W O R L D M E T E O R O L O G I C A L O R G A N I Z A T I O N

JOINT WMO/IOC PREPARATORY MEETING

FOR THE ESTABLISHMENT OF A DRIFTING BUOY CONSORTIUM

Geneva, 15 to 19 April 1985

FINAL REPORT

NOTE

The designations employed and the presentation of material in this report do not imply the expression of any opinion whatsoever on the part of the Secretariat of the World Meteorological Organization concerning the legal status of any country, territory, city or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

GENERAL SUMMARY OF THE WORK OF THE MEETING

1. OPENING OF THE MEETING (Agenda item 1)

1.1 The meeting was opened at 10 a.m. on Monday 15 April 1985 in the WMO headquarters, Geneva, by Mr. D.K. Smith, Deputy Secretary-General of WMO.

1.2 On behalf of the Secretary-General of WMO, Professor G.O.P. Obasi, Mr. Smith welcomed the participants in the meeting to WMO and to Geneva. In doing so, he gave an especially warm welcome to the oceanographers amongst the participants, since he felt that this present meeting was a very good example of the developing climate of close and fruitful co-operation between meteorologists and oceanographers, to their mutual benefit.

1.3 Mr. Smith then reviewed briefly the history of the development of drifting buoy programmes, from the early 1970s to the present time, in support of meteorological and oceanographic requirements. In particular, he referred to the very successful operation of the southern hemisphere drifting buoy system during the Global Weather Experiment in 1979, when a number of countries co-operated closely to deploy over 300 buoys in the southern hemisphere as part of a globally co-ordinated programme. While buoy numbers declined rapidly after 1979, this was then followed by a slow but steady increase in support of a variety of marine applications and programmes. Under these cirmustances, the annual Argos joint tariff agreement meetings had worked well as a forum for informal discussions on buoy topics of mutual interest. However, more recently, expanding requirements and much more rapid increase in buoy deployments in support of both meteorological and oceanographic programmes have led many people to feel the need for some more extensive co-operative activities with regard to drifting buoys. In response to this need, and in the light of the significant contribution which drifting buoy data could make to both operational and research programmes, the WMO Executive Council had, therefore, at its thirty-sixth session, endorsed a proposal to convene the present meeting, jointly with the Intergovernmental Oceanographic Commission, for the purposes of considering the establishment of a drifting buoy consortium.

1.4 While observing that the experts present at this meeting were clearly well placed to determine the correct form for any such co-ordinating mechanism, Mr. Smith at the same time suggested that they should bear two particular factors in mind in their deliberations. Firstly, he felt that there are a number of elements of drifting buoy programmes that are common to all programmes and with which it may be advantageous for a co-ordinating group to deal in order to ensure an efficient and mutually beneficial buoy system. Secondly, he stressed again the particularly successful co-ordinating mechanism which was developed for the southern hemisphere drifting buoy system during the Global Weather Experiment and which he considered was a good starting point for the present discussion.

1.5 With these remarks, Mr. Smith then wished the participants every success in their work during the coming week. He looked forward with interest to the outcome of the discussions and also wished them a pleasant stay in Geneva.

1.6 The representative of IOC, Mr. Y. Tréglos, conveyed to the meeting the best wishes of his Organization and its Secretary, Dr. Mario Ruivo, for every success to this week's meeting. He then reported that the IOC Assembly, at its thirteenth session (Paris, 12-28 March 1985), was presented with a proposal with regard to the possible establishment of an international consortium for the co-operative implementation of drifting buoy programmes similar to the one upon which the WMO Executive Council agreed at its thirty-sixth session. The Assembly discussed this proposal in depth and considered that it needed more information to be able to take a definitive decision in this respect: the concept of a "consortium" needed clarification with respect to its membership, tasks and fuctions, as well as its relationship to intergovernmental organizations such as IOC and WMO; the relationship between the consortium and the Secretariats of IOC and WMO needed also to be specified. The Assembly agreed that the preparatory meeting would provide a forum for clarification of the various problems found with this new concept. It nevertheless re-affirmed its belief in the value of drifting buoy data to many operational and research programmes and re-stated its desire for an effective co-operative programme with WMO to match national commitments with ongoing requirements for drifting buoy data. The Assembly stressed that its decision (i.e. to postpone its decision on the proposal put forward) should not be interpreted in a negative fashion but only in the light of its wish to receive further information on this subject.

2. ELECTION OF THE CHAIRMAN (Agenda item 2)

The meeting unanimously elected Mr. W.K. Henderson (Australia) as its chairman.

3. ADOPTION OF THE AGENDA (Agenda item 3)

The meeting adopted the provisional agenda without change. This agenda is given in Annex I to the report. A list of participants is at Annex II.

4. REVIEW OF REQUIREMENTS FOR DRIFTING BUOY DATA (Agenda item 4)

4.1 In order to provide a proper background to its deliberations, and to assist in identifying elements of buoy programmes which would be appropriate for further co-operative activities, the meeting undertook a broad general review of both the meteorological and oceanographic requirements for drifting buoy data. It was felt that these requirements should be identified in terms of general programmes, meteorological or oceanographic, operational or research. A tabulated summary of requirements was drawn up and is given in Annex III.

4.2 As a specific example of requirements for drifting buoy data in support of an operational meteorology programme the meeting was informed of developments in the Operational WWW System Evaluation for the North Atlantic (OWSE-NA), 1987-1988 of the WWW of WMO. The OWSE-NA is a programme for the evaluation of all aspects of the design and operation of a combined observing system on the North Atlantic. Its operational phase is expected to last

through 1987 and 1988 and one of its features is the deployment of 60 drifting buoys continuously to fill identified gaps in the North Atlantic observing network. In order to make this component of the OWSE-NA effective, the following features are regarded as necessary:

- The measuring systems should attain a defined minimum accuracy
- Data should be in an agreed standard format
- There should be a common administrative interface with the satellite authorities (e.g. Service Argos)
- There should be co-ordinated deployment of buoys to achieve best coverage
- There should be co-ordinated use of any available means of deployment.

4.3 Under the requirements and circumstances described above, it was clearly felt that there was a need for some regional buoy co-ordinating group for the North Atlantic in support of the OWSE-NA. The meeting considered this specific need further in the context of the existing operations and known termination date (1 December 1988) of COST-43 and also of the broader global requirements for co-operation.

4.4 In discussing the requirements for buoy data, as tabulated in Annex III, the meeting felt that there were two features of significance:

(a) There were considerable differences in the requirements of individual programmes, particularly in terms of spacing, timescales, reporting frequency, etc.;

(b) Nevertheless, despite these differences all programmes could contribute significantly towards fulfilling the requirements of the WWW of WMO and the WCRP, which might be regarded at the present time as principal long-term objectives of any co-ordination process.

5. REVIEW OF PAST AND ONGOING DRIFTING BUOY ACTIVITIES (Agenda item 5)

Southern hemisphere drifting buoy system (of FGGE)

5.1 As background to the discussions concerning the possible establishment of a drifting buoy consortium the meeting reviewed relevant aspects of the southern hemisphere drifting buoy system which was deployed during the First GARP Global Experiment (FGGE) in 1978-1979. In particular, it discussed the objectives, structure, operations and performance of the Committee of Participants for the Southern Hemisphere Drifting Buoy System as an example of a successful organizational structure for an extensive co-ordinated network of drifting buoys.

5.2 The Committee of Participants was responsible for ensuring that the buoys met the necessary requirements of accuracy and reliability and for overseeing the planning and logistics of the deployment together with the planning and monitoring of the data handling system. The Committee of Participants reported to the WMO EC Intergovernmental Panel on the FGGE through the GARP Activities Office of the WMO Secretariat.

5.3 In addition to the Committee of Participants there were three operational elements to the co-ordinating mechanism for the FGGE drifting buoy system - the Logistics and Deployment Centre, the Data Processing and Control Centre and Buoy Transmitter Terminal Certification Control. These operational elements, and indeed buoy supply and deployments themselves, were all provided to the system as part of national contributions to the FGGE.

5.4 In assessing the performance of the whole FGGE drifting buoy system, in particular the co-ordination mechanism, the Committee of Participants felt that this system and its co-ordination were very successful, in part because:

(a) The Committee of Participants was comprised only of members actively involved in the buoy programme;

(b) All members of the Committee were working towards a clearly-defined objective.

5.5 Some further comments on the operation of the FGGE Committee of Participants were provided to the meeting by Dr. J. Garrett (Canada), the former chairman of the Committee. In particular he emphasized that, while planning and co-ordination of the system were carried out by the Committee of Participants, this co-ordination in fact took place between specific national programmes. At the same time, some permanent and ongoing entity was required in addition to the Committee and these national programmes to ensure proper liaison during operations on such activities as quality control and deployment planning and for the day-to-day running of the system. This entity was provided by the Buoy Control and Logistics and Deployment Centres which were made available to the system as part of one country's national contribution to FGGE.

5.6 Despite the fact that the FGGE buoy system was implemented as part of a single programme, Dr. Garrett felt that the Committee of Participants was nevertheless relevant to the present situation since it involved the co-ordination of a multiplicity of individual national contributions. Nowadays, there exists a multiplicity of programmes, each with its own effective "Committee of Participants", which might benefit from overall co-ordination, particularly through the provision of a central service agency to which the programmes could turn for assistance. While each programme has its own objectives and requirements and does its own planning, there will be some executive requirements common to all groups and a need to co-ordinate at times outside the region or programme (e.g. the deployment of buoys in the North Atlantic by ships from outside that region). At the same time, some co-ordination mechanism could help to ensure that these programmes, together, came to more than the total of individual efforts, e.g. in their overall benefit to the WWW of WMO, the WCRP and other programmes of WMO and IOC.

5.7 The meeting was clearly of the opinion that there were indeed many elements of the FGGE drifting buoy system which were relevant in the context of the co-ordination of current and planned drifting buoy programmes. It further felt that the present requirements for co-ordination of national, regional and global programme drifting buoy activities were sufficient to justify some permanent and ongoing co-ordination structure. At the same time, the meeting agreed strongly that such co-ordination of activities, while benefiting individual programmes, would also contribute significantly to fulfilling the broader global requirements of the WWW, the WCRP and other programmes of WMO and IOC.

Current national programmnes

5.8 The meeting was informed by various participants of their country's particular current and ongoing drifting buoy programmes. These programmes are sumarized in Annex IV and details of national contributions provided by the Members concerned are contained in Annexes V to XIII. The meeting agreed that the sum of these programmes, together with a number of others of which it was aware, represented a considerable contribution to the provision of meteorological and oceanographic data from the oceans. At the same time they indicated the scope of potential benefit which might derive from some form of overall co-ordination. It was also recognized that there were other, sometimes classified, drifting buoy programmes which had the potential to become quite large and could provide substantial quantities of data.

Current regional programmes

5.9 An important regional co-operative programme in the field of drifting buoys, relevant to the problem of international co-operation and co-ordination, is the European COST-43 project. The meeting took careful note of both the management structure of this programme and of its activities, plans and achievements in operating a co-operative drifting buoy programme in the North Atlantic. In particular, the meeting noted that under the terms of the COST-43 Agreement the co-operation generated by COST-43 will terminate finally on 1 December 1988 unless some provision for its continued parentage can be found. COST-43 functions under the overall direction of a management committee with day-to-day operational co-ordination and running of the project in the hands of a technical secretariat. The project had been responsible since its formal commencement in 1979 for the initiation and continuing operation of over 50 ocean data acquisition systems (ODAS) in the North Atlantic, including both moored and drifting buoys contributing data to the WWW of WMO and other programmes of WMO and IOC. A particular feature of the project has been its success as a multi-national co-operative venture in providing a drifting buoy system (SOBA) which was considerably more than could be provided by the participating countries acting individually. This had been achieved at relatively low cost - the provision of an essential one-man technical secretariat in addition to individual national contributions to the buoy programmes.

5.10 The meeting agreed that COST-43 provided an excellent example of a successful regionally-based, co-operative drifting buoy activity. However, it also felt that its own concerns should remain at the global level and that in this circumstance not all of the aspects of COST-43 would necessarily be relevant.

TOGA programme

5.11 The meeting also took note of the drifting buoy programme being undertaken as part of the TOGA project of the WCRP. Clearly this programme is global in scope although it has important regional aspects. The meeting felt it to be important both from the point-of-view that the programme was involved with a significantly large number of drifting buoys and also because any global co-operative drifting buoy activity should be capable of dealing with programmes organized on a global as well as regional or national basis.

5.12 The meeting was informed in particular of the result of the TOGA Drifters Planning Meeting held recently in La Jolla, U.S.A. This latter meeting had been especially concerned with the planning of oceanographic drifting buoy programmes and, in this regard, had felt that a number of aspects might benefit from global co-ordination. These included: cost of components of buoy systems; establishment of performance standards; access to local operational facilities; access to ships and aircraft for buoy deployments; legal issues; data transmission formats; sharing of data and distribution.

5.13 The present meeting was pleased to note these requirements of the TOGA programme for wider co-operative action since they helped to reinforce its developing belief in the need for such co-operative action. At the same time it was clear that, as indicated above, any global activity should have the ability to accommodate existing and developing drifting buoy programmes whether they be organized on a global (programme), regional or national basis.

Service Argos

5.14 The meeting was also pleased to be informed, under this agenda item, of the plans and projects in train for the future development of the Argos data collection and location system, in the short- and medium-term, relevant to possible future co-operative activities. Clearly the satellite data link is an essential feature of all drifting buoy programmes and the future continuance and development of the Argos system is important to the future of these programmes. The assurance of operations until at least 1995, together with planned improvements in the Argos system, were therefore welcomed by the meeting. The meeting also noted with interest the offer by Service Argos concerning the location of a Technical Co-ordinator's position at Service Argos in Toulouse. The meeting thanked the Service Argos for this offer but felt that further consideration of it would be more appropriate to any future co-operative group, if so established.

6. DEVELOPMENT OF CO-ORDINATED DRIFTING BUOY PROGRAMMES (Agenda item 6)

6.1 The meeting considered a large number of aspects of drifting buoy programmes which might be amenable to co-operative actions. A detailed list of these aspects was compiled and is given in Annex XIV. The meeting was clearly of the opinion that not all of these items are indeed appropriate to any future co-operative group. Its conclusions on which aspects are most likely to be appropriate are reflected in the annexes to Recommendation 1 (WMO/IOC-PREP-DBC) (see paragraph 7.2).

6.2 In addressing the question of what form a proposed international co-ordinating mechanism should take the meeting was faced with a series of partially conflicting requirements and issues which had to be resolved. The discussions under agenda item 5 had clearly illustrated that whenever international co-operation in the field of drifting buoys has been successfully achieved it has resulted in an increase in the data available to the major programmes of the WMO and IOC. Outstanding examples of this are the FGGE and the European venture COST-43. In each case, co-operation has both improved the availability of existing data and generated buoy deployment which would have been impossible without the co-operation. The meeting therefore concluded that co-operation of this type is essential if the best use is to be made of the resources actually or potentially available in the field of drifting buoys.

6.3 However it was accepted by the meeting that some activities of the major WMO and IOC programmes are organized on programme lines and have already an element of international co-operation within them. Moreover, since many national activities are also organized this way, their co-ordination may require programme-oriented action internationally.

6.4 It was nevertheless recognized and agreed that over the entire spectrum of drifting buoy activities opportunities are being lost to optimize the availability and use of existing data (e.g. of over 300 buoys currently deployed data from only about 90 are inserted into the GTS) and that there is potential which is not being exploited both to generate additional data from buoys being deployed (e.g. pressure sensors could be added to some buoys now deployed without them) and to deploy more buoys especially for operational meteorological purposes. At the same time, there is also scope for considerable cost savings to accrue from many other aspects of co-operative buoy activities.

6.5 The meeting concluded therefore that to avoid this waste of resources, and for the mutual benefit of all drifting buoy operators, it is essential to generate a form of international and interdisciplinary co-operation in the drifting buoy field.

6.6 It was clear from the characteristics of the organization of both national and international programmes that a centralized, executive mechanism charged with implementing drifting buoy programmes would be costly and probably unworkable. It was also felt that such a structure might well not be sufficiently sensitive and flexible to achieve the measure of cross-programme liaison and contact which is needed to exploit the potential referred to above. The highly successful models of international co-operation used in the FGGE and COST-43 were considered for the role now to be filled. The FGGE model, as a project-oriented scheme, was deemed to be probably more rigid and elaborate than is needed at present. The COST-43 model was felt to have many of the features required for the present requirement but its structure and governing framework needed to be modified substantially to fit it for adoption within the context of WMO and IOC and to the requirements of their different programmes.

6.7 The meeting also took note of the need to create a body which, while initially of minimal size, complexity and cost, could evolve to accommodate the growth in drifting buoy activity which the meeting saw as one of the principal objectives which should be set for the body to achieve.

6.8 The need was clearly recognized for a vehicle for the input by Members of WMO and Member States of IOC to the overall co-ordination problem and for a body to provide parentage for groups, extant or future, which will be needed to permit regional joint action to implement actual co-operative buoy programmes. In particular, the request from the OWSE-NA planning group for a means by which the present highly successful drifting buoy co-operation in Europe can be continued beyond 1988 was regarded very seriously.

6.9 It was clear to the meeting that whenever successful international co-ordination in this field has been achieved, the co-ordinating mechanism responsible has had the services of a dedicated Technical Co-ordinator to ensure that ongoing intersessional tasks are prosecuted vigorously and to act

as a well-publicized and active focal point for activities which need to be linked between national and international programmes. They therefore concluded that the difficult problem of establishing such a Technical Co-ordinator must be faced and solved if any significant benefit is to be obtained from the attempt at co-ordination.

7. AN INTERNATIONAL CONSORTIUM FOR THE IMPLEMENTATION OF DRIFTING BUOY PROGRAMMES (Agenda item 7)

7.1 The meeting concluded that to meet the foregoing needs a Drifting Buoy Co-operation Panel should be established, together with a dedicated Technical Co-ordinator to serve its purposes. In arriving at this conclusion, the meeting took particular note of the feelings of the WMO Executive Council and the IOC Assembly concerning the establishment of a drifting buoy consortium. However, it felt that the name consortium had, for many countries and organizations, formal connotations which were not appropriate to the type of co-operative activities proposed. It therefore considered that, while preserving the spirit of the decisions of the WMO and IOC governing bodies, the name Drifting Buoy Co-operation Panel would better reflect these activities.

7.2 The meeting's views on the required terms of reference for both the Panel and its Technical Co-ordinator were extensively discussed in the light of the suggestions and proposals set out by previous groups who have debated this issue and made available in the various working papers of the meeting. The overall conclusions of the meeting on these issues are contained in Recommendation 1 (WMO/IOC-PREP-DBC) (Annex XV) and its associated annexes.

7.3 In proposing the establishment of a Drifting Buoy Co-operation Panel, the meeting wished to place on record the enthusiastic support expressed by participants. Of 13 countries present 9 gave immediate indication of their interest in participating in the Panel: one, although reserving its position, expressed its intention to continue contributing to drifting buoy activities. The meeting requested the WMO and IOC Secretariats to bring this fact to the attention of their governing bodies.

8. FUTURE ACTION PLAN (Agenda item 8)

8.1 The meeting was first informed by the Secretariats of the approval process of its report and recommendations by the governing bodies of WMO and IOC which basically includes the following:

WMO:

(a) The Secretary-General will submit to the thirty-seventh session of the Executive Council (Geneva, June 1985) Recommendation 1 (WMO/IOC-PREP-DBC) - Drifting Buoy Co-operation Panel - together with important supporting discussions contained in the report;

(b) The Executive Council, if in favour of the proposal of the meeting, is expected to adopt a formal resolution approving the establishment of the said Panel and inviting strongly IOC to take a similar decision with a view to establishing the Panel jointly.

IOC:

(a) Following the decision of the thirteenth session of the Assembly the Secretary of the IOC will submit to the next session of the Executive Council (Paris, March 1986) his findings and additional information concerning international co-operative activities in drifting buoy programmes; these will be largely based on the report and Recommendation 1 (WMO/IOC-PREP-DBC) - Drifting Buoy Co-operation Panel and on the decision of the Executive Council of WMO;

(b) The Executive Council, if in favour of the proposal of the meeting, will adopt a resolution similar to that adopted by the WMO Executive Council.

8.2 The meeting noted that some delay is expected in obtaining the final decision of the IOC Executive Council on the proposals of the meeting. On the other hand, the meeting felt that, in view of the pressing requirements of WWW and WCRP for implementing projected drifting buoy arrays, some urgent actions to implement certain of its proposals may be necessary and justified pending the completion of the approval process by the governing bodies of WMO and IOC. In this connexion, the meeting supported the view expressed by the Fourth Meeting on Argos Joint Tariff Agreement that routine supporting activities, particularly information exchange services on operational drifting buoys should be fostered; indeed this aspect is one of the action items proposed by the meeting. The meeting therefore proposed that the Drifting Buoy Co-operation Panel be established as soon as possible following approval by the thirty-seventh session of the WMO Executive Council and that the first session of the Panel be convened in conjunction with the next meeting of the Argos Joint Tariff Agreement in Toulouse in October 1985. The meeting believed that such a session would enable interested nations to review the ongoing and planned drifting buoy programmes and propose any urgent co-operative actions to be taken in implementing these programmes.

8.3 The representative of Service Argos indicated the willingness of his Service to host also the first session of the Panel in conjunction with the Fifth Argos Joint Tariff Agreement Meeting.

8.4 In response to a query concerning the procedures for possible early approval in IOC, the representative of IOC stated that the possibility exists for the Chairman of IOC to act on urgent matters on behalf of the Executive Council and that the IOC Secretariat may seek the provisional approval by the Chairman of IOC of the proposals of the meeting in the light of the decision to be taken by the WMO Executive Council.

8.5 Finally the meeting requested the WMO Secretariat, in co-ordination with the IOC Secretariat as necessary, to issue an invitation to the first session of the Panel to be held in Toulouse in October 1985.

9. CLOSURE OF THE MEETING (Agenda item 9)

9.1 In his closing remarks to the meeting the chairman, Mr. W.K. Henderson, stated his belief in the importance of the consensus which had been achieved by the meeting concerning co-operative drifting buoy programmes and in its significance to the future of ocean observation systems. He expressed his appreciation to all the participants for their enthusiasm and spirit of co-operation which had allowed such a consensus to be obtained.

9.2 Speaking on behalf of the participants, Dr. R. Pettifer thanked the chairman most warmly for his able conduct of the meeting. Dr. Pettifer also expressed his thanks to all the other participants for their contributions to the undoubted success of the meeting. Dr. J.M. Hall supported the remarks of Dr. Pettifer and extended his appreciation also to the Secretariats and interpreters for their assistance in enabling the meeting to proceed in such a smooth and efficient manner.

9.3 The meeting closed at 1.15 p.m. on Friday 19 April 1985.

AGENDA

1. OPENING OF THE MEETING

2. ELECTION OF THE CHAIRMAN

3. ADOPTION OF THE AGENDA

4. REVIEW OF REQUIREMENTS FOR DRIFTING BUOY DATA

   4.1 Meteorological requirements
   4.2 Oceanographic requirements

5. REVIEW OF PAST AND ONGOING DRIFTING BUOY ACTIVITIES

   5.1 Southern hemisphere drifting buoy system (of FGGE)
   5.2 Current national programmes
   5.3 Current regional programmes

6. DEVELOPMENT OF CO-ORDINATED DRIFTING BUOY PROGRAMMES

   6.1 Operational programmes in support of WWW and IGOSS
   6.2 Drifting buoy programmes in support of the IOC ocean observing systems
   6.3 Other drifting buoy programmes in support of meteorological and oceanographic research programmes
   6.4 Implementation aspects

7. AN INTERNATIONAL CONSORTIUM FOR THE IMPLEMENTATION OF DRIFTING BUOY PROGRAMMES

8. FUTURE ACTION PLAN

9. CLOSURE OF THE MEETING

(This page left intentionally blank.)

LIST OF PARTICIPANTS

ARGENTINA	Norberto Ulises Pereiro Capitan de Fragata Armada Argentina Comisión Naval Argentina en Europa Vorsetzen 50 2000 HAMBURG 11 Federal Rebpulic of Germany
AUSTRALIA	W.K. Henderson Assistant Director (Facilities) Bureau of Meteorology G.P.O. Box 1289K MELBOURNE, Vic. 3001
CANADA	A.D.J. O'Neill (Dr.) Regional Director, Atlantic Region Atmospheric Environment Service 1496 Bedford Highway (5th floor) BEDFORD, Nova Scotia B4A 1E5
	J. Garrett (Dr.) Head, Ocean Physics Institute of Ocean Sciences P.O. Box 6000 SIDNEY, B.C. V8L 4B2
CHILE	Aguilera Américo Rivera Servicio Meteorologico de la Armada Base Aeronaval El Belloto CORREO NAVAL VALPARAISO
FRANCE	P. Waldteufel (Dr.) Adjoint Scientific EERM Direction de la météorologie nationale 77, rue de Sèvres 92106 BOULOGNE-BILLANCOURT CEDEX
	P. Nounou (Dr.) Secrétaire du Comité français pour la COI Institut français de recherches pour l'exploitation de la mer (IFREMER) 66, av. d'Iéna 75116 PARIS
	B. Voituriez (Dr.) Institut français de recherches pour l'exploitation de la mer (IFREMER) 66, av. d'Iéna 75116 PARIS

ICELAND	H. Sigtryggsson Director, Icelandic Meteorological Office Büstadavegur 9 105 REYKJAVIK
NETHERLANDS	W.A. Oost (Dr.) Senior Scientific Officer Royal Netherlands Meteorological Institute (KNMI) P.O. Box 301 3730 AE DE BILT
NORWAY	Knut Bjørheim Senior Scientific Officer Det Norske Meteorologiske Institutt Postboks 320 Blindern 0314 OSLO 3
SAUDI ARABIA	S.O. Baazim Director, Observations and Systems MEPA P.O. Box 1358 JEDDAH
SPAIN	Pedro Rodriguez Franco Director de Programa Instituto Nacional de Meteorologia Apartado de Correos 285 MADRID
	Rafael Cubero Robles Attached to the central Instituto Nacional de Meteorologia Paseo de las Moreras Apartado de Correos 285 MADRID
U.S.S.R.	Evgeny Baranov (Dr.) Senior Scientist U.S.S.R. State Committee for Hydrometeorology and Control of Natural Environment 12, Pavlik Morozov Street 123376 MOSCOW D-376
UNITED KINGDOM	P. Collar (Dr.) Institute of Oceanographic Sciences Brook Road Wormley GODALMING, Surrey GU8 5EF
	D.J. Painting Meteorological Office (MET 016) Beaufort Park, Easthampstead WOKINGHAM, Berkshire RG12 2SZ

UNITED STATES OF AMERICA	J.M. Hall (Dr.) Director, U.S. TOGA Project Office NOAA/CAR 6010 Executive Boulevard ROCKVILLE, MD 20852
	J.C. McCall (Dr.) Director, NOAA Data Buoy Center NATIONAL SPACE TECHNOLOGY LABS, MS 39529
	R.C. Landis Chief, Marine Services Branch NWS/NOAA W/OM12 8060 13th Street SILVER SPRING, Maryland 20910
ORGANIZATIONS	
COST-43	R.E.W. Pettifer (Dr.) Chairman of COST-43 Meteorological Research FLight Royal Aircraft Establishment FARNBOROUGH, Hampshire GU14 6TD United Kingdom
	T. Kvinge Project Leader, COST-43 The Chr. Michelsen Institute Fantoftvegen 38 N-5036 FANTOFT Norway
SCOR	J. Garrett (Dr.) Head, Ocean Physics Institute of Ocean Sciences P.O. Box 6000 SIDNEY, B.C. V8L 4B2 Canada
SERVICE ARGOS	M. Taillade-Carrière Chef du Service Argos Centre Spatial de Toulouse 18, Av. Edouard-Belin 31055 TOULOUSE CEDEX France
	A.E. Shaw U.S. Representative Service Argos U.S. Office F.B. No.4, Room 0118 SUITLAND, MD. 20233 U.S.A.

SERVICE ARGOS (contd.)	A. Goasguen Technical Manager Service Argos Centre Spatial de Toulouse 18, Av. Edouard-Belin 31055 TOULOUSE CEDEX France
	R. Rosso Promotion Manager Service Argos
	L. Mesnier Argos Promotion Department Service Argos

SECRETARIATS

IOC

Y. Tréglos	Assistant-Secretary IOC, UNESCO, 7 place de Fontenoy 75700 PARIS France

WMO

G.K. Weiss	Director World Weather Watch Department WMO, Case postale No 5 CH-1211 GENEVE 20 Switzerland
S. Mizuno	Chief, Ocean Affairs Division World Weather Watch Department
P. Dexter	Scientific Officer Ocean Affairs Division World Weather Watch Department
M. Krasnoperov	Scientific Officer Ocean Affairs Division World Weather Watch Department
E. Sarukhanian	Chief, Observing System Division World Weather Watch Department
J. Giraytys	Senior Scientific Officer Integrated Systems Study Office World Weather Watch Department
T. Kaneshige	Senior Scientific Officer World Climate Research Programme
H. Ohno	Junior Professional Officer Office of the Deputy Secretary-General

SUMMARIZED GENERAL REQUIREMENTS FOR DRIFTING BUOY DATA

Programme	Parameters* Atmosphere V	P	Ta	Interface Ts	Vs	Waves	Sub-surface Tx	Vx	Spacing	Timescale	Reporting frequency	RT/NRT*	Archival
Synoptic meteorology WWW	x	x	x	x					250-500 km	Continous	4/day	RT	Yes
OWSE-NA of WWW		x	x	x					250-500 km (60 buoys)	1987-1988	4/day	RT	
Marine Meteorological Services (MMS)	x	x	x	x	x	x			250-500 km	Continous	4/day	RT	
WCRP TOGA	x	x	x	x	x		x	x	Various	1985 - 1995	1/day	RT/NRT	Yes
WCRP WOCE	not yet defined									1990 - 2000			
IGOSS				x	x		x	x		Continuous	2/day	RT	Yes
General oceanographic			Various										
Specific purpose National or regional (e.g. tropical cyclones)			Various						50-100 km	Days	Frequent	RT=NRT	Yes
Operational oceanography (other than IGOSS)			Various							1990 ---	1/day	NRT	Yes

* Notes: RT = real-time, understood to be of the order of 3 hours after observation
NRT = non-real-time
V = surface windspeed; P = atmospheric surface pressure; Ta = air temperature; Ts = SST; Vs = surface current; Waves = wave spectral or other wave data; Tx = subsurface temperature at depth x; Vx = current at depth x

(This page left intentionally blank.)

Country	Buoy No. / Type / Supplier	Deployment area	Programme	Timescale
Australia	10 / meteorological per year / Australia	S of 20S, 70E to 180E	WWW	3 + years
	20 / meteorological per year / U.S.A.	S of 20S, 70E to 180E	TOGA	10 years
	3 / met/oceanographic per year / Australia	Antarctic	Antarctic Sea Ice Research	5 + years
	30 / oceanographic over 5 years / Australia	West Tasman Sea	Oceanographic Research	5 years
Canada	9 / meteorological per year / Canada	N.E. Pacific	WWW	Current and continuous
	15 / meteorological total per year / Canada and U.S.A.	Arctic icepack	WWW and ice drift studies	Continuous
	1 / meteorological / Canada	Hudson Bay	WWW	1984 and 1985
	30 / oceanographic total / Canada	NE Pacific/Arctic	Various oceano-graphic research	1983-1985
	30 / oceanographic total / Canada	Atlantic	Various oceano-graphic research	1984-1985
France	3 / meteorological per year / France	N. Atlantic	WWW/SOBA	Continuing and increasing up to 10/year
	number undecided / oceanographic / France	W. Pacific Indian Ocean	TOGA	1986 -
Iceland	Deployment of all SOBA buoys	N. Atlantic	WWW/SOBA	1984 - 1988
Netherlands	1 / meteorological per year / Netherlands	N. Atlantic	WWW/SOBA	Continuous and increasing

Country	Buoy No. / Type / Supplier	Deployment area	Programme	Timescale
New Zealand	5 / meteorological / New Zealand per year	Mid-Tasman Sea	WWW	1985 +
	various / meteorological / U.S.A.	Southern Ocean	TOGA	1985 +
Norway	3 / meteorological / Norway	Arctic Icepack	WWW and icedrift studies	1985
	10 / meteorological / Norway to 20 per year	Norwegian Sea/Barents Sea	WWW	1985 +
	3 / meteorological / Norway	N. Atlantic	WWW/SOBA	3 years
Saudi Arabia	13 / met/oceanographic / Saudi Arabia and U.S.A.	Gulf and Red Sea	Meteorological and oceanographic	1983 - 1985
	10 / met/oceanographic / Saudi Arabia	Gulf and Red Sea	Meteorological and oceanographic	1985 +
Peru	12 / oceanographic / U.S.A. to 20 per year	N.E. South Pacific, Peruvian coast	Oceanographic research	Continuing
United Kingdom	5 / meteorological / United Kingdom per year	N. Atlantic	WWW/SOBA	1984 +
	various / oceanographic / United Kingdom	N.E. Atlantic	Oceanographic	Continuing
U.S.A.	40-/ meteorological / U.S.A. 60 per year	Southern hemisphere	TOGA	Continuous 1985-1995
	10-/ meteorological / U.S.A. 20 per year	Atlantic/Pacific/Coastal	Other meteoro-ligical	1984-1985 and seasonal
	255/ met/oceanographic / U.S.A.	Atlantic/Arctic/Pacific/ Great Lakes	Various oceano-graphic and other research	1985 +

AUSTRALIAN DRIFTING BUOY ACTIVITIES

Programmes as at March 1985

1. Bureau of Meteorology

(a) Objectives. The Bureau programs are in support of broadscale synoptic analysis, and in support of the TOGA Program in collaboration with NOAA US.

(b) Number of buoys. The Bureau intends to deploy up to 10 buoys per year for its own program, and has entered an agreement with NOAA to take delivery of up to 20 TOGA buoys per year in US and deploy them in the Australian area.

(c) Area. The Bureau's area of interest is the oceans south of latitude 20S and between longitudes 70E and 180.

(d) Status. The Bureau has firm and continuing commitments to deploy buoys for its own program for three years, and anticipates continuation indefinitely. The collaboration with US for the TOGA program is firm for ten years. Six buoys are operating at present. Data reception is via GTS.

(e) Co-ordination

There is informal co-ordination between the Bureau and other Australian buoy programs, but the requirements do not overlap at present. There is close contact with the US TOGA program, and with New Zealand. The southern ocean buoy network in the Australian region will depend heavily on buoys entering the area from the west in circumpolar current. Co-ordination in this respect has not been necessary so far, but will be desirable in future. Present plans are for bilateral co-ordination with other southern hemisphere countries and the US TOGA office. By arrangement through JMA the Japanese National Institute of Polar Research has collaborated by launching our buoys from their Antarctic relief ship.

(f) Program details

All buoys will measure atmospheric pressure and sea-surface temperature, and will be drogued. Air temperature and wind sensors are desirable extras. Deployment will be mostly from Antarctic expedition ships, and research and merchant ships of opportunity. We are investigating possibilities for air deployment to top up the network as required.

2. Antarctic Division, Department of Science

(a) Objectives. The Division's drifting buoy program is to study the dynamics of the Antarctic sea ice zone and its interaction with ocean and atmosphere.

(b) Number of buoys. Up to three buoys per year for five or more years. The most probable program would deploy three buoys every second year.

(c) Area of deployment. South of latitude 60S, between longitudes 40E and 160E.

(d) Status. This is an approved and committed program, for five or more years. Three buoys are at present in operation.

(e) Co-ordination. There is co-ordination as required with other Australian buoy programs.

(f) Program details. All buoys will measure pressure and tendency, air and sea surface temperature and ocean temperature at eleven levels down to 100 m. They will be launched in open water and are intended to freeze in. They are undrogued and must survive collisions with ice floes. At present "ICEX" capsules are being used, from the Chr. Michelsen Institute, Norway. Data reception is via GTS, plus monthly tapes of all transmissions. Buoys are launched from Australian expedition relief ships.

3. Royal Australian Navy

(a) Objectives. Study of ocean currents and circulations.

(b) Number of buoys. Thirty buoys over five years.

(c) Area. The west Tasman Sea.

(d) Status. Thirty buoys have been purchased.

(e) Co-ordination. The program is managed and implemented by the Division of Oceanography at the Commonwealth Scientific and Industrial Research Organisation (CSIRO).

(f) Program details. The buoys are of Australian manufacture. They measure sea surface temperature only, and are drogued. Deployment is by research or Navy ships. Data reception is by monthly tape, and also by daily telex calls to the Service Argos data file.

REPORT ON CANADIAN DRIFTING BUOY ACTIVITIES

BUOY PROGRAMMES OF THE ATMOSPHERIC ENVIRONMENT SERVICE (AES)

1. Data Reception and Processing Stations

AES operates two Local User Terminals (LUT's) - one located at Edmonton, Alberta and the second at Toronto, Ontario. These LUT's consist of electronic receiving equipment and a mini-computer which automatically receive, decode and process data received from buoys and disseminate this information on AES telecommunication circuits. The data transmitted from buoys or DCP's are received via the Data Collection and Locating System (DCLS) on board the NOAA series of polar-orbiting satellites.

These LUT's are capable of determining buoy positions to an accuracy of 15-20 km. at the present time but work is planned which will reduce this error to approximately 5km. The method of location determination used by our LUT's is not as accurate as that available from Service ARGOS, which claims an accuracy of 0.5 km. However, data is available from our LUT's within 15 minutes after a satellite pass which can be considered near real-time.

2. Pacific Ocean

AES currently deploys nine drifting buoys per year in the N.E. Pacific Ocean. These buoys are equipped with sensors to measure barometric pressure and water temperature; and have holey sock drogues attached to slow their drift rate and thus maintain their station for a longer time period. The buoys are usually deployed in the area bounded by latitudes 40 to 50 degrees North and longitudes 140 to 155 degrees West. After deployment, the buoys drift slowly eastward toward the west coast of Canada and U.S.A.

The arrangements for deploying buoys are the responsibility of the Vancouver Port Meteorological Officer.

3. Arctic Ocean

AES contributes $100K annually as its share of the Coordinated Arctic Buoy Program (previously called the Arctic Basin Buoy Program). This program calls for approximately 15 buoys to be maintained on the ice pack of the Arctic Ocean at all times. The program is coordinated by NOAA, Office of Special Projects which has contracted the Polar Science Center of the University of Washington in Seattle to develop suitable buoys and to archive and analyse the data received.

AES's interest in these data is for use in real-time weather forecasting for northern communities and to support offshore drilling in the Beaufort Sea.

Deployment of these buoys is performed by Canadian DND Hercules aircraft on an opportunity basis. The buoys are air-droppable and are parachuted onto the ice pack from low altitudes.

4. Hudson Bay

AES does not have an operational buoy program in Hudson Bay. However, one drifter was deployed on an experimental basis in the summer of 1984 and another is planned in 1985. Data from these buoys were processed at the Toronto LUT.

5. Atlantic Ocean and Canadian Coastal Waters

AES has supported Hermes Electronics through a product development contract in producing Shipboard Data Platforms (SDP's) and having them installed on six east coast ships. The SDP's are of two types - the first is a completely automatic system which is the equivalent of a drifting buoy except that it is installed on the deck of a ship to report barometric pressure and air temperature. The second type of SDP requires manual input by a ship's officer of meteorological information similar to a synoptic report. The data from both types of SDP's were processed at the Toronto LUT and disseminated on AES meteorological circuits.

The feasibility of both systems was proven. However, the manual input system was not totally satisfactory because although the observation was input to the SDP for transmission at synoptic hours, a satellite was not always available to relay the message to the LUT site for several hours. In this respect, this type of system would be more useful transmitting through a geostationary satellite rather than a polar-orbitter. (Even this latter system has its limitations at latitudes greater than about 70 degrees when the line of sight between transmitter and satellite comes too close to the horizon.)

The AES has not until recently had a program to deploy drifters in the Atlantic Ocean and East Coast areas. However, we have received the cooperation of other organizations such as the oil industry and Bedford Institute of Oceanography in allowing us to use and transmit data from their buoys on AES communications circuits.

A recent development of interest is the operational use of moored Hermes drifters off the East Coast to provide real-time data for weather forecasting in support of oil drilling and other marine activities. In March 1985, an AES drifter is being moored in deep water off the Scotian Shelf near Nova Scotia.

6. AES Drifting Buoys

All drifting buoys and SDP's purchased by AES are manufactured by Hermes Electronics of Dartmouth, N.S. The air-deployable buoys used for the Arctic Ocean program are manufactured by Polar Research Laboratory in California.

The drifting buoys that are purchased by AES for deployment in the Pacific cost approximately $20K each, including the drogue and tether. With these buoys, we try to achieve a life of one year. A recent study of ten buoys deployed during the past two years shows an average life of just over 300 days. Since 1980, when AES first started the Pacific program, the life of these buoys has gradually improved.

BUOY PROGRAMMES OF THE DEPARTMENT OF FISHERIES AND OCEANS

1. Pacific Ocean

The Department of Fisheries and Oceans Institute of Ocean Sciences (IOS) is engaged in a number of drifting buoy programs to study surface currents in the Pacific Ocean off the coast of British Columbia.

Ten drifting buoys, reporting via System ARGOS, were deployed off the west coast of Vancouver Island for a 6 week period during July and August 1984. This program will be repeated in 1985.

Three buoys were deployed off the Queen Charlotte Islands in the late fall of 1983. Data from these buoys is now being analysed.

Six drifters were deployed for short periods off Vancouver Island. One of these was not recovered and is still reporting as it heads towards Hawaii. Data from the latter buoy is being analysed to study surface current meander patterns in the Pacific.

As part of a study of pack ice kinematics an array of 13 drifting ice platforms was deployed in the Beaufort Sea during 1985. These platforms reported through System ARGOS.

A number of drifting buoy systems are under development in IOS. In cooperation with the Departments of Transport and National Defence, IOS has initiated an 18 month design and development project for an air-deployable drifting buoy. This drogued drifting buoy will use LORAN C positioning and report via meteor-burst communications. The objective is to develop a suitable design for an operational drifter for Coast Guard search and rescue and oceanographic research use, which employs these positioning and communications techniques.

Other means of location and data transmission are also actively under study, including on board satellite navigation receivers and communication by VHF and HF radio and GOES. Another development is that of a buoy with solar panels and a propulsion motor which has the capability to seek and maintain a pre-determined station.

2. Atlantic Ocean

The Department of Fisheries and Oceans, Bedford Institute of Oceanography (BIO) has an active drifting buoy program in the North Atlantic particularly off the east coast of Canada.

In January 1984 three moored drifters were deployed on the Grand Banks of Newfoundland and operated for 195 days. As noted earlier, they reported atmospheric pressure and sea surface temperature via satellite for real time support of weather and wave forecasting. This experiment was carried out in collaboration with Petro Canada and the Atmospheric Environment Service and is being repeated in 1985.

As part of the international MIZEX experiment, commencing in June and July 1984 seven beacon buoys with no sensors and three with anemometers were air dropped onto the ice field between Greenland and Spitzbergen. The objective was to study processes at work at the edge of the ice field. A smaller experiment will be carried out in Spring 1985 off the Labrador Coast using 11 buoys.

Three buoys, drogued at 30 metres, were deployed by BIO in August 1984 to study the circulation in the northern part of Baffin Bay. The experiment was scheduled to produce data for a 90 day period but one buoy continued in operation until the end of 1984. This project will be repeated in August 1985 using 6 buoys.

Bedford Institute has deployed a number of drifting buoys to study continental shelf circulation. In support of fish stock modelling in the Brown's Bank area off Nova Scotia five drogued drifting buoys were deployed for a 30 day period commencing in May 1984. In addition, three undrogued buoys and 3 drogued buoys were deployed off Cape Sable, Nova Scotia for 10 days in November 1984. All of the drifters measured sea surface temperature and two buoys on Brown's Bank also measured barometric pressure.

In cooperation with Mobil Oil Canada, BIO deployed 5 drogued buoys on the Grand Banks in December 1984 to obtain data to improve iceberg trajectory prediction, in support of offshore resource development. At the end of February 1985 4 buoys had left the Banks and were being carried eastward across the Atlantic while the fifth buoy was still on the Banks. This experiment will be repeated in May 1985.

3. National Ocean Data Centre

The Marine Environmental Data Centre in Ottawa acts as a Responsible National Ocean Data Centre for archiving drifting buoy data as recommended by the Committee on Climate Change and the Ocean and the International Committee on Ocean Data Exchange. Subject to the agreement of the buoy operator, Service ARGOS supplies the Marine Environmental Data Centre with computer compatible tapes containing all buoy data. These are subsequently transformed to an agreed format and archived for further use in climate research. The archives only include buoy positions and other data available as physical quantities. The system is currently under development and methods are being sought to include data not decoded by Service ARGOS.

FRANCE DRIFTING BUOY ACTIVITIES (SUMMARY)

FGGE

1. France's activity concerning drifting buoys began with a contribution of 35 buoys to FGGE. France also contributed the cost of the Argos system for the FGGE operation.

Northern Atlantic (1980-1982)

2. Both in 1980 and 1982, a small network (3-5 buoys) was deployed in the northern Atlantic. The objective of such deployments was twofold: First, test technological developments with respect to the FGGE drifters; second, test the feasibility of maintening a network of drifting buoys in the northern Atlantic. In the first respect, the main effort was focused on wind measurements; although the buoys equipped with wind sensors did not stay in operation more than a few months due to weaknesses in the mechanical structure, the measured winds were shown to be satisfactory in the meteorological sense. In the second respect, the results were quite encouraging and helped to define the future COST-43 SOBA experiment.

Tropical Ocean (1983-1984)

3. Within the frame of the FOCAL Programme in the tropical Atlantic Ocean, up to 20 buoys were deployed in these two years with the specific feature of measuring the sub-surface temperature profile. The system was not reliable and its duration fell by far short of expectations.

Northern Atlantic (1984 -)

COSt-43 SOBA experiment

4. France participates to the SOBA project; its contribution includes:

- Three buoys per year
- The programme co-ordinator.

OWSE-NA

5. France participates to the technical committees concerned with this topic. Specifically, France plans to conduct in 1985 simulations in order to test the impact on numerical weather prediction of:

- The spacing between buoys
- The nature of measurements (e.g. n buoys with pressure against m buoys with pressure and wind).

Technical developments

6. In the course of its participation to the COST-43 SOBA experiment, France plans to test buoys with both sub-surface temperature measurements and wind sensors.

Further deployments

7. France plans to increase its contribution to ocean coverage by drifting buoys, substantially above the present level. The primary area of interest is the northern Atlantic.

TOGA

8. A French contribution to buoy coverage in the TOGA experiment will quite probably be made. Final decisions regarding this contribution are to be made fairly soon.

REVIEW OF PAST AND ONGOING DRIFTING BUOY ACTIVITIES IN NEW ZEALAND

DISCUSSION

1. During 1978-1979, New Zealand contributed ten drifting buoys instrumented to measure atmospheric pressure and sea-surface temperature to the Southern Hemisphere Drifting Buoy System of FGGE. Data was relayed and position determined using the Argos data collection and location system, the reports being received in DRIBU code over the GTS.

2. Delivery is awaited of five drifting buoys to be deployed during 1985. These are instrumented to measure air temperature, sea-surface temperature and atmospheric pressure. Data will be relayed through the Argos system and the GTS. In addition, data from buoys within range of the Wellington satellite HRPT terminal will be processed for local use. The buoy programme is intended to contribute to national oceanographic and fisheries research studies, as well as to a regional buoy array in support of GOS and the TOGA programme. It is expected that the majority of the buoys will be deployed in the mid-Tasman Sea in May-June 1985.

3. It is expected that a buoy programme with similar objectives will be maintained at a similar level in the following years. New Zealand is also assisting in the deployment of U.S. buoys for the TOGA programme.

(This page left intentionally blank.)

A SUMMARY OF PLANS AND PROGRAMMES FOR THE OPERATION OF DRIFTING METEOROLOGICAL AND OCEANOGRAPHIC PLATFORMS IN NORWAY

1. Norway participates presently in drifting platform-programmes in the Arctic Sea, Norwegian Sea/Barents Sea and in the North Atlantic.

Arctic Sea

2. Norway has, on an informal basis, co-operated with the U.S.A. and Canada in deploying ice-drift-based automatic platforms in the Arctic. Since the late 1970s, 23 platforms have been deployed under this programme. In 1985, three platforms will be air-dropped in the area between Spitzbergen and the North Pole. The Norwegian contribution to the Co-ordinated Arctic Buoy Programme is likely to continue at the present level. However, no commitment beyond 1985 has yet been made. The interest in this programme is the programme's support of the broadscale synoptic analysis, providing data for real-time weather forecasting in the Spitzbergen area and studies of the general ice-drift in the Arctic Basin.

Norwegian Sea/Barents Sea

3. A national operational programme to improve synoptic and meso-scale weather monitoring in the Norwegian Sea/Barents sea using drifting buoys was established in 1982. The ideal buoy array as defined in Figure 1 consists of 10 deployment areas for drifting platforms in the Norwegian Sea and 5 fixed locations in the Barents Sea. In the Barents Sea only small moored buoys are presently used under this programme. Since the start of this programme, more than 50 deployments of drifting buoys has taken place. All deployments are carried out by ships-of-opportunity. Normally there are two major deployment missions - one in early spring and one in early autumn. In 1985 about 20 drifting buoys will be used in this programme.

4. This programme will continue beyond 1985 with deployments of 10-20 buoys per year. A rather high number of buoys are retrieved (about 40%), refurbished and re-used. All buoys used under this programme are equipped with pressure sensor and sea surface sensor. All the newer buoys report 3-hourly asynoptic pressure tendency as a standard. Some buoys also have an air temperature sensor. Data are available on the GTS.

4. A number of programmes using drifting buoys for surface current mapping along the continental shelf have been undertaken. The main purpose of these programmes is to study the drift and spread of oil at sea (offshore industry), transport and spreading of eggs and larvae (fishing industry), drift experiments related to search and rescue operations. Data from these programmes are not generally available.

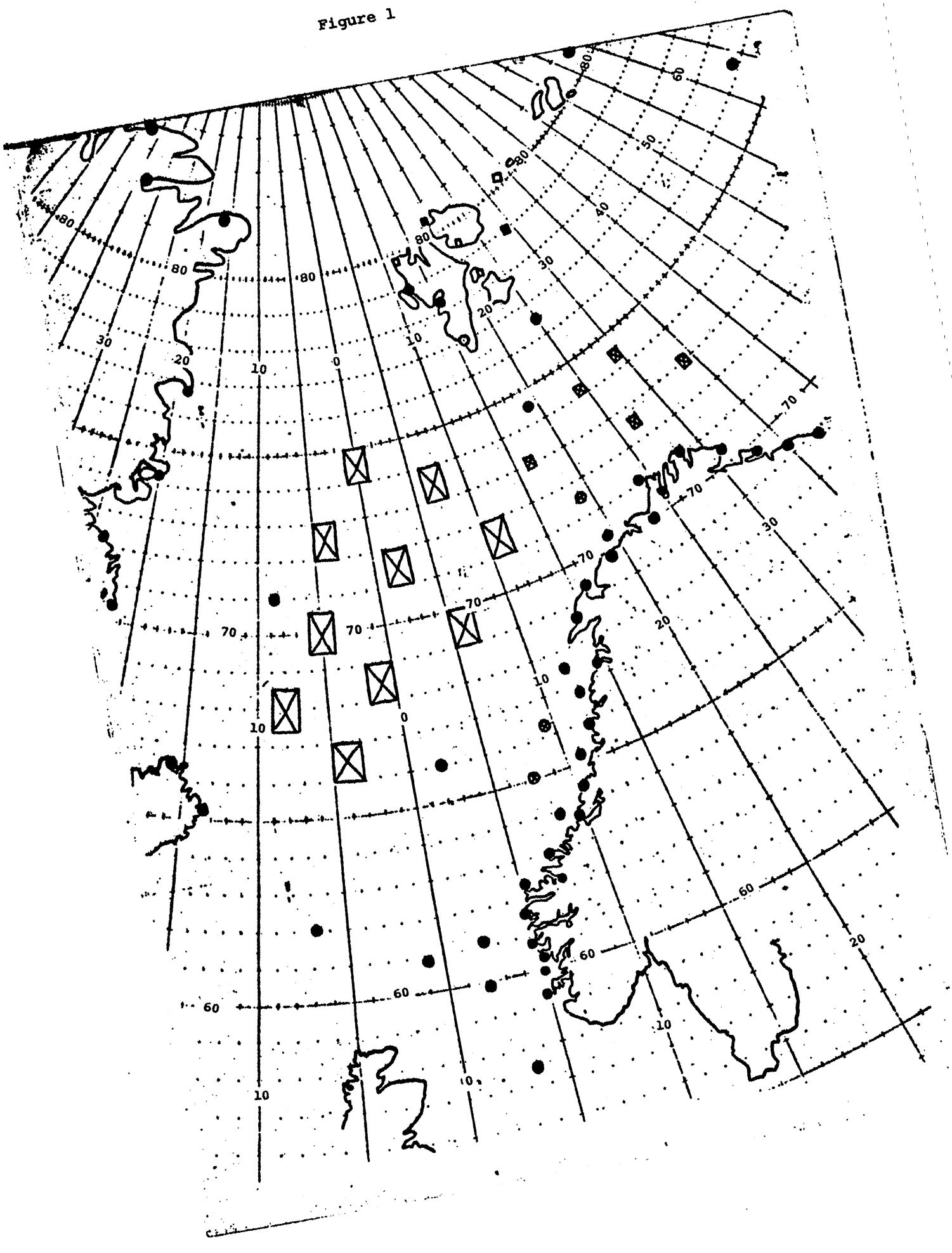
North Atlantic

5. Norway did join the COST-43 drifting buoy programme SOBA. This programme will run for a minimum of a 3-year period. The present commitment is three buoys. No other plans exist for further involvement in this area.

Data collection and processing

6. To ensure the timely reception of data from drifting stations, the Norwegian Meteorological Institute (DNMI) has established a LUT (HRPT) facility in Oslo. The LUT is operated on a 24-hour basis with full positioning capability implemented. Special ground reference stations have been established to ensure "stable" positioning. All platforms operated by DNMI are processed and positioned by the LUT. More than 50 platforms are presently processed and disseminated. Only platforms operated by Norway or by agreement with the operator are disseminated onto the GTS. Data are, at the national level, generally available to the forecaster 10-15 minutes after the satellite overpass which is in agreement with his requirement for surface information used for monitoring purposes.

Figure 1



(This page left intentionally blank.)

DRIFTING BUOY ACTIVITIES OF IMARPE (PERU) FOR OCEANOGRAPHIC PURPOSES

1. OBJECTIVE

To continue studying the variations in the sea-surface currents along the Peruvian coast using oceanographic drifting buoys tracked by satellites in the Argos system.

2. DEPLOYMENT AREA

The buoys are deployed during oceanographic expeditions made by the Instituto del Mar del Perú (IMARPE) and by the Dirección de Hidrografía y Navegación (DHNM) in the coastal zone between 3 and 10°S and largely within 200 miles of the coast. Figure 1 shows the standard route of the oceanographic expeditions and the selected deployment locations (five buoys per expedition out of which the priority buoys are B1, B3 and B5). The oceanographic expeditions which normally last 30 days each are scheduled for February/March, (summer), May/June (autumn) August/September (winter) and November/December (spring).

3. STATUS OF BUOY OPERATIONS

Drifting buoy activities started off the Peruvian coast in 1979 during the FGGE Special Observing Periods I and II as a task to be performed jointly with the AOML/NOAA (U.S.A.): (Atlantic Oceanographic Meteorological Laboratories of the National Oceanic and Atmospheric Administration of the U.S.A.) with Dr. D. Hansen as intermediary. Figure 2 shows the locations for the buoy deployment in January and June 1979 by oceanographic expeditions on board the BAP Unanue, whose results have been reported in various publications and revealed important and previously unknown aspects of the surface circulation particularly opposite Peru.

The deployment of oceanographic drifting buoys has been continued since 1979 both by national vessels (BIC SNP-1, BIC Humboldt and BAP Unanue) and by U.S.A. research vessels (R/V Researcher, R/V Discoverer, R/V Wecoma, R/V Endeavor, etc.). In 1979, the buoys were launched with drogues at 30 m but later with drogues at 10 m to take account of the region's characteristics.

The data from these buoys are stored in the Argos system and copies of the magnetic tapes are sent to AOML/NOAA, where the data are processed. A copy of the resulting products is placed at the disposal of IMARPE and DHNM. Figure 3 shows some interesting results concerning the drift-tracks of the buoys in July-August 1979, November-December 1981, February-March 1982 and April-May 1982. Figure 4 shows the monthly averages of the anomalous period of 1982-1983. Figures 3 and 4 require no further comment since they are self-explanatory.

4. PLANS FOR CO-OPERATION AND CO-ORDINATION

As mentioned above, the deployment of oceanographic drifting buoys has been accomplished through a co-operative effort between IMARPE, DHNM and AOML/NOAA, which can be summarized as follows:

4.1 Contribution of AOML/NOAA

(a) Supply of oceanographic buoys, equipment, materials and accessories;

(b) Training of Peruvian personnel both in Peru and abroad, for field work and the analysis and interpretation of the data;

(c) Support for the participation of Peruvian personnel in scientific events concerning research work off the coast of Peru, and for the joint analysis of the data;

(d) Supply of data and products from oceanographic drifting buoys;

(e) Facilities for permanent communication, exchange of information and suitable, timely implementation of programmes.

4.2 Contribution of IMARPE and DHNM

(a) Deployment of the oceanographic drifting buoys by the ships BIC SNP-1 (length 33 m; displacement 260 metric tons), BIC Humboldt (length 76 m; displacement 1980 metric tons) and BAP Unanue (length 43 m; displacement 858 metric tons) during the research expeditions;

(b) Completion of customs formalities for the reception of the buoys sent by the AOML;

(c) National co-ordination for the security of the buoys deployed off the Peruvian coast;

(d) Facilities for the U.S.A. research expeditions (particularly those of the NOAA) working under co-operative agreements off the Peruvian coast;

(e) Dispatch to the AOML/NOAA of information concerning the deployment of the buoys and XBT observations.

There is an interest in continuing the above work in the future within the framework of international co-operation in order to extend the copying and exchange of oceanographic and meteorological data. The deployment of oceanographic drifting buoys could be accompanied by the launching of meteorological balloons as was done in 1979.

5. IMARPE REQUIREMENTS TO ACHIEVE THE STATED OBJECTIVE

(a) To have annually between 12 and 20 oceanographic drifting buoys, to be deployed at 3 or 5 of the selected locations shown in Figure 1 during the seasonal expeditions during normal periods.

(b) To intensify the deployment of such buoys during anomolous periods related to El Niño, this intensification being not only in number but also in frequency and including drogues at various levels, with the addition, for example, of the 50-m and 100-m levels;

(c) To have the SST and wind data transmitted by the buoys available within one month, for inclusion in the monthly charts produced by IMARPE;

(d) To obtain economic assistance for the buoy logistics (expenses related to customs, local transportation and telex services);

(e) To obtain personnel training at professional and technical levels in buoy deployment and the use of the data;

(f) To participate in international events concerning the analysis of the results obtained using buoys.

6. RESEARCH PROGRAMMES OF THE IMARPE ON PHYSICAL ASPECTS

(a) Monthly charts of SST, sea-surface salinity and surface wind

The monthly charts of SST and of sea-surface temperature anomalies have been produced operationally since 1969 according to a plan for monitoring changes in the sea surface. The monthly charts of sea-surface salinity have been produced operationally since 1983. Those of surface wind are planned to be produced as from 1985 on the basis of observations from research expeditions, VACOM operations and some fishing vessels;

(b) Study and forecasting of the El Niño phenomenon (ERFEN)

The basic observations to be used are those from coastal stations, research expeditions, VACOM operations and satellite data;

(c) Study of oceanic circulation and air-sea interaction (ECIMA)

The main problems to be covered are the variations in the coastal upwelling, characteristics and variations of the surface and sub-surface currents off the Peruvian coast and variations in surface wind;

(d) Effect of oceanographic conditions on marine organisms (ECOOM)

The overall objective is to determine the main physical parameters whose variability causes considerable fluctuations in the populations of the principal marine fauna species, particularly commercially important fish for direct human consumption. The basic observations to be used are those from expeditions to evaluate pelagic and demersal resources as well as from the operations carried out under the Monitoreo oceanográfico pesquero de áreas seleccionadas (MOPAS - fishing/oceanographic monitoring of selected areas). The latter operations started in the area of Ilo (17-18°S) in 1984 and will be extended in 1985 to other coastal areas, including those of Callao (12-14°S), Chimbote (9-10°S), Paita (5-6°S) and Tumbes (3-4°S).

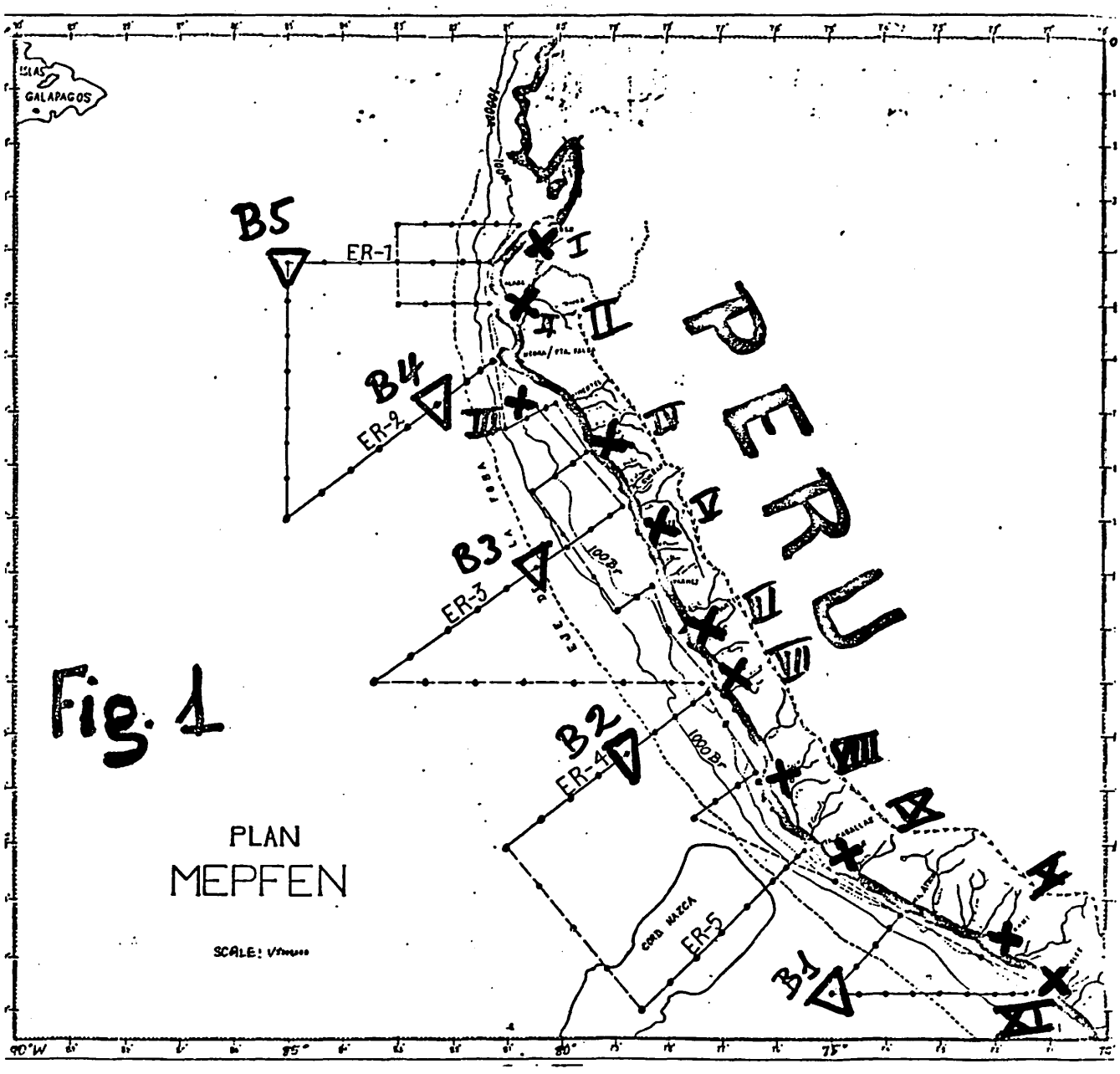
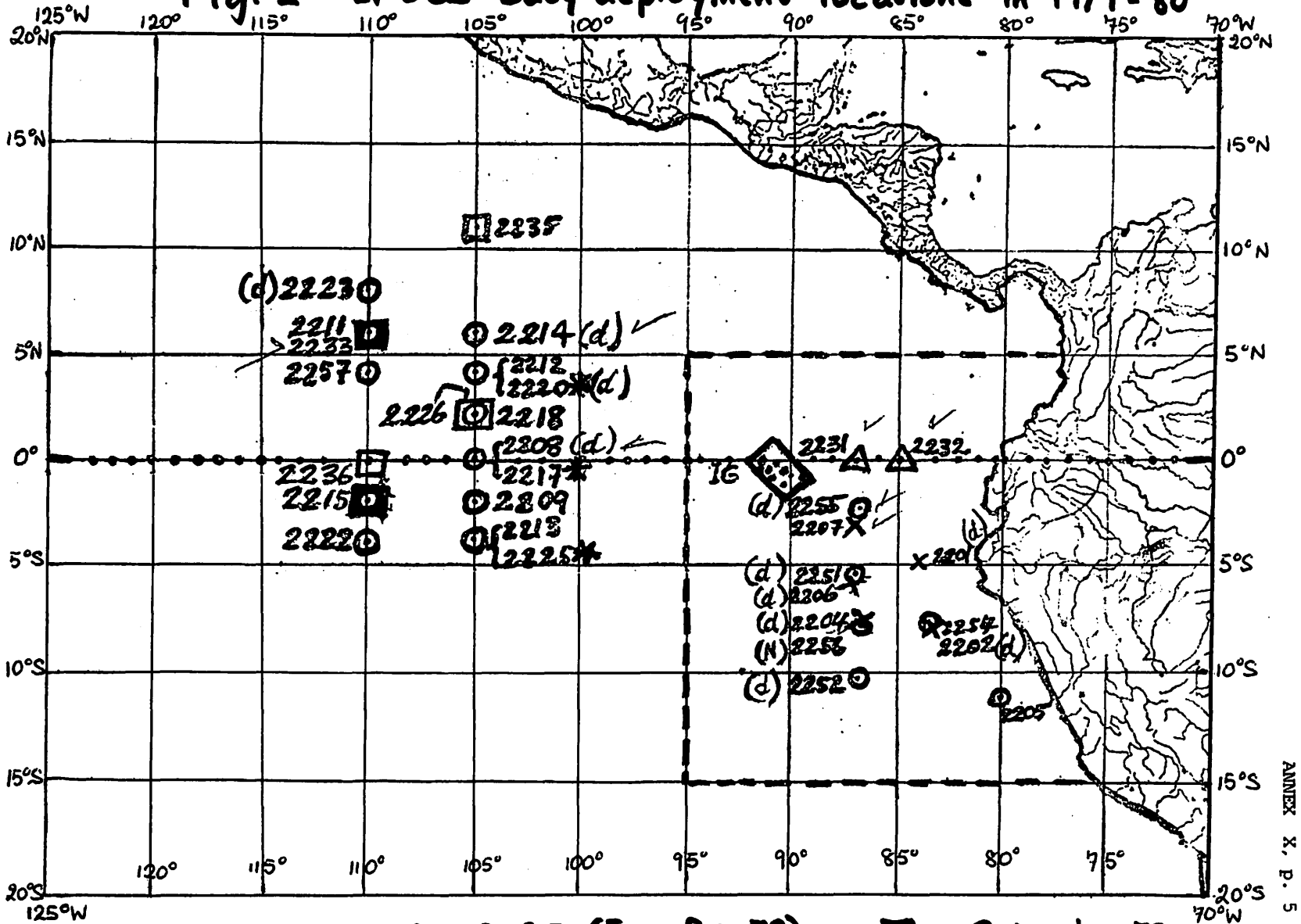


Fig. 1

▽ = Oceanographic drifting buoy

Fig. 2 - EPOCS Buoy deployment locations in 1979-80



* = Drogue at 100 m
(d) = Died before July 80

X = SOP-I (Jan.-Feb. 79)
⊙ = SOP-II (May-June 79)

⊡ = Oct.-Nov. 79
△ = Jan. 1980

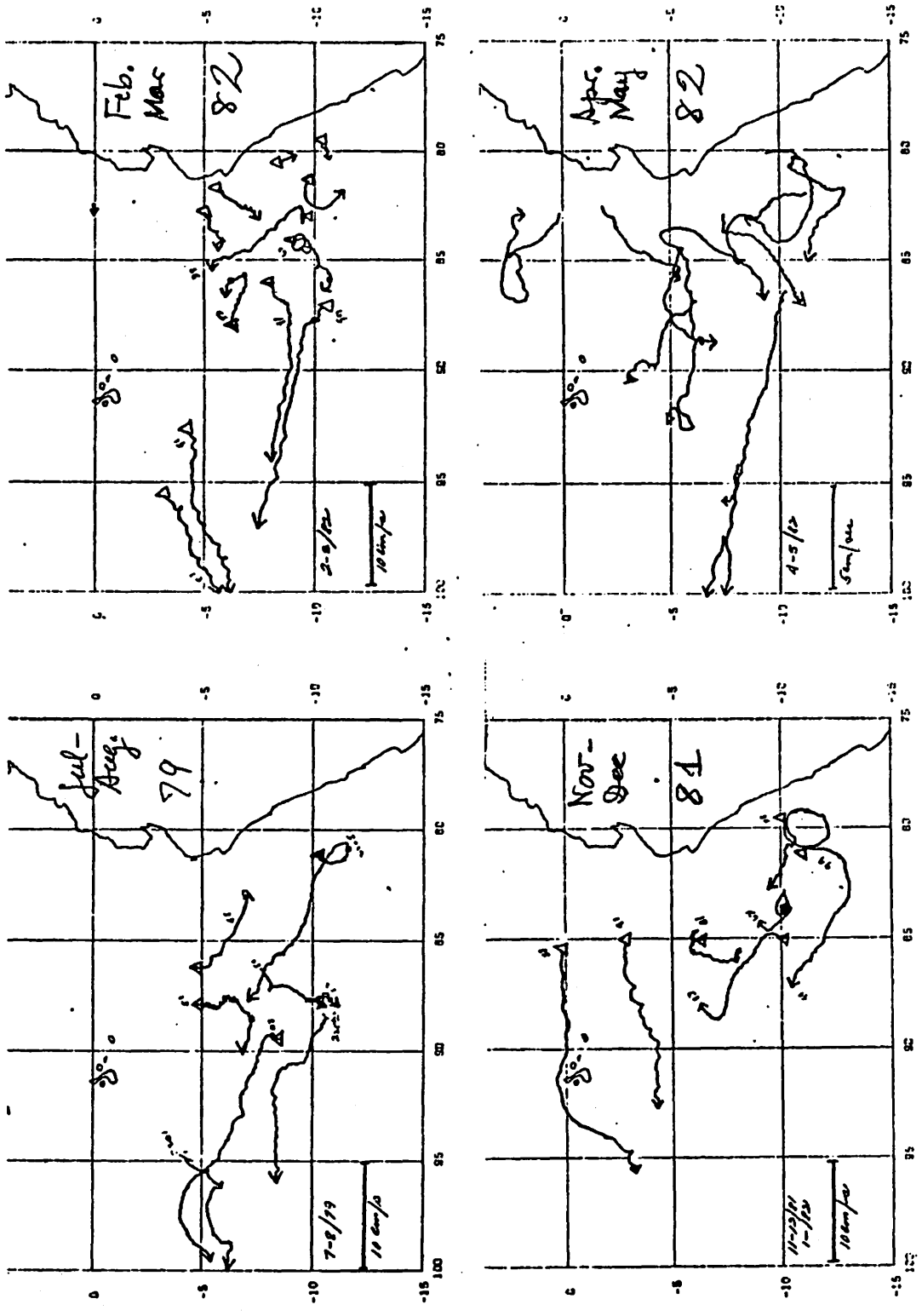


Fig. 3

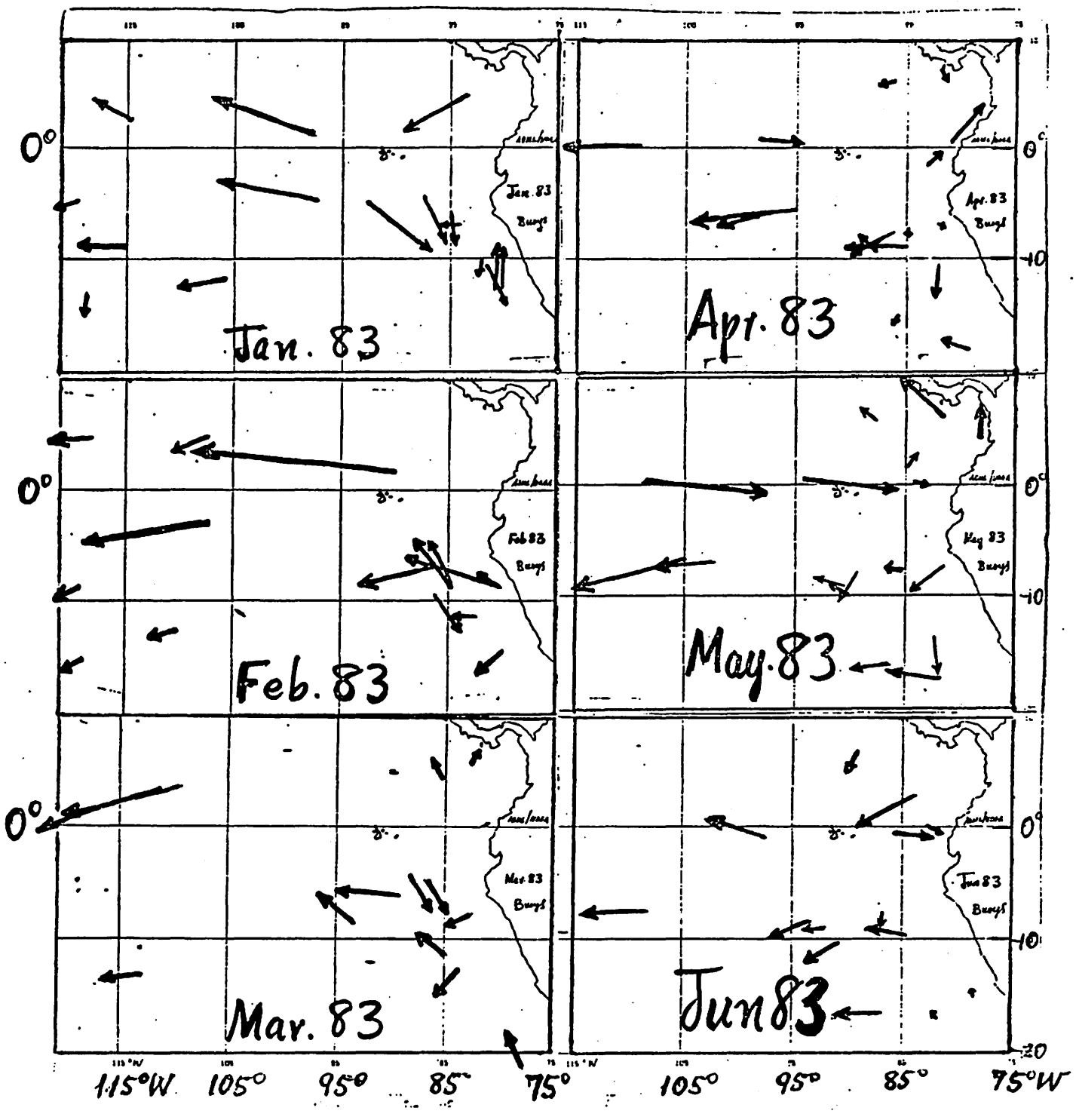


Fig. 4

(This page left intentionally blank.)

DRIFTING BUOY ACTIVITIES IN SAUDI ARABIA

REQUIREMENTS FOR DRIFTING BUOY DATA

Meteorological requirements

During the pollution threat on the Gulf caused by the collapse of the NOWRUZ oil field well in February 1983, MEPA established an Oil Spill Response Task Force in Dhahran, Saudi Arabia to co-ordinate the Kingdom of Saudi Arabia's response effort. MEPA's environmental team was hampered by the lack of real-time observational data from stations in this area and quickly identified drifting buoys as a method of obtaining both meteorological and oceanographic data.

MEPA's responsibilities included the provision of marine forecasts for the Gulf. MEPA was also tasked with the additional responsibility of providing specialized forecast support for the Oil Spill Task Force operations which included small boat movements, placement of protective equipment and preparations for offshore combat.

Meteorological observations in the Gulf were limited to infrequent reports from scattered oil platforms which were received through oil company channels in non-standard formats. Reports from ships transitting the Gulf waters were very limited due to restricted communications procedures practised by vessels in this sensitive area.

During this initial experience, drifting buoy technology including Service Argos relays, did meet some minimal meteorological requirements for the preparation of forecast products. However, future requirements in this same Gulf area will be met using a combination of fixed buoy and fixed platform networks. The acquisition of marine meteorological data from drifting buoys is recognized and this will be considered to meet future requirements in other sparse data areas. Drifting buoys may be considered for use in the Gulf of Aden, Gulf of Oman and the Arabian Sea pending further development through the regional organizations listed below.

The use of drifting buoys is now further recognized as a method for consideration in future operational network designs.

A Local User Terminal (LUT) has been ordered and will be utilized to improve data timeliness and increase the effectiveness of data for operational weather analyses.

Oceanographic requirements

All marine areas adjacent to the coastline of Saudi Arabia are considered as sparse data zones by oceanographers. Modelling efforts repeatedly reflect the need for more oceanographic data to be collected in these areas.

Buoy trajectory data from active drifting buoys continues to provide baseline data for MEPA analysis on the movement of water parcels in the area adjacent to the coastline of Saudi Arabia. Oil spill trajectory model output comparisons with selected trajectories are also being investigated and reviewed.

Initial drifting buoy deployments have been concentrated in offshore areas to assist in the identification of shoreward current components which might advect oil towards the sensitive coastal industrial facilities. This offshore deployment also maximized the operational drift due to the numerous shoals in the nearshore zones.

Sea temperature data is also being archived with observed ranges varying from 18-30°C.

Future plans include continuing the study of seasonal variabilities, identification of slack areas, areas of divergence and boundary current monitoring.

PAST AND ONGOING DRIFTING BUOY ACTIVITIES

National programme

In May 1983, the Meteorology and Environmental Protection Administration (MEPA) initiated its first drifting buoy programme. Assistance was received from the U.S. Department of Commerce / NOAA in the early stages. An initial purchase of 13 buoys included 6 which were made available from the National Data Buoy Office of NOAA.

A buoy deployment and recovery plan was formulated with the assistance of numerous Kingdom Ministries, including the Ministry of the Interior, Ministry of Petroleum and Seaports Authority. Personnel from within MEPA were quickly trained to participate in the programme activities and a data flow was initiated to provide support to meet MEPA's environmental responsibilities.

Through March 1985- this initial purchase has provide a total of 22 separate drifts from various locations in the Gulf.

Several deployment procedures were used. Initially, buoys were sling-loaded under Civil Defence helicopters transported to the launch site, lowered in the sea and released. Oil company work boats and Coast Guard vessels were also used for deployments using the more conventional approach of lowering "over the side" and releasing with pelican hook devices. After the initial arrays were in place, recovery and subsequent re-deployment was made prior to land fall using work boats and small craft. On several occasions, when the recovery plan faltered, the buoys were beached in neighbouring countries. This necessitated delay in the recovery and re-deployment of those buoys. Some have not been recovered and were likely damaged upon beaching causing loss of signal. In several cases, the oil companies in the region co-operated very effectively to return the buoys for additional use.

Although buoy deployments were announced through "Notice to Mariners" and buoy positions were broadcast via the coastal radio stations, buoys were retrieved offshore by unknown parties and returned to port. Two buoys were retrieved in the offshore waters, transported to an identifiable port in Qatar and Kuwait and then subsequently moved further inland before signal cessation. On three other occasions, buoys were retrieved while drifting in the offshore area bay oil company vessels. In all these cases, transmissions continued allowing the vessel to be identified and then contacted. The only penalty imposed on the recoveror was that MEPA asked that the buoy be re-deployed in an offshore location.

A six-month delay in the programme was encountered when the appearance of mines from unknown sources became evident in the area. The maritime agencies declared the buoy programme to be halted to minimize sightings of drifting objects. When it was determined that the buoy programme could provide excellent guidance for the tracking of any mine-like objects, the programme was allowed to continue. However, the programme logistics intensified. It then became necessary to inform numerous parties concerned at least twice daily of the location of each buoy. Buoy position data was then relayed via telex from the MEPA Central Forecast Office to the coastal communications stations, oil companies, maritime authorities and to the Governments of neighbouring states. This procedure continues to date.

Pre-deployment checks were made whenever practical by comparison with adjacent weather station observations. Deployment comparisons were made using shipboard observations of air temperature, sea temperature and barometric pressure. Adjustments to transmitted pressure readings were relayed to Service Argos for Global Telecommunication Service (GTS) advice. All MEPA buoy data is relayed via the GTS.

The MEPA buoy programme continues to date with two buoys continuing to be used in the programme. One of these buoys is now ashore pending recovery and the other is being readied for re-deployment.

Ten additional buoy systems have been ordered and will be activated during the second half of 1985 in the Gulf and the Red Sea.

MEPA has joined the Service Argos Tariff Agreement and will maintain a 5 platform-year operation over the next 2-3 years to achieve programme objectives. The possibility of expanding the programme will be reviewed in the next year.

Regional programmes

There are several regional programmes in which MEPA is actively involved. These include the following:

ROPME: Regional Organization for the Protection of the Marine Environment (Sea area includes the Gulf, Straits of Hormuz, Gulf of Oman and portions of the Arabian Sea).

GCC: Gulf Co-operation Council (Sea area similar to ROPME).

RMMP: Regional Marine Meteorological Programme (Sea area similar to ROPME and GCC).

PERSGA: Regional Organization for the Preservation of the Environment of the Red Sea and Gulf of Aden (Sea areas include the Red Sea, Gulf of Aden, Bab al-Mandab, Gulf of Agaba, Gulf of Suez).

Saudi Arabia's experience with drifting buoy technologies and systems will be beneficial towards participating as an even stronger member of these regional organizations. MEPA's drifting buoy programme, as a subset of the national marine programme, will proceed toward meeting programme objectives and may well serve as an example of emulation by other organizations and institutions in this part of the world.

Consortium support

Buoy deployment and recovery are recognized areas for buoy consortium support. Regional programmes are supportive towards providing assistance in these areas but individual states must support these requests with "hands-on" actions. The recovery of buoys from shallow water requires specialized equipment, small boats and understanding of buoy sensitivities. Recovery and deployment of buoys in offshore areas requires maritime support and co-ordination of efforts.

Presently, Saudi Arabia's activities are limited to the enclosed areas of the Gulf and Red Sea. Future development through regional programmes may well extend these areas to the Gulf of Oman, Gulf of Aden and the Arabian Sea.

On a large scale, it is recognized that drifting buoy programmes can be expensive undertakings. Perhaps through the development of assistance through consortiums, some of these costs may be reduced.

MEPA's immediate support to any of these large-scale programmes is presently minimal, however, future programme plans may be developed whereby participation as an active consortium member may be possible. The lessons learned from past programmes will be used to assist in the determination and planning of future regional programmes. The potential for co-ordination and participation by neighbouring states in the sea areas near Saudi Arabia will continue to be investigated.

1985 DRIFTING BUOY PROGRAMMES SPONSORED BY THE U.S.A. GOVERNMENT

PROGRAM	P.I.	FIRM	# BUOYS	PERIOD	LOCATION
Low Cost Drifter Development	Dahlen	Draper Labs	8	Cont.	N. Atlantic
Great Lakes Currents	Bennett	NOAA/GLERL	7	Cont.	Great Lakes
North Atlantic Eddy	Raff	Johns Hopkins	1	Cont.	N. Atlantic
Hurricane Drifters	Kozak	NOAA/NDBC	4	Seasonal	Atlantic or Pacific
Air/Sea Interaction	Kozak	NOAA/NDBC	8	Cont.	N. Atlantic
Gulf of Mexico Ring Studies	Partridge	NOAA/NDBC	6	Cont.	Gulf of Mexico
Satellite Outage Support	Kozak	NOAA/NDBC	10	Begin 5/85	N.Atlantic or N.Pacific
Drifter Rapid Response	Kozak	NOAA/NDBC	8	As needed	Global
TOGA	Hall	NOAA/OCAR	80	Cont.	S.Hemisphere
Wind Speed and Direction T&E	Kozak	NOAA/NDBC	3	10/84 - 12/85	U.S.Coastal
Florida Atlantic Coast Transport Study	Maul	NOAA/AOML	12	Cont.	N. Atlantic
Equatorial Pacific Ocean Climate Studies	Hansen	NOAA/AOML	30	Cont.	Eq. Pacific
Bering Sea Experiments	Reynolds/ Pease	NOAA/PMEL	10	Winter/ Spring	Bering Sea
Arctic Ambient Noise Experiments	Sotirin	Navy/NOSC	4	Mid 85	Arctic

PROGRAM	P.I.	FIRM	# BUOYS	PERIOD	LOCATION
Southern Oceans Studies	Spence	Navy/ONR	20	1985	S. Atlantic
Upper Arctic Ocean (Mixed layer) Studies	Morrison	U.Wash.	2	Cont.	Arctic
Arctic Basin Buoy Program	Colony	U.Wash.	20	Cont.	Arctic
Arctic Res. for Env. Acoustics	Buck	Polar Res. Lab	11	4/85-12/85	Arctic
Deep Drifter Dev.and Salt Lens Study	Rossby	U.Rhode Island	6	thru 1986	N. Atlantic
Tropic Heat	Niiler	Scripps	25	Cont.	Eq. Pacific
Calif. Fronts	Niiler	Scripps	25	thru 9/86	N. Pacific
Circulation in Gulf of Maine	Brooks	Texas A&M	3	thru 9/86	N. Atlantic
Ice Island Trajectories	Sackinger	U. Alaska	6	Cont.	Arctic
International Ice Patrol	Anderson	U.S.C.G.	10	Spring/ Summer	N. Atlantic
Search and Rescue	Robe	U.S.C.G.	3	Mid 1985	N. Atlantic
Arctic Oil Spill Movement	Lissauer	U.S.C.G.	7	Mid 1985	Beaufort Sea
N.Eq.Current Obs.	Richardson	WHOI	8	Cont.	Trop.N.Atlantic
Agulhas Current	Luyten	WHOI	5	1985	S. Atlantic
	TOTAL		342		

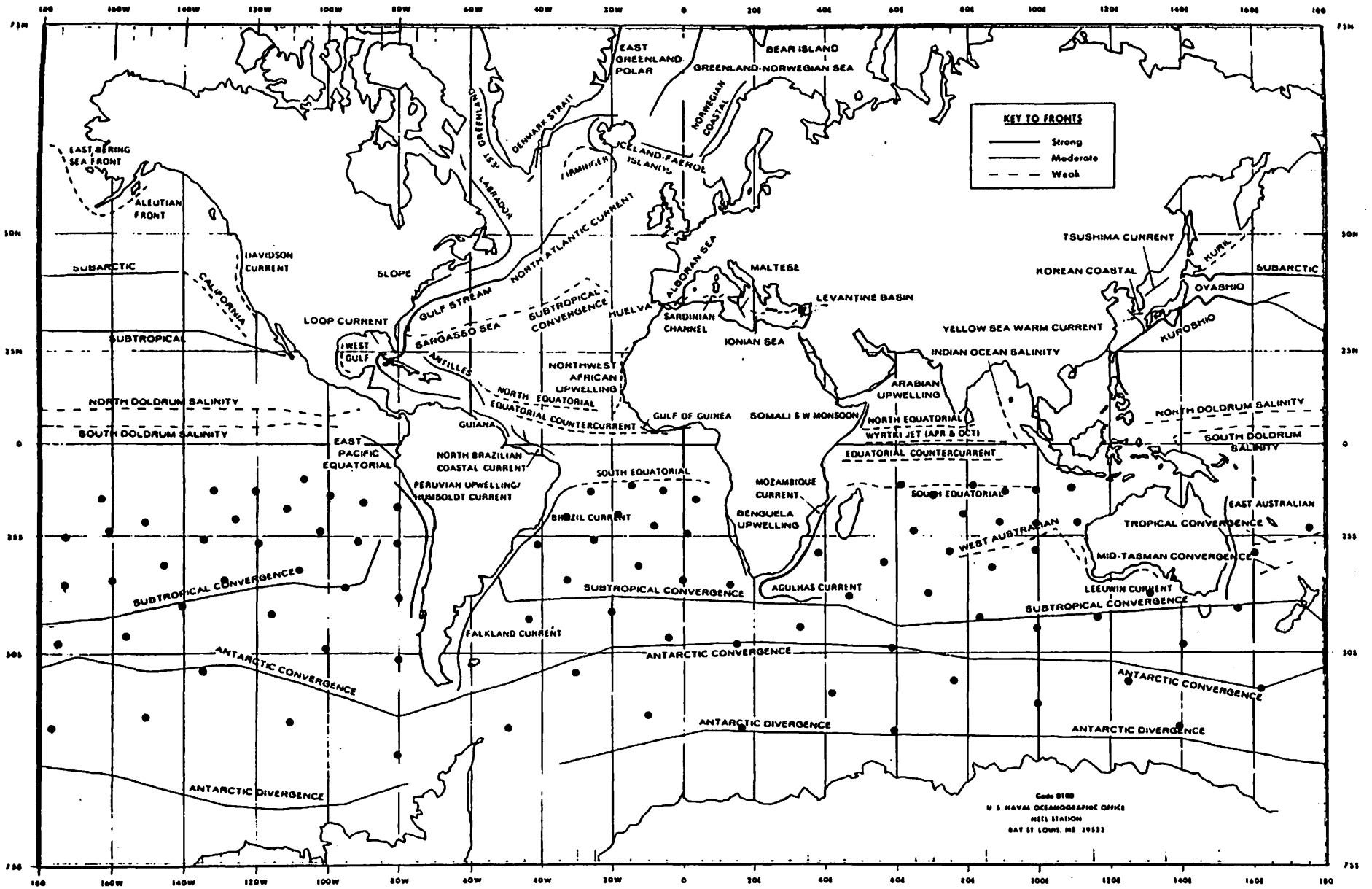


Figure 1 - 1984-1985 Southern Hemisphere Drifting Buoy Array in Support of TOGA

(This page left intentionally blank.)

REVIEW OF PAST AND ONGOING DRIFTING BUOY ACTIVITIES IN THE UNITED KINGDOM

North Atlantic (1983-1984)

1. The United Kingdom has contributed pressure sensors for five drifting buoys deployed by the Kiel University (FRG) and has arranged for the data to be distributed in DRIBU code on the GTS.

North-Atlantic (1984-)

COST-43 SOBA project

2. The United Kingdom participates in the SOBA project with a contribution of five buoys per year.

Future plans (meteorology)

3. The United Kingdom expects to contribute to the OWSE-NA by way of future buoy deployments (possibly under an extension to the SOBA project).

4. Drifting buoys will continue to be used in support of oceanographic research. Present usage is largely in connexion with the Continental Shelf break processes but recent work has included circulation studies in the North-east Atlantic.

(This page left intentionally blank.)

FACTORS IN DRIFTING BUOY PROGRAMMES POSSIBLY RELEVANT TO INTERNATIONAL CO-OPERATIVE ACTIVITIES

Planning and co-ordinating drifting buoy programmes

- Co-ordinating programme aims and plans
- Avoiding duplication in national programmes
- Liaison with Service Argos
- Liaison with NESDIS
- Arranging payment for Service Argos for out-of-area buoys
- Increasing the number of buoys
- Optimizing co-operation between meteorology and oceanography
- Resolving legal status of buoys and programmes
- Allocation of international buoy identifiers
- Increasing the availability of drifting buoy data in support of WWW, WCRP and other programmes

Design, acquisition, testing of drifting buoys

- Standardization of parameters and accuracies
- Standardization of calibration procedures
- Standardization of mechanical aspects of buoys
- Developing and disseminating improvements to drifting buoys
- Contracting for development of improvements
- Bulk purchase of buoys

Deployment

- Co-ordinating deployment programmes (locations, times)
- Standardizing deployment procedures (packing, testing)
- Co-ordinating deployment means (contacting ships, etc.)
- Facilitating customs clearances
- Facilitating the provision of operational support services

Data monitoring and quality control

- Setting data quality criteria
- Arranging data quality monitoring
- Maintaining records of buoy location and status

Data distribution and archiving

- Arranging optimum drifting buoy data distribution
- Liaison with distribution organizations to remedy problems
- Maintaining records of distribution
- Co-ordinating data archiving
- Publicizing drifting buoy data availability
- Documenting and publicizing the drifting buoy programmes
- Maintenance of records of buoy tracks and performance
- Development of distribution codes and formats

(This page left intentionally blank.)

RECOMMENDATION 1 (WMO/IOC-PREP-DBC) - DRIFTING BUOY CO-OPERATION PANEL

The Joint WMO/IOC Preparatory Meeting for the Establishment of a Drifting Buoy Consortium,

NOTING:

(1) Res. 8 (EC-XXXVI) of the thirty-sixth session of the WMO Executive Council (June 1984);

(2) The considerations and decisions of the thirteenth session of the IOC Assembly (March 1985) concerning the possibility of international co-operative activities with respect to drifting buoys,

(3) The many different practical attempts to organize international joint drifting buoy actions, particularly the Committee of Participants for the Southern Hemisphere Drifting Buoy System of FGGE and the COST-43 European programme,

(4) The various other proposals covering aspects of the possible co-ordination of drifting buoy programmes which have been made by the SCOR WG 66, COST-43, the WMO Informal Planning Meeting on OWSEs (April, 1984) and the Planning Meeting on Combined Observing Systems (October, 1984);

CONSIDERING:

(1) The data requirements of the WWW of WMO, the WCRP and the various other programmes of WMO and IOC, and the pressing need to increase the flow of oceanographic and surface meteorological observations from many oceanic regions of the globe to meet these requirements,

(2) That the basic technology of freely drifting buoys making automatic surface measurements and transmitting them routinely through the polar-orbiting satellites is now firmly established,

(3) That many data-sparse oceanic areas are not on regular shipping routes and drifting buoys can present an efficient and cost-effective source of data from these areas;

(4) The economic benefit which may be gained through international co-ordination of drifting buoy activities,

(5) The desirability of providing an appropriate joint WMO/IOC framework for supporting some regional drifting buoy activities;

RECOMMENDS:

(1) That drifting buoy activities designed to supply operational meteorological and/or oceanographic data should, where possible, be co-ordinated on a global and regional basis,

(2) That a Drifting Buoy Co-operation Panel be established with the participation of interested Members of WMO and Member States of IOC,

(3) That the principal objectives of the Drifting Buoy Co-operation Panel shall be to achieve the optimum use of any drifting buoy deployments being undertaken world-wide and an increase in the amount of drifting buoy data available to meet the objectives of the WWW, the WCRP and other major WMO and IOC programmes;

(4) That Secretariat support for the Drifting Buoy Co-operation Panel be provided jointly by the Secretariats of WMO and IOC,

(5) That the Drifting Buoy Co-operation Panel be served by a dedicated Technical Co-ordinator with adequate secretarial support, both provided under appropriate arrangements,

(6) That the terms of reference of the Drifting Buoy Co-operation Panel and its Technical Co-ordinator be those given in Annexes 1 and 2 of this Recommendation,

(7) That the Drifting Buoy Co-operation Panel should encourage and support the establishment of action groups of working level representatives from nations interested in particular programmes or regional applications and that the composition and terms of reference of action groups shall be determined, as necessary, to effect the desired co-operation but might be modelled on those used successfully by the FGGE and COST-43.

ANNEX 1

RECOMMENDATION 1 (WMO/IOC-PREP-DBC) - DRIFTING BUOY CO-OPERATION PANEL

Terms of reference for the Drifting Buoy Co-operation Panel

The Drifting Buoy Co-operation Panel shall:

1. Consider the expressed needs of the international meteorological and oceanographic communities for real-time or archival data from buoys drifting freely in the oceans and request action from its members, Technical Co-ordinator or action groups to meet these needs.

2. Co-ordinate activity on existing programmes so as to optimize the provision and timely receipt of good quality data from them.

3. Propose, organize and implement through the co-ordination of national contributions, the expansion of existing programmes or the creation of new ones to supply such data.

4. Encourage the initiation of national contributions to drifting buoy programmes from countries which do not make them.

5. Promote the insertion of all available and appropriate drifting buoy data into the Global Telecommunication System.

6. Promote the exchange of information on drifting buoy activities and encourage the development and transfer of appropriate technology.

7. Ensure that other bodies actively involved in drifting buoy use are informed of the workings of the Panel and encourage, as appropriate, their participation in the Panel deliberations.

8. Make and regularly review arrangements to secure the services of a Technical Co-ordinator with the terms of reference given in Annex 2.

9. Submit annually to the Executive Councils of the WMO and the IOC a report which shall include summaries of the existing and planned drifting buoy deployments and data flow..

ANNEX 2

RECOMMENDATION 1 (WMO/IOC-PREP-DBC) - DRIFTING BUOY CO-OPERATION PANEL

Terms of reference for the Technical Co-ordinator of the Drifting Buoy Co-operation Panel

The Technical Co-ordinator of the Drifting Buoy Co-operation Panel shall:

1. Under the direction of the Drifting Buoy Co-operation Panel take all possible steps within the competence of the Panel to assist in the successful achievement of its aims.

2. Assist in the development and implementation of quality control procedures for drifting buoy systems.

3. Assist in setting up suitable arrangements for notifying the appropriate user communities of changes in the functional status of operational drifting buoys.

4. Assist in the standardization of drifting buoy data formats, sensor accuracy, etc.

5. Assist when requested with the development of co-operative arrangements for drifting buoy deployment.

6. Assist in the clarification and resolution of issues between Service Argos and drifting buoy operators.

7. Assist in promoting the insertion of all available and appropriate drifting buoy data into the Global Telecommunication System.

8. Supply information about drifting buoy developments and applications to the WMO and IOC Secretariats and assist the Drifting Buoy Co-operation Panel to promote an international dialogue between oceanographers and meteorologists.

9. Co-ordinate and monitor the flow of drifting buoy data into appropriate permanent archives.