

WORLD METEOROLOGICAL  
ORGANIZATION

INTERGOVERNMENTAL OCEANOGRAPHIC  
COMMISSION (OF UNESCO)

DRIFTING BUOY CO-OPERATION PANEL

FIRST SESSION

TOULOUSE, 14-16 October, 1985

FINAL REPORT

WWW 731

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## GENERAL SUMMARY OF THE WORK OF THE SESSION

### 1. OPENING OF THE SESSION (Agenda item 1).

1.1 The first session of the Drifting Buoy Co-operation Panel opened at 10 a.m. on Monday 14 October 1985 in the Centre de formation internationale aéronautique et spatiale (FIAS) located near the Centre national d'études spatiales (CNES) in Toulouse, France. In his opening address to the Panel session the director of the Toulouse CNES Centre, Mr. J-C. HUSSON, welcomed all the participants to Toulouse and the Centre. He then outlined in general terms the satellite activities of the Centre, at the same time referring specifically to those activities which were relevant to the work of the Panel. Such activities included in particular developments with regard to the Service Argos, and cooperative actions involving CNES and relevant European and USA space and other agencies.

1.2 On behalf of the Secretary-General of WMO and the Secretary of IOC, the representative of WMO welcomed all participants to the session. He then briefly outlined the background to the formation of the Panel including in particular the decision of the WMO Executive Council to establish the Panel and the recommendation concerning its Technical Coordinator. He stressed that the WMO Executive Council considered the Panel an important body which should contribute significantly to the co-ordination and expansion of drifting buoy programmes in support of the WWW, the WCPR and other national and international meteorological and oceanographic programmes. For this reason the Executive Council had requested that the first Panel session should take place as soon as possible, and had accepted the offer of Service Argos that it be held in Toulouse in conjunction with the fifth Argos Joint Tariff Agreement Meeting. The representative of WMO then indicated to the Panel that its main tasks for this session would be the adoption of operating procedures for the Panel, the establishment of the technical coordinator position, and the development of a future action plan. Finally, on behalf of WMO he thanked CNES and Service Argos for their provision of such excellent facilities for the Panel session.

1.3 A list of participants in the session is given in Annex I.

### 2. ELECTION OF THE CHAIRMAN (Agenda item 2).

The Panel unanimously elected Dr. J. GARRETT (Canada) as its chairman, on the understanding that this would be for the duration of this Panel session only. The question of a continuing chairman for the Panel was to be reviewed during the course of the discussion, and further consideration given to the election of a person to fill this ongoing position at the end of the session. This will be dealt with further under Agenda item 8.

### 3. ADOPTION OF THE AGENDA (Agenda item 3)

The Panel adopted unchanged the provisional agenda as its agenda for the session. This agenda is given in Annex II.

4. DECISIONS OF THE GOVERNING BODIES OF WMO AND IOC FOR THE ESTABLISHMENT OF THE PANEL, INCLUDING ITS TERMS OF REFERENCE (Agenda item 4)

4.1 The representative of WMO again outlined briefly the decision of the thirty-seventh session of the WMO Executive Council concerning the establishment of the Panel. In particular, the WMO Executive Council had provided the Panel with a comprehensive set of terms of reference, covering all relevant aspects of the co-ordination of drifting buoy programmes in support of major WMO programmes such as WWW and WCRP. In doing so, the WMO Executive Council had strongly invited the IOC Executive Council to take similar action, so that the Panel might be established jointly, to better serve the interests of both meteorologists and oceanographers.

4.2 The WMO Executive Council had also supported the suggestion that the Panel would operate most effectively if served by a dedicated technical coordinator. It had therefore adopted draft Terms of Reference for this technical co-ordinator. The terms of reference for both Panel and technical co-ordinator are given in Annex III

4.3 The Representative of IOC explained that no governing body of IOC had met since the time the Preparatory Meeting was held. Along the lines suggested by the Preparatory Meeting (final report, para. 8.4) and taking into account the afore-mentioned decision by the WMO Executive Council, the chairman of IOC agreed that, in order to speed up procedures, he might provisionally approve the proposals put forward by the Preparatory Meeting. He therefore decided to associate the IOC to the preparation for, and organization of, the first session of the Panel, pending a final decision by the IOC Executive Council at its nineteenth Session to be held in Paris in March 1986.

5. ESTABLISHMENT OF THE OPERATING PROCEDURES FOR THE PANEL (Agenda item 5)

5.1 The WMO Executive Council, in deciding to establish the Drifting Buoy Cooperation Panel, provided a comprehensive set of terms of reference for the Panel and its technical co-ordinator, as indicated above. The Panel recognized, nevertheless, that the terms of reference did not address questions relating to the establishment of basic operating procedures for the Panel or to detailed procedures for the appointment and maintenance of the technical co-ordinator. Questions relating to the technical co-ordinator are addressed further in this report under agenda item 6.

5.2 With regard to its operating procedures, the Panel agreed that these involved matters such as Panel membership and participation in meetings, requirements for and frequency of such meetings, the election of chairman (and possibly vice-chairman) for the Panel, relationship to the Secretariats of WMO and IOC, general liaison procedures amongst members and with related organizations. The Panel's decisions on these and related matters are recorded in the following paragraphs.

5.3 In consideration of the fact that the Drifting Buoy Co-operation Panel is a body officially designated through a decision of the WMO Executive Council, and supported by the chairman of IOC, the Panel agreed that its membership would comprise representatives of Members of WMO and Member States of IOC which expressed a willingness to participate in Panel activities. At the same time, the Panel recognized that its primary responsibility was to act

as a means for enhanced co-operation in all aspects of drifting buoy activities, for the benefit of the Members of WMO or Member States of IOC. It therefore agreed that representatives of any institution or programme (eg. : SCOR, TOGA, etc...), actively involved in the use, development or deployment of drifting buoys, or which specifically require drifting buoy data, may participate in Panel meetings without necessarily being Panel members

5.4 The Panel agreed that it should meet annually. At the same time, it was recognized that, for many countries, attendance at Panel sessions would be very costly. It was therefore suggested that, in order to minimise such travel costs and in view of the fact that many Panel members would wish to be involved in the Joint Argos Tariff Agreement discussions, Panel sessions should, wherever practicable, be organised in conjunction with the Joint Argos Tariff Agreement Meeting.

5.5 The Panel was strongly of the opinion that the position of chairman was very important to the success of the Panel, in carrying out the work of the Panel during intersessional periods, in overseeing the work of the technical co-ordinator, and in carrying out other executive actions as appropriate. It therefore agreed that the chairman should be elected from among Panel members at the annual Panel sessions, and empowered to act on behalf of the Panel between sessions. The Panel felt that there was no need, at the present time, to appoint a vice-chairman, but would review this requirement at future sessions. At the same time, however, it was recognized that the chairman may sometimes require assistance in various matters such as representing the Panel at meetings of other bodies, preparing of reports, etc... The chairman was therefore empowered to seek such assistance from other Panel members, if and when appropriate.

5.6 It was also the opinion of the Panel that, in order to effectively discharge its duties as laid down in its Terms of Reference, it would require the support of a full time technical co-ordinator. It therefore decided to move to appoint such a technical co-ordinator. The costs associated with this position would be supported through voluntary contributions to a Trust Fund, specifically designated for this purpose. It was further decided that, assuming satisfactory progress in implementing the work of the Panel, the position would be reviewed at the 1987 annual meeting. Other questions relating to the funding and appointment of the technical co-ordinator are considered under agenda item 6.

5.7 The Panel agreed that it would require some support from the Secretariats of WMO and IOC, particularly with regard to the preparation for and conduct of its sessions, as well as in connection with other matters requiring the general attention of WMO Members and IOC Member States. In this connection, it noted with thanks the offer of the WMO Executive Council concerning WMO Secretariat support to the Panel.

5.8 It was recognized by the Panel that it would operate most effectively and efficiently if clear lines of communication, and recognisable focal points, were established amongst Panel member countries and with related organizations. The Panel noted in this regard the list of national focal points for drifting buoy programmes already maintained by WMO, and felt that this would be a useful starting point for its own internal communications. It therefore agreed to instruct its technical co-ordinator (when appointed) to identify appropriate focal points for the Panel, using the WMO list as a basis.

5.9 A summary of these basic operating procedures, and related matters, is contained in Annex IV. The Panel agreed that such procedures could only be of a provisional nature at the present time, and should be reviewed at its next annual meeting. It therefore agreed to instruct its chairman to prepare recommendations in this regard, to be distributed before the meeting. It was also agreed that, to simplify and speed up its operations, and with the kind co-operation of all the non-English speaking members concerned, all the Panel's activities, including correspondence, should be undertaken in English.

6. ESTABLISHMENT OF A TECHNICAL CO-ORDINATOR'S POSITION (Agenda item 6).

6.1 Detailed discussions on this topic covered the various considerations involved in the establishment of a technical co-ordinator's position :

- the location for the co-ordinator's office
- the administrative arrangements required
- the way in which the co-ordinator should be selected
- the possible cost of the co-ordinator and his activities
- length of tenure.

6.2 After considering various alternative locations, it was agreed that, subject to the negotiation of a suitable contract, the offer of Service Argos to provide accommodation and local logistic support for the technical co-ordinator should be accepted. This would ensure that the interests of the Panel were effectively communicated to Service Argos as well as providing the technical co-ordinator with easy access to a large source of information about actual drifting buoy activities.

6.3 As a result of this decision, it was agreed that the most appropriate arrangement would be for the funds provided for the position of technical co-ordinator to be administered by the Intergovernmental Oceanographic Commission on behalf of WMO and IOC. To achieve this, funds should be deposited to the IOC Trust Fund, where they may be earmarked for a particular project and accounted for separately. Subject to the agreement of the IOC Executive Council, the Secretary General of WMO and the Secretary of IOC were requested to:

- (a) Advise Member states as to how to deposit the funds in such a way that they were properly earmarked.
- (b) Establish a contract with the technical co-ordinator selected by the Panel whereby he is employed as a consultant based in Toulouse.
- (c) Set up a procedure whereby costs for travel approved by the Panel chairman can be reimbursed using the earmarked funds.
- (d) Negotiate a contract with Service Argos to provide the secretarial, communications and computer support required by the technical co-ordinator, subject to the assistance and agreement of the Panel chairman.

6.4 The meeting was advised of a possible candidate for the technical co-ordinator position. It was decided that, before formal consideration was made of his qualifications, an attempt should be made to attract others so that the Panel could be sure that the best qualified candidate had been

chosen. Accordingly the Secretariats of WMO and IOC were requested to circulate an invitation to Member countries to propose candidates who might be available, at or below the P4 level of the International Civil Service Salary Scale. Those proposals received before the end of 1985 were to be distributed to a selection committee made up of the Panel chairman plus Panel members representing the countries contributing to the cost of the technical co-ordinator (presently Australia, Canada, France and the United States). This committee is to choose the best candidate among those proposed, with the process to be completed before the end of January 1986, so that the necessary contract can be arranged before the end of February 1986. The chairman is to advise the Secretariats on an appropriate statement of requirements for the technical co-ordinator to be distributed to Member countries when seeking nominations.

6.5 According to current figures the minimum annual cost for a technical co-ordinator based at Toulouse was estimated to be (in \$US).

|   |   |           |
|---|---|-----------|
| Salary and related allowances                     | : | \$ 38,000 |
| Travel  | : | \$ 15,000 |
| Communications                                    | : | \$ 8,000  |
| Computer support                                  | : | \$ 7,000  |
| Stationary, supplies, other<br>operating expenses | : | \$ 3,000  |
| Contingencies                                     | : | \$ 5,000  |
|   |   | <hr/>     |
| TOTAL   |   | \$ 76,000 |

6.6 Funds committed so far total \$ 58,000. These are made up of: Australia: \$ 5,000, Canada: \$10,000, France: \$ 5,000, USA: \$ 38,000. Although these were not sufficient to cover a whole year's operation, the co-ordinator will not be available until part way through the first year, and a higher level of commitments is expected for the second year. Therefore, it was decided to go ahead, with the understanding that it would be necessary to terminate the position prematurely should funds anticipated for the second and subsequent years not be forthcoming. It was agreed that the minimum time required to evaluate the effectiveness of the position was more than one year, and that the position should be evaluated in depth at the 1987 meeting of the Panel.

6.7 Finally, the Panel agreed that, in view of the presently existing possible shortfall in funds for 1986, there was a need to solicit additional contributions to the support of the technical co-ordinator immediately. It therefore requested the Secretariats to address a further enquiry to Member countries in this regard.

## 7. FUTURE ACTION PLAN (Agenda item 7)

7.1 In addressing the question of its future action plan, the Panel considered that it had to translate its terms of reference into actual tasks that could be substantially completed, in the course of the coming year. It also took into consideration that any current action on its part required that it be firstly provided with relevant information in an easy-to-consult form.

7.2 The general feeling of the Panel was that it had to make concrete progress before its next session. It was nevertheless quite aware that the actions it decided to undertake would probably have to be reviewed on an ad hoc basis as their implementation proceeded. The Panel also considered it appropriate to indicate for each task defined the individual or body responsible for implementing the task, the individual(s)/ bodies that might be requested to assist in the undertaking of the task, and the expected outcome (under the form of a report or an action) of the task. The conclusions of the Panel with regard to its work plan and objectives for the first year are summarized in Annex V, parts A and B.

7.3 The Panel considered task 5, relating to the formulation of proposals for action by the co-ordinator and Panel, to be of crucial importance and discussed its scope in some detail. It was thought that, resulting from the investigation carried out in the first four tasks, the technical co-ordinator would be in a position to assist in the co-ordination of existing (e.g. : COST 43 and TOGA) projects or help to implement new co-ordinated programmes to meet identified requirements (e.g. : through the establishment of ad hoc action groups). Thus the types of co-ordination activities would be expected to involve:

- (a) Liaison with Service Argos,
- (b) Co-operation between meteorological and oceanographic programmes,
- (c) Increasing the availability of drifting buoy data into the GTS,
- (d) Standardization of sensor performance characteristics, quality control and calibration procedures,
- (e) Optimizing deployment procedures and planning,
- (f) Documenting and publicizing drifting buoy data availability,
- (g) Arranging for data archiving.

7.4 It was anticipated that it would be possible for the technical co-ordinator to propose and carry out selected tasks with the agreement of the chairman of the Panel at any time but that major proposals might well be presented to the Panel at its next session for discussion and guidance.

7.5 The Panel noted the information provided to the Joint WMO/IOC Preparatory Meeting for the Establishment of a Drifting Buoy Consortium with regard to general requirement for drifting buoy data and national activities and plans in the field (Annexes III to XIII to the final report of the Joint Preparatory Meeting). It also noted the updated information provided by Saudi Arabia on its drifting buoy activities (See Annex VI). The Panel expressed the opinion that this information should be taken into account by the technical co-ordinator when undertaking the first two tasks listed in the work plan.

## 8. OTHER BUSINESS (Agenda item 8)

8.1 Under this agenda item, a number of other matters of importance to the Panel were discussed, as well as the question of the election of the Panel chairman. In particular, progress on the archival of drifting buoy data was reviewed. A report on this project is given in Annex VII.

8.2 Possible difficulties related to the future availability of a VHF downlink for the direct data transmission by the Argos system after 1990 were also considered. The Panel noted that real time data from drifting buoys can



be received from present TIROS-N series satellites by direct readout of the VHF signal by Local User Terminal (LUT) and of the S-band transmission by High Resolution Picture Transmission (HRPT) stations. There are two problems with continuation of the VHF beacon. First, by international agreement, the use of the frequency reverts from primary to secondary status in 1990 and the primary use then passes to the aircraft mobile service. Secondly, the transition to the shuttle for launch of NOAA-K introduces demands to convert the command and telemetry system to S-band. The cost of S-band receiving stations is more expensive than LUT, \$US about 250,000 versus 30,000, and they are not portable as are LUT. With the increasing requirement for real time processing of drifting buoy data, the deletion of the VHF down on NOAA-K will represent a serious hardship for some Member countries. In view of this information, the Panel directed its chairman to write to the WMO and IOC Secretariats requesting that they study the problem further with a view to seeking solutions with the ITU, in order to maintain, if possible, the current availability of the system for meteorological and oceanographic data collection purposes.

8.3 As indicated under agenda item 2, the question of the election of a continuing chairman for the Panel had been deferred until after the discussions on other agenda items. The Panel clearly felt that the position of chairman was one of crucial importance to the success of the Panel, particularly during the first few years. Further ideas of the Panel in this regard, including actions to be undertaken by the chairman, are recorded in the paragraphs above. In addition, the Panel agreed that the election of its continuing chairman should be included as one of the later items on its agenda for future meetings.

8.4 The Panel unanimously elected Mr. C. BILLARD (France) as its chairman until the end of its next session.

## 9. CLOSURE OF THE SESSION

9.1 The Panel agreed that, subject to the decision of the Fifth Argos Joint Tariff Agreement Meeting concerning the date and place of its next session, it would accept the invitation of the representative of WMO to host the second session of the Panel in the WMO Secretariat in Geneva in October 1986.

9.2 In closing the meeting, the chairman warmly thanked all the participants, including those representing various international organizations, for the active and cooperative approach which they had adopted for this first Panel session. The session had been a crucial one for the future of the Panel, both in deciding to appoint a technical co-ordinator and in developing a concrete and realisable action plan for the Panel. The success of the session, in such a short time, was due very much to this spirit of cooperation on the part of all concerned.

9.3 The first session of the drifting Buoy Co-operation Panel closed at 6 p.m. on Wednesday, 15 October 1985.

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AGENDA

1. OPENING OF THE SESSION
  2. ELECTION OF THE CHAIRMAN
  3. ADOPTION OF THE AGENDA
  4. DECISIONS OF THE GOVERNING BODIES OF WMO AND IOC FOR THE ESTABLISHMENT OF THE PANEL, INCLUDING ITS TERMS OF REFERENCE
  5. ESTABLISHMENT OF THE OPERATING PROCEDURES FOR THE PANEL
  6. ESTABLISHMENT OF A TECHNICAL CO-ORDINATOR'S POSITION
  7. FUTURE ACTION PLAN
  8. OTHER BUSINESS
  9. CLOSURE OF THE SESSION
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EXTRACT FROM THE ABRIGDED REPORT OF THE THIRTY-SEVENTH SESSION  
OF THE WMO EXECUTIVE COMMITTEE

Annex I to Resolution 10 (EC-XXXVII)

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 II,
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 II to Resolution 10 (EC-XXXVII)

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.
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OPERATING PROCEDURES FOR THE DRIFTING BUOY COOPERATION PANEL

1. To the extent that the Panel is a formally established body of the WMO and IOC, Panel members will be the representatives of Members of WMO or Member States of IOC which expressed a willingness to participate in Panel activities.
  2. The Panel will meet annually. Representatives of any institution or programme actively involved in the use, development or deployment of drifting buoys, or which specifically require drifting buoy data, may participate in the meetings.
  3. The Panel will elect a chairman from among Panel members, to carry out the work of the Panel between sessions. The chairman will prepare reports for the 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 will also require 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. Assuming satisfactory progress the position will be reviewed at the 1987 annual meeting.
  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 10 (EC - XXXVII). The Panel also adopts as Terms of Reference for its Technical Co-ordinator, those suggested by the WMO Executive Council in Resolution 10 (EC - XXXVII), as endorsed by the IOC Executive Council.
  8. The working language of the Panel, including for correspondence, will be English.
  9. Panel 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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DRIFTING BUOY CO-OPERATION PANEL WORK PLAN AND OBJECTIVES FOR THE FIRST YEAR

## PART A

Summary of the tasks

1. Compile and maintain summary of requirements for drifting buoy data to meet expressed needs of the international meteorological and oceanographic communities.
2. Prepare and maintain a catalogue of existing on-going drifting buoy programmes.
3. Identify focal points for national contributions and within other relevant bodies with potential for involvement in drifting buoy programmes.
4. Identify sources of drifting buoy data not currently reported on the GTS and determine the reason for their non-availability.
5. Make proposals to the Panel for co-ordination activity as a result of the above actions to address items 2 - 5 and 7 in the Terms of Reference for the Drifting Buoy Co-Operation Panel, and undertake actions possible before the next Panel meeting.
6. Initiate and arrange for the circulation of quarterly newsletter containing information on Panel activities, current and planned drifting buoy programmes and related technical developments.
7. Make the arrangements (including finance) to secure the services of a technical co-ordinator.
8. Review programme and establish working priorities of the technical co-ordinator.
9. Prepare annual report of the Drifting Buoy Co-operation Panel.

| Task | Carried out by                      | Supported / Assisted by                        | Reported to / Action by  | Related to terms of reference No. |
|------|-------------------------------------|--|--|-----------------------------------|
| 1    | Technical Co-ordinator              | Panel members and WMO/IOC Secretariats         | Chairman for presentation to Panel   | 1, 2                              |
| 2    | Technical Co-ordinator              | Panel members and WMO/IOC Secretariats         | Chairman and Panel for information   | 1, 2                              |
| 3    | Technical Co-ordinator              | Panel members and WMO/IOC Secretariats         | Chairman and Panel for information   | 1, 2, 7                           |
| 4    | Technical Co-ordinator              | Panel members and WMO/IOC Secretariats         | Chairman and Panel for information   | 5                                 |
| 5    | Technical Co-ordinator and chairman | WMO/IOC Secretariats and others as appropriate | To Panel for consideration and appropriate action or for direct action by chairman | 1, 2, 3, 4                        |
| 6    | Technical Co-ordinator              | Chairman and WMO/IOC Secretariats              | Wide circulation by WMO/IOC Secretariats   | 6, 7                              |
| 7    | Chairman and sub-committee          | WMO/IOC Secretariats                           | WMO/IOC Secretariats   | 8                                 |
| 8    | Chairman/Panel                      |  | Panel (at next session)  | 8                                 |
| 9    | Chairman                            | Technical Co-ordinator                         | Executive Councils of IOC and WMO  | 9                                 |

Implementation of tasks

PART B

ANNEX V, p.2

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 transiting 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 and Red 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.

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 by 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.

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.

Through September 1985 - this initial purchase has provided a total of 23 separate drifts from various locations in the Gulf. Figure 1 depicts these buoy tracks.

MEPA has no active drifting buoys at this time.

Ten (10) additional buoys were ordered from CEIS-ESPACE (FRANCE) in 1985 to provide additional resources for MEPA's ongoing drifting buoy programme. Delivery was accomplished in late September and MEPA is currently positioning buoys on both the Red Sea and Gulf coasts. Additional deployments are planned for late 1985.

MEPA has recently acquired two Storebro 34 workboats which, in addition to providing assistance for oil spill surveillance and other scientific endeavours, will be tasked to assist in the launch and recovery of buoys in the Red Sea and Gulf. As before, all MEPA buoy data will be relayed via the GTS.

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).

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 Aqaba, 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.

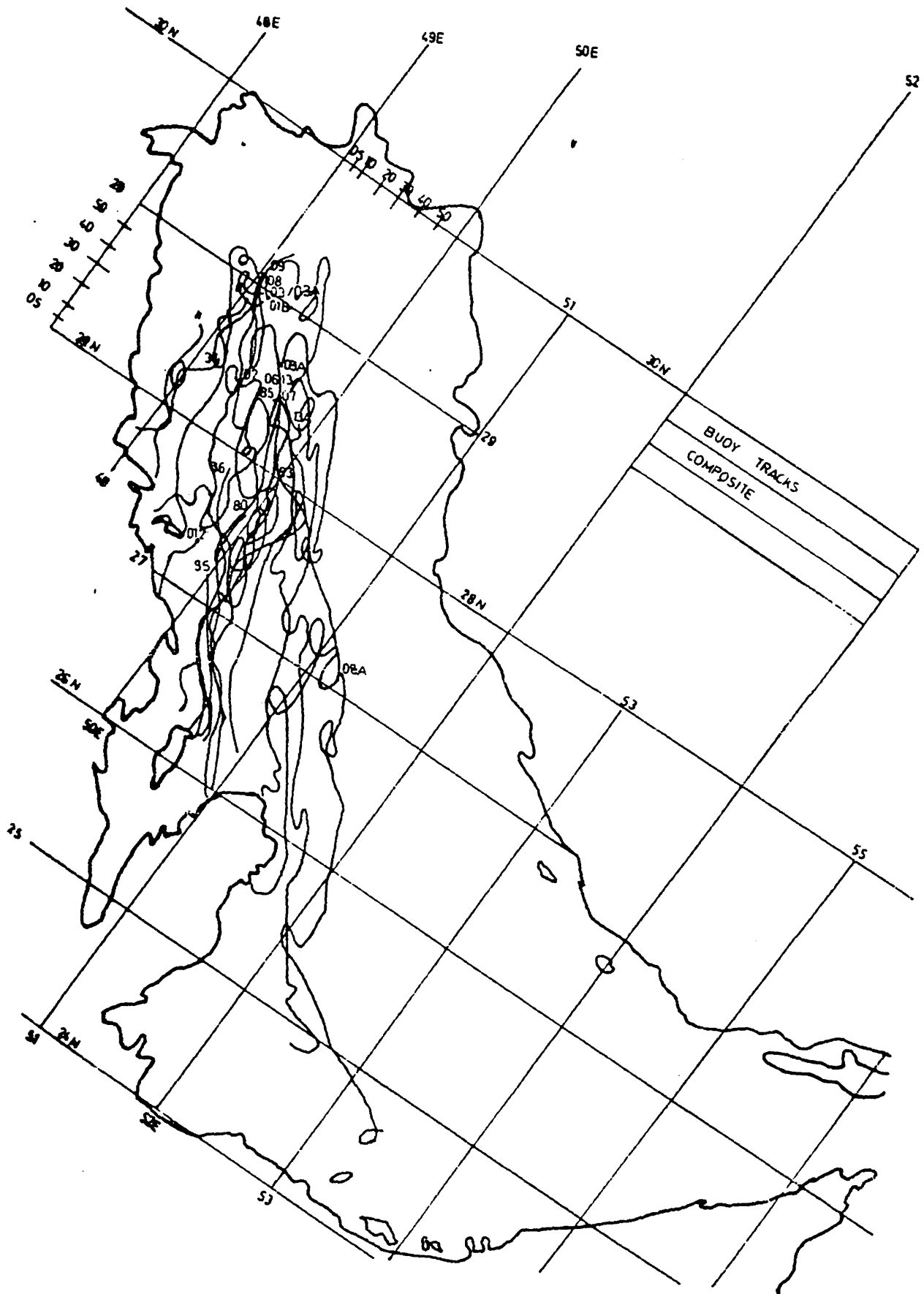


FIG. (8) Buoy Tracks-Composite

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STATUS REPORT ON ARCHIVING OF DRIFTING BUOY DATA

Recognizing the value of Drifting Buoy Data for the development of climatological summaries of surface currents and temperatures, the Joint SCOR/IOC Committee on climatical changes and the Ocean requested that steps be taken to establish a central archive for such data. At the 1983 Argos Joint Tariff Agreement Meeting (JTA-III), the Canadian Marine Environment Data Service offered to provide such an archive. Service ARGOS sent a letter to all drifting buoy users requesting their permission to supply their data to the MEDS, but received only a small number of positive replies, as reported at JTA IV.

As of October 1985, 18 users have indicated unconditional agreement for placing their data in the archive. This includes a large portion of the buoys in use, particularly since some countries have adopted a policy that all buoys covered by that country's global agreement will be available for the archive.

The Canadian Marine Environmental Data Service has taken steps to become recognized as the Responsible National Ocean Data Centre (RNODC) for Drifting Buoy Data within the IOC system. It is expected that this process will be completed shortly.

Archiving of drifting buoy data circulating in the GTS in DRIBU code began on May, 3 1985. As an example of the amount of data being obtained this way, during the month of September 1985 MEDS archived 27,247 DRIBU reports from 182 buoys, including some platforms deployed on the Arctic ice pack.

MEDS now possess a variety of software related to drifting buoy data processing. The real time processing system is fully operational and provides quality control of a range-rate nature. The data from the GTS are accumulated for one week at which time they are processed, quality controlled and updated into the archive data base. Present plans are to replace data received via the GTS with the data received from Service ARGOS when there is duplication. If processed data from principal investigators is made available, it will also be incorporated in the archive although there may be delays when such data are sent in non-standard formats.

Development of the delayed mode processing system is complicated by the problems associated with different channels on the tape being used for different parameters, many of which are not in physical units. The question of whether and how data should be converted to physical units needs to be resolved. At present, tapes from Service ARGOS will be archived in their original form until the development of the processing systems is complete.

The final development requirement is for software to write drifting buoy data in GF-3. A programme to write the present GF-3 subset is now available but implementation is waiting for the finalization of a slightly revised GF-3 format to accommodate such additional fields as pressure tendency. It is hoped that the GF-3 software can be finalized in time to submit the 1985 data to the World Data Centre in February or March 1986. For many buoys, it is likely that the data submitted to WDC's will be position only in view of the difficulty in converting transmitted values to physical values.

In examining data received via the GTS, it has become apparent that there are quite a lot of erroneous data flowing in the DRIBU code. The quality control system used by MEDS during the FGGE year has therefore been re-activated. This system includes a semi-automated set of range/rate checks, an automated comparison of the sea surface temperature to climatological values and visual inspection by a person of the position, pressure and sea-surface temperature records to date identified as suspicious. Random visual inspection of other records is also made to ensure that the automated system is working satisfactorily. As a result of the quality control checks appropriate flags will be set in the data base to identify suspicious or erroneous data. A report will be prepared describing the errors detected in the data from September 1985.

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