	12 satellites 1998+ 24 satellites 2000+
VITASAT (gemstar)	Planned 1995+	Little LEO	GPS required	data no max.	laptop size	10	$2,000 est.	$1 per kilobyte + $250/yearly	1st satellite 1995+ 3 satellites by 1997+

OPERATING PROCEDURES FOR THE DATA BUOY CO-OPERATION PANEL

1. To the extent that the panel is a formally established body of the WMO and IOC, the panel members will be the representatives of Members of WMO or Member States of IOC which expressed a willingness to participate in the panel's activities.

2. The panel will meet annually. Representatives of any institution or programme actively involved in the use, development or deployment of data buoys, or which specifically require buoy data, may participate in the meetings.

3. The panel will elect a chairman and a vice-chairman, from among the panel members, to carry out the work of the panel between sessions. The chairman will prepare reports for WMO and IOC, as required, and act as the focal point for communications amongst the panel members.

4. The chairman may call on individual panel members for assistance in matters such as representing the panel at meetings of other bodies, preparing of reports on specific topics, etc.

5. The panel requires the support of a full-time technical co-ordinator. The costs associated with this position will be supported through voluntary contributions to a trust fund specifically designated as being for the purpose. These arrangements will be reviewed annually.

6. The panel requires support from the Secretariats of WMO and IOC in the dissemination of invitations to panel meetings and the preparation of documents and reports related to meetings.

7. The terms of reference for the panel are those given in WMO Executive Council Resolution 9 (EC-XLV) and IOC Assembly Resolution XVII-6. The panel also adopts as terms of reference for its technical co-ordinator those suggested by the WMO Executive Council in Resolution 9 (EC-XLV) and the IOC Assembly in Resolution XVII-6.

8. The working language of the panel, including for correspondence, will be English.

9. The panel's operating procedures will be revised as required at the annual meeting. The chairman will prepare recommendations to be distributed before the meeting .

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DATA BUOY CO-OPERATION PANEL WORKPLAN AND OBJECTIVES FOR THE TENTH YEAR

PART A

Summary of the tasks

1. Maintain summary of requirements for buoy data to meet expressed needs of the international meteorological and oceanographic communities.

2. Maintain a catalogue of existing ongoing ocean data buoy programmes.

3. Maintain a list of national contact points for the DBCP and within other relevant bodies with potential for involvement in DBCP activities.

4. Identify sources of buoy data not currently reported on the Global Telecommunication System and determine the reason for their non-availability; this includes investigation of possible distribution of Australian LUT data.

5. If deemed necessary, make proposals for co-ordination activity as a result of the above actions to address item 2 to 6 and 8 in the terms of reference for the Data Buoy Co-operation Panel.

6. Arrange for the circulation of information on the panel's activities, current and planned buoy programmes and related technical developments/evaluations, including the preparation of an in-depth presentation for GOOS and GCOS, of a document package to promote the new GTS processing sub-system and the panel in general, and the design of a DBCP publication series cover.

7. Monitor the operation of the new Argos GTS processing sub-system and arrange for modifications as necessary.

8. Continue the arrangements (including finance) to secure the services of a technical co-ordinator.

9. Review programme and establish working priorities of the technical co-ordinator.

10. Prepare annual report of the Data Buoy Co-operation Panel.

11. Investigate potential support for an Indian Ocean Data Buoy Programme and, if appropriate, initiate planning for its implementation.

12. Support, as required, existing DBCP action groups (EGOS, IABP, IPAB and ISABP) and, on request, provide assistance to other internationally co-ordinated buoy programme developments.

13. Investigate requirements for initiating new co-ordinated buoy deployments in other ocean areas.

14. Assist in the planning and implementation of the ocean data buoy component of the Global Ocean Observing System and of the Global Climate Observing System.

15. Keep up-to-date with the latest buoy technical developments and, in particular participate in the evaluation and introduction into operational use of the new low-cost drifter developed under the WOCE/TOGA SVP.

16. Co-ordinate amended operating guidelines for buoy data quality control as agreed by the panel at its tenth session.

17. Study the detailed design of a possible dedicated Internet server for the DBCP.

18. Investigate new developments in communication technology and facilities, relevant to the collection of sensor and/or location data from buoys.

19. Prepare and publish a construction Manual on the low-cost Lagrangian barometer drifter.

20. Develop and implement co-operative buoy deployment strategies, in particular with the SVP, to provide buoy networks which serve both research and operational applications.

21. Arrange for scientific/technical presentations at panel sessions.

22. Prepare and implement an impact assessment study of networks of buoys with differing transmission duty cycles.

PART B

TASK	CARRIED OUT BY*	SUPPORTED/ASSISTED BY	REPORTED TO/ACTION BY	RELEVANT TOR OF THE PANEL
1	Technical co-ordinator (1, 8)	Panel members and WMO/IOC Secretariats	Chairman for presentation to the panel	1, 2
2	Technical co-ordinator (1, 3, 8)	Panel members and WMO/IOC Secretariats	Chairmam and panel for information	1, 2
3	WMO/IOC Secretariats	Panel members	Chairman and panel for information	1, 2, 8
4	Technical co-ordinator, CLS/Service Argos (1, 7)	Panel members and WMO/IOC Secretariats	Chairman and panel for information	6
5	Chairman and technical co-ordinator (1, 3, 4, 5, 8, 9)	WMO/IOC Secretariats and others as appropriate	To panel for consideration and appropriate action or for direct action by chairman	1, 2, 3, 5
6	Technical co-ordinator (1, 3, 4, 5, 8, 9)	Chairman, WMO/IOC Secretariats and CLS/Service Argos	Wide circulation by WMO/IOC Secretariats and CLS/Service Argos	7, 8
7	Technical co-ordinator (1, 2, 3, 7) and chairman	WMO/IOC Secretariats	Panel and users	1, 2, 6
8	Chairman and sub-committee	WMO/IOC Secretariats	WMO/IOC Secretariats	9
9	Chairman/panel		Panel (at next session)	9
10	Chairman	Technical co-ordinator	Executive Councils of WMO and IOC	10
11	Chairman	Technical co-ordinator and WMO/IOC Secretariats	Panel	3, 5, 6, 7
12	Chairman and WMO/IOC Secretariats	Technical co-ordinator (1, 5, 8)	Panel	1
13	Chairman and WMO/IOC Secretariats	Panel members	Panel	4
14	Chairman and technical co-ordinator (1, 4, 5, 8)	Panel members	Panel	7, 8
15	Operational services, chairman and technical co-ordinator (1, 4, 5, 8)	Panel members	Panel	1, 2, 3, 7. 8
16	Technical co-ordinator (1, 2)	Panel members and operational services	Panel	2, 3, 6
17	NOAA National Ocean Service	Technical co-ordinator (1, 3, 8)	Panel	6
18	Vice-chairman and technical co-ordinator (1, 7, 8)	Chairman and panel members	Panel	1, 2, 6, 7
19	Technical co-ordinator and SIO (4, 8)	WMO/IOC Secretariats, chairman	Panel	7
20	Regional action groups, GDC	Technical co-ordinator, panel members (5)	Panel, SVP	1, 2, 3
21	Chairman	WMO/IOC Secretariats	Panel	7
22	Technical co-ordinator, WMO Secretariat, national Meteorological Services (5, 7)	Chairman	Panel	2, 6

* When the technical co-ordinator is involved in carrying out a task, the figures in parenthesis relate to the terms of reference for the technical co-ordinator

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ACTION SHEET ON DBCP-X DECISIONS
(La Jolla, 1-4 November 1994)

REFERENCE	SUBJECT	ACTION PROPOSED	RESPONSIBLE	TARGET DATE	ACTION TAKEN
General	Final report	(a) To prepare the final version (b) To forward report to all concerned	WMO/IOC WMO	30.XII.94 ASAP	done done
General	Action sheet	To prepare and agree	WMO/IOC	II.95	
Para 2.4	International Arctic Buoy Programme (IABP)	To provide and include brief report on the IABP activities in the DBCP Annual Report for 1994	IABP/WMO	II.95	
Para 2.4.2	European Group on Ocean Stations	To relay the results of the EGOS tests on buoy air temperature measurements to IABP	Chairman EGOS, Technical Co-ordinator	ASAP	
Para 3.1.2	Cover for DBCP publications	To design a suitable DBCP publication series cover	Chairman, WMO/IOC	ASAP	

Para 3.2.2	Future arrangements for Technical Co-ordinator's support	To explore the possibility for Météo-France to host the Technical Co-ordinator	Mr F. Gérard	IV.1995	
3.3	Panel funding; Technical Co-ordinator employment	(a) To invoice contributors on provisional contributions for 1995-1996, arrange contracts etc.	WMO/IOC	end V.1995	
		(b) To make efforts to convince potential Members Countries(including Brazil and China) to participate actively in the Panel's work	Panel's Member States, WMO/IOC	Continuous	
Para 4.2	World Weather Watch	To provide Panel with further information on decisions of Twelfth World Meteorological Congress on arrangements for the exchange of meteorological and related data and products	WMO	DBCP-XI	
Para 4.3.2	IGOSS and IODE	(a) To reach a common approach to statistical presentation of buoy data figures by Technical Co-ordinator and RNODC	Technical Co-ordinator, RNODC	DBCP-XI	
		(b) To include a full list of MEDS services and charges in the DBCP Annual Report for 1994	WMO	II.95	

Para 4.4	GOOS and GCOS	To prepare and organize a presentation on DBCP activities for the next I-GOOS session and a future session of the JSTC for GCOS	Chairman, Technical Co-ordinator with GOOS and JPO GCOS	1995	
Para 5	Current and planned data buoy programmes	To include the national reports on data buoy programmes in the DBCP Annual Report for 1994	Technical Co-ordinator, WMO	II.95	
Para 6.1.3	INTERNET	To implement the DBCP Internet server on a trial basis and report to DBCP-XI	NOAA/NOS with Technical Co-ordinator	DBCP-XI	
Para 6.2.2	Code matters	To prepare an analysis of the technical and costing aspects of implementing BUFR in ARGOS	Technical Co-ordinator	DBCP-XI	
Para 6.3.3 6.3.4	New ARGOS GTS processing sub-system	(a) To distribute among all buoy users a package of various documents on data buoy processing and distribution	Technical Co-ordinator	Continuous	
		(b) To investigate the feasibility and funding options for ARGOS distribution of Australian LUT buoy data on GTS	Technical Co-ordinator with ARGOS	IV.95	

Para 6.4.5	Co-operation with the SVP	(a) DBCP Sub-group on Technical Developments to cooperate with SVP on finalization of SVP-B drifter and other developments	Chairman and Sub-group	ASAP	
		(b) To incorporate scientific/technical presentations on ocean data buoys as an agenda item for the next DBCP session	WMO/IOC	DBCP-XI	
		(c) To develop mechanisms for direct collaboration between the research and operational communities in planning buoy deployment strategies	Chairman, WMO/IOC	DBCP-XI	
Para 6.4.6	SVP-B drifter	To prepare a proposal for the implementation of a network impact study for SVP-B drifters	Technical Co-ordinator, WMO	DBCP-XI	

Para 6.5.4	International South Atlantic Buoy Programme (ISABP)	(a) To analyze possible GTS delays in the region	Technical Co-ordinator with Met Services concerned	ASAP	
		(b) To support investigations for LUT in the region	Technical Co-ordinator	As required	
6.5.7	International Buoy Programme in the Indian Ocean (IBPIO)	(a) To write a letter to all potentially concerned institutions and agencies to assess interest in the possible formation of an IBPIO	Chairman	early 1995	
		(b) To convene a first preparatory meeting for IBPIO	Chairman, WMO/IOC	second half 1995	
Para 6.5.8	Action groups of the Panel	To distribute general guidelines developed by the Panel to existing and potential future action groups of DBCP	Chairman, WMO	ASAP	

Para 6.6.2	Satellite communication systems	(a) To inform on technical developments in communication technology to promote the efficient collection and exchange of buoy data	Vice-chairman, Mr D. Meldrum	Continuous	
		(b) To consider application of ARGOS processing and data distribution infrastructure to the handling of buoy data collected by other satellite systems	CLS/Service ARGOS, Chairman	ASAP	
Para 7.0	Publications				
7.2		(a) To finalize and publish the Guide to data collection and location services using Service Argos	Chairman, WMO	1995	
7.3		(b) To include the publication "Monitoring a data assimilation system for the impact of observations" in the DBCP Annual Report for 1994	WMO	II.95	
7.4		(c) To finalize the Guide on the ARGOS GTS processing sub-system to be published by WMO in the DBCP series	Technical Co-ordinator	ASAP	
7.5		(d) To finalize and publish the Manual on the low-cost Lagrangian barometer drifter construction	Chairman, Mr D. Meldrum, Technical Co-ordinator, WMO	ASAP	

Para 10.1	Next session of the DBCP	To hold DBCP eleventh session in Pretoria, Republic of South Africa	WMO/IOC	17-20 X.1995	

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Joint IOC-WMO Circular Letter DBCP No. 94-36 GENEVA, 30 December 1994
(available in English, French, Spanish and Russian)

Annex: 1 (available in English only)

Subject: Final report of the tenth session of the Data Buoy Co-operation Panel

Action required: For information

To: Member States of IOC
Permanent Representatives of Members of WMO (PR-5075)

Dear Sir/Madam,

The tenth session of the Data Buoy Co-operation Panel (DBCP) was held in La Jolla, USA, from 1 to 4 November 1994, hosted by the National Ocean Service, NOAA. The final report of this session has now become available and we have pleasure in enclosing a copy for your information. The report is available in English only and additional copies may be obtained on request, from the Secretariats.

Amongst the many items under discussion at the session, the following may be particularly noted:

(a) The report by the technical co-ordinator (section 2.2 and Annex IV);

(b) Financial statements for 1993-1994 (section 3.1 and Annex V);

(c) Location and employment status of the technical co-ordinator, provisional contributions and draft expenditure budgets for 1995-1996 (section 3.3 and Annexes VI, VII and VIII);

(d) Decisions concerning the quality control of drifting buoy data (section 6.1 and Annex XII);

(e) The new SVP-barometer drifter (section 6.4 and Annex XIII);

(f) Co-operation with the Surface Velocity Programme (SVP) (section 6.4);

(g) Establishment of the International South Atlantic Buoy Programme (section 6.5);

(h) Discussions on a possible Indian Ocean Buoy Programme (section 6.5).

Yours faithfully,

(G. Kullenberg)
Secretary IOC

(R.C. Landis)
for the Secretary-General of WMO

cc: Chairman and vice-chairmen, IOC
Chairman, vice-chairman and technical co-ordinator, DBCP
Chairman and vice-chairman, Joint IOC-WMO Committee for IGOSS
Chairman, Intergovernmental Committee for GOOS
Chairman, J-GOOS
Participants in DBCP-X
National focal points for the DBCP
Responsible National Oceanographic Data Centre for drifting buoy data
Presidents and vice-presidents, WMO CMM and CBS
Chairmen, WMO/CMM Working Group on MOS and CBS Working Group on GOS
International Maritime Organization
National Representatives for IGOSS
Chairman, Joint WMO/ICSU IOC Scientific Committee for WCRP
President and Executive Secretary, SCOR
Chairman and Technical Secretary, EGOS
Chairmen, IABP, IPAB, ISABP
Director, WOCE IPO
Director, ITPO
Permanent Delegations and Observer Missions to UNESCO of IOC Member States