WORLD METEOROLOGICAL ORGANIZATION

COMMISSION FOR MARINE METEOROLOGY

ABRIDGED FINAL REPORT OF THE SEVENTH SESSION

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LIST OF PERSONS ATTENDING THE SESSION

1. Officers of the session

J. M. Dury	president
M. A. Rebolledo	vice-president

2. Representatives of Members of WMO

M. A. Rebolledo	principal delegate	Argentina
O. R. Rivero	delegate	
J. L. van Hamme	principal delegate	Belgium
J. M. Dury	delegate	
A. da Cunha Silva	principal delegate	Brazil
P. G. Aber	principal delegate	Canada
W. F. Ganong	delegate	
G. Valdivia K.	principal delegate	Chile
P. Barraos	delegate	
D. Boina	principal delegate	Comoros
G. Stougaard-Nielsen	principal delegate	Denmark
H. H. Valeur	delegate	
S. N. Venho	principal delegate	Finland
P. de la Cochetière	principal delegate	France
J. Romer	delegate	
P. Chavy	delegate	
H. O. Mertins	principal delegate	Germany, Federal Republic of
L. Hoffmann	delegate	
G. Kassimidis	principal delegate	Greece
S. Sotiropoulos	delegate	
E. W. K. Chu	principal delegate	Hong Kong
P. K. Misra	principal delegate	India
M. Oliai	principal delegate	Iran
W. G. Callaghan	principal delegate	Ireland

2. Representatives of Members of WMO (contd.)

S. Gadish	principal delegate	Israel
A. Yamamoto	principal delegate	Japan
K. Terashima	delegate	
E. G. Njoroge	principal delegate	Kenya
W. E. Stewart	principal delegate	Liberia
Y. Valadon	principal delegate	Mauritius
M. L. Selassi	principal delegate	Morocco
W. D. Moens	principal delegate	Netherlands
C. G. Korevaar	delegate	
L. J. Mahieu	delegate	
J. M. Babalola	principal delegate	Nigeria
E. O. Mkpanam	delegate	
L. Haaland	principal delegate	Norway
A. Al-Gain	principal delegate	Saudi Arabia
M. Y. Alsufiani	delegate	
C. Zabaleta Vidales	principal delegate	Spain
T. Thompson	principal delegate	Sweden
S. Suwanpong	principal delegate	Thailand
A. Tamer	principal delegate	Turkey
V. M. Popov	principal delegate	Union of Soviet
K. P. Vasil'ev	delegate	Socialist Republics
F. S. Terziev	delegate	
A. V. Lipovka	delegate	
N. E. Rider	principal delegate	United Kingdom of
G. A. White	delegate	Great Britain and
R. K. Alcock	delegate	Northern Ireland
D. J. Painting	delegate	
U. B. Lifiga	principal delegate	United Republic of Tanzania

2. Representatives of Members of WMO (contd.)

M. Mull	principal delegate	United States of America
L. Baer	delegate	
G. D. Cartwright	delegate	
J. Frosio	delegate	
R. G. Quayle	delegate	
M. Sikić	principal delegate	Yugoslavia
M. Grakalić	delegate	

3. Observers from other international organizations

A. Tolkachev	United Nations Educational, Scientific and Cultural Organization (Unesco)
A. Tolkachev	Intergovernmental Oceanographic Commission (IOC)
M. Bétancourt L. S. Huang A. Zaccagnini	International Telecommunication Union (ITU)
F. Masson J. L. Thompson	Inter-Governmental Maritime Consultative Organization (IMCO)
R. Tessier	European Space Agency (ESA)
P. de la Cochetière	International Association of Lighthouse Authorities (IALA)
P. de la Cochetière	Permanent International Association of Navigation Congresses (PIANC)

4. Lecturers

R. K. Alcock
D. J. Painting
M. J. Rubin

5. WMO Secretariat

G. Weiss	Representative of the Secretary-General
Y. Tarbeev	Chief, Ocean Affairs Division
G. Verploegh	Chief, Marine Meteorology Branch
S. Mizuno	Chief, Ocean Activities Branch
I. Carter	Technical Officer
G. Varadha Rajan	Technical Officer

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GENERAL SUMMARY OF THE WORK OF THE SESSION

1. OPENING OF THE SESSION (Agenda item 1)

1.1 The seventh session of the Commission for Marine Meteorology was opened by the president of the Commission, Mr. J.M. Dury, at 10 a.m. on Monday 29 November 1976 in the Headquarters of the World Meteorological Organization in Geneva.

1.2 In the absence of the Secretary-General, Mr. R. J. Schneider, the Deputy Secretary-General of the World Meteorological Organization, greeted the participants and stated that it was a great honour and pleasure for him to address the session, a session which, due to an unfortunate set of circumstances, could not be held in Lima, Peru, as originally scheduled. Mr. Schneider recalled the first session of the Commission which had been held in London in 1952 and drew attention to the fact that many of the subjects discussed at that time were, 25 years later, again on the agenda for this session but the approach to the problems had changed considerably. Although marine meteorology had developed considerably in that period, the requirements of marine user groups had expanded and this time more precise marine meteorological support was required for activities on the high seas and in coastal zones. These requirements had been discussed in detail in the previous week at the Technical Conference on the Applications of Marine Meteorology to the High Seas and Coastal Zone Development and Mr. Schneider felt that the Commission was now in a position to formulate recommendations aimed at improving marine meteorological services and, at the same time, contributing to the economic and social development of nations. He referred to the great contribution made by voluntary observing ships to the acquisition of observations from the oceans. Thanks to Members participating in the WMO voluntary observing ships' scheme, the number of ships is now around 7 500. In spite of this total, the number of observations are still insufficient and it is fortunate that, in recent years, satellites and ocean data buoys have provided new possibilities for obtaining ocean data. Mr. Schneider said it would be one of the objectives of the Commission to define clearly the type of observations required from the oceans, their form and the means by which they are to be received, so that Members can take the necessary steps to implement the Commission's recommendations. He mentioned the close collaboration between the Intergovernmental Oceanographic Commission and WMO on joint programmes such as IGOSS and the research programme on the "El Niño" phenomenon. He stressed that collaboration between meteorologists and oceanographers was indispensable if ocean-atmosphere interaction processes were to be fully understood. He emphasized the fact that this collaboration had been strengthened in recent years. On behalf of WMO, Mr. Schneider thanked the president of the Commission, the vice-president, the chairmen of the working groups and the rapporteurs for the excellent work they had accomplished in the last four years and concluded by wishing the participants a pleasant stay in Geneva.

1.3 In his opening address, Mr. Dury recalled that twelve years ago, the fourth session of CMM had been held in Geneva in the same conference room. He thanked the WMO Secretariat for their work in organizing another session of the Commission although he regretted that it could not have been held in a country where a session of CMM might have provided a powerful stimulant for the development of marine meteorological services in the region. The president then stated that the Commission had been called upon to define their specific projects for the next four years in very precise terms and drew attention to his report in which a proposed work programme with target dates for accomplishment had been set out. This had been done in response to a request from the WMO Executive Committee to see whether the costs involved in the envisaged projects would be financially acceptable to WMO. He referred to the Technical Conference on the Applications of Marine Meteorology to the High Seas and Coastal Zone Development and the useful discussions which would assist the Commission to identify the actions needed for its future work programme. Mr. Dury said that CMM could be congratulated on having accomplished the greater part of the tasks set by the sixth session of the Commission. He drew attention to the fact that Seventh Congress had noted with satisfaction the assistance rendered by CMM to developing countries in establishing or improving their marine meteorological services. He then referred to specific points such as the technical difficulties involved in observing and measuring various parameters at sea and the need to intensify efforts to obtain and exchange more marine observations during the First GARP Global Experiment. The president congratulated the Members participating in the Marine Climatological Summaries Project and especially the Members responsible for publishing marine climatological summaries which benefit both the scientific and operational marine user groups. He hoped that the Commission's surface-current project would be equally successful. Mr. Dury concluded by thanking all those who had helped the Commission and its president in the last four years and hoped that the session would produce an effective operational programme for the next four years and that it would be a realistic aid to Members of WMO in their efforts to intensify their marine meteorological support to activities on the high seas, at coastal zones and in ports.

1.4 There were 73 participants at the session. These included representatives of 34 Members of WMO, seven international organizations and non-governmental bodies. A complete list of participants is given at the beginning of this report.

2. ORGANIZATION OF THE SESSION (Agenda item 2)

2.1 Consideration of the report on credentials (Agenda item 2.1)

The representative of the Secretary-General presented the first report on credentials and stated that any additional information would be submitted to the session at a later date. The Commission accepted this report and decided not to set up a Credentials Committee.

2.2 Adoption of the agenda (Agenda item 2.2)

The provisional agenda was adopted without amendment at the first plenary meeting, on the understanding that, at any time during the session, additions and/or alterations could be made. The agenda finally adopted is reproduced at the beginning of the report together with a list of relevant documents and numbers of resolutions and recommendations.

2.3 Establishment of committees (Agenda item 2.3)

2.3.1 Working committees

Two working committees were established to deal with specific agenda items:

(a) Committee A: to deal with agenda items 6.2, 7, 8, 10 and 15; Mr. E. W. K. Chu (Hong Kong) was elected chairman and Mr. R. G. Quayle (U.S.A.) vice-chairman;

(b) Committee B: to deal with agenda items 5, 6 (except 6.2), 9 and 10; Captain G. A. White (U.K.) was elected chairman and Dr. K. P. Vasil'ev (U.S.S.R.) vice-chairman.

The representative of the Secretary-General explained that as agenda items 11 and 12 contained subjects common to both committees they would be dealt with by the two committees sitting in one session.

2.3.2 Co-ordination Committee

In accordance with Regulation 27 of the WMO General Regulations, a Co-ordination Committee was established, consisting of the president, the vice-president, the chairmen of the two working committees and staff members of the WMO Secretariat.

2.3.3 Nomination Committee

To facilitate the election of officers of the Commission and the selection of members of working groups and the nomination of rapporteurs a Nomination Committee was established consisting of:

The principal delegate of Brazil;

The principal delegate of France;

The principal delegate of Japan;

The principal delegate of Tanzania;

The principal delegate of the United States of America;

The principal delegate of Yugoslavia.

2.4 Other organizational questions (Agenda item 2.4)

Under this item, the Commission decided its working hours for the duration of the session. It was agreed that minutes of plenary meetings, which could not be approved during the session, could be approved later by the president of the session on behalf of the Commission.

3. REPORT BY THE PRESIDENT OF THE COMMISSION (Agenda item 3)

3.1 The Commission noted with appreciation the report submitted by the president on the activities of CMM since its sixth session. An innovation in the report which was particularly welcomed was the detailed programme of work for the period 1977-1980 set out in Annex I to this report. This was regarded as a very realistic programme in that the financial implications of the proposed projects had already been reviewed to ensure that their implementation was within the resources of the Organization. In this connexion, the Commission noted that one of their most important tasks would be to determine priority areas in their future work programme which could serve later on as guidelines for the Executive Committee and Congress when deciding on the overall technical programmes of WMO.

3.2 The Commission agreed with the view of its president that there was a need to re-establish the CMM Advisory Working Group. The past four years had shown the need for closer co-ordination within CMM for the development and implementation of a coherent programme. Although for practical purposes the work of CMM will be divided among a number of individual working groups and rapporteurs, there exists a close inter-relationship between the problems dealt with by each of these groups and experts. However, the Commission felt that the Advisory Working Group should not only have an internal co-ordinating role as in the past but should review, at given times, external developments which influence the work of the Commission, advise on priorities and stimulate action. It invited the president of CMM to arrange for the participation of experts well acquainted with scientific programmes in marine meteorology and oceanography and representatives from other organizations with which CMM maintains close relationship at the working group level, if required. Resolution 1 (CMM-VII) was adopted.

3.3 The Commission decided that its work programme should continue to be carried out through working groups established to deal with the following specialized fields:

(a) Marine meteorological services;

(b) Marine climatology;

(c) Sea ice;

(d) Technical problems relating to marine meteorological observations aboard ships and by satellite.

In addition, matters relating to satellite data requirements for marine meteorological services and to marine telecommunications will be dealt with by CMM rapporteurs.

3.4 Furthermore, the Commission established a list of projects to be executed in individual specialized fields. In this connexion, the Commission noted the request of the Executive Committee that each technical commission, as a matter of procedure, should determine in advance the cost and the priorities of its programme of work with the help of the Secretariat during the session itself. With regard to the financial implication to the Organization of these projects, the Commission was of the opinion that during the remaining part of the seventh financial period, four sessions of CMM working groups would be required. It was also realized that the execution of such projects would obviously require considerable support by individual Members. The Commission hoped that the financial allocation for sessions of working groups during the next financial period would increase so that working groups could meet more frequently.

4. REPORTS BY THE CHAIRMEN OF WORKING GROUPS AND BY THE RAPPORTEURS (Agenda item 4)

4.1 The Commission noted the reports of the chairmen of the working groups and expressed appreciation for the amount and quality of the work carried out in the inter-sessional period. After formal presentation to plenary, the reports of the chairmen were then studied in detail by the working committees under the relevant agenda items.

4.2 From the report of the president, it was also noted with appreciation that the four rapporteurs had been very active. Two of them had completed their tasks and their reports had been published in the Marine Science Affairs Series as:

Report No. 9 - Environmental factors in operations to combat oil spills. By L. Otto;

Report No. 10 - The meteorological aspects of ice accretion on ships. By H. C. Shellard.

4.3 The conclusions of the Commission on the revision of Technical Note No. 72 - The preparation and use of weather maps by mariners - are recorded under agenda item 10.

5. MARINE METEOROLOGICAL SERVICES (Agenda item 5)

5.1 Services for the high seas (Agenda item 5.1)

5.1.1 The Commission noted that investigations were continued with respect to the specific symbols, content and format for special marine facsimile charts by the Working Group on the Marine Meteorological Services System. The Commission was aware of the difficulties in arriving at uniform symbology for marine information on facsimile charts. A suggestion was made by a member for using legends on marine

facsimile charts, as one of the possibilities for simplification of interpretation by users. The Commission considered the proposals of the working group with regard to representation, in particular of sea-surface temperature and waves. The working group further proposed that the suggested methods might be tested on an experimental basis. In regard to the depiction of waves, some delegates felt that it would be difficult to represent both sea waves and swell on the same facsimile chart with two different sets of solid and broken lines. It was mentioned further that the charts established by several countries did not make any distinction between the above-mentioned types of waves. Finally, the Commission decided that, for trial purposes, the methods proposed by the working group should be followed and after about a period of one year of trials the results should be evaluated by appropriate working groups of CMM. Recommendation 1 (CMM-VII) was adopted.

5.1.2 The Commission was informed of the "Draft Plan for the Establishment of a World-wide Navigational Warning System" and of the opinion expressed by IMCO:

> "It is important to keep in mind that the interest of the mariner would best be served by the eventual amalgamation of areas of responsibility for all services, i.e. navigational warnings, meteorological information and search and rescue, and this goal should be pursued in future international efforts. Such an amalgamation would be in accordance with the long-range goal of a single world-wide system of marine information broadcasts that would encompass both navigational and meteorological warnings".

The Commission agreed that any such co-ordination would enhance the safety and efficiency of marine operations, especially in areas of dense traffic. The Commission noted that in some regions satisfactory arrangements already existed while in some other regions such co-ordination of broadcasts might present some practical difficulties, especially as some areas for navigational warnings do not correspond to the areas of responsibility allocated under the WMO system for meteorological warnings. The Commission further noted that the IMCO/IHO plan was being implemented in individual areas. It felt that, likewise, the desired co-ordination of broadcasts of meteorological warnings of hazardous phenomena and navigational warnings would be more suitably considered on a regional basis where the IMCO/IHO plan had been implemented. Accordingly, the Commission recommended that presidents of regional associations should be invited to arrange, as a matter of high priority, for studies to be conducted with the aim of achieving the maximum possible co-ordination by Members in their Regions. The Commission further decided that a future Working Group on MMS should prepare necessary guidelines for the use of the regional associations in dealing with the regional aspects of such co-ordination. At the same time, the Commission requested the Secretary-General to take the necessary action with IMCO to obtain an official statement of requirements on the elements of meteorological information and their criteria, which would be needed for broadcasting by an amalgamated system. Recommendation 2 (CMM-VII) was adopted.

5.1.3 The Commission noted that a statement of requirements for meteorological information and advice in support of search and rescue operations is now in preparation by IMCO for inclusion in a new Convention on Search and Rescue for consideration by an international conference in 1978. The Commission was informed by the representative of IMCO that the detailed requirements in this regard would be communicated to WMO in due course. The Commission recognized that the requirements might call for certain special arrangements, within the present WMO system, for which suitable international procedures would have to be developed, taking into account the capabilities of Members in undertaking the responsibilities in particular regions and the possibility of regional co-ordination in using the existing facilities and available resources. The Commission considered that, as soon as the required information was made available, appropriate action should be taken by the president of CMM on the matter.

5.1.4 Concerning ship weather routeing, the Commission noted the important discussions which took place during the Technical Conference on the Applications of Marine Meteorology to the High Seas and Coastal Zone Development. This conference, in addition to highlighting the general advantages of ship weather routeing, had dealt at length with the nature of the services provided and the practices followed by different countries. The Commission felt that this highly sophisticated form of meteorological support to individual ships constitutes a special service undertaken purely on a national basis or as a particular enterprise by private companies. It was further noted that the conditions governing ship weather routeing services and the procedures used differed from one country to another. In view of these considerations, the Commission agreed that there was no need for CMM, for the time being, to develop international procedures and practices in this field of marine meteorological activity.

5.1.5 The Commission noted that the terminology in weather and sea bulletins was not always uniform in phraseology and usage. This created problems in the preparation of marine meteorological products by countries responsible for issuing the bulletins as well as in the interpretation of these products by users. In this connexion, the Commission considered a proposal by the Working Group on the Marine Meteorological Services System for the preparation of a standard vocabulary and multi-language lexicon of terms used in the bulletins, with their definitions. As it was felt that such a vocabulary would be highly useful to ensure correct interpretation of weather and sea bulletins and facilitate their comprehension, the Commission decided that the future Working Group on MMS should prepare a new standard vocabulary for the purpose of using the information already collected by the working group and that contained in the existing WMO publications.

5.1.6 The Commission expressed its concern that there was still lack of uniformity in describing the forecast area boundaries, as well as in their names, in several WMO Regions. It recognized that this was not an easy problem to solve but the matter should receive the serious attention of Members concerned, in view of the safety aspects involved. The president of CMM was requested to invite the Secretary-General to bring this matter to the attention of regional associations.

5.1.7 The Commission considered that, in describing the general system of services for the high seas, only those services for which international arrangements would be required should be taken into account. Accordingly, it was agreed that the

system for the high seas should consist of the following components, their differentiation being based on the kind of international arrangements for responsibilities undertaken by Members:

(a) Provision of weather and sea bulletins for the high seas;

(b) Marine meteorological support to search and rescue operations;

(c) Provision of information by means such as radio facsimile;

(d) Provision of marine climatological information;

(e) Provision of marine meteorological expertise.

5.2 Services for coastal and off-shore activities (Agenda item 5.2)

5.2.1 The Commission considered that, although the services provided under this category were primarily intended to serve national requirements, the basic services should be designed to the extent possible, according to international standards, with supplementary services where considered necessary. In this connexion, it was mentioned that the implementation of Recommendation 4 (CMM-V) directed to the revision of international meteorological services to merchant shipping at harbour approaches and other shipping convergence zones had not advanced as was hoped for. It was recognized that meteorological services had a very wide impact on safety and economic factors on shipping in these areas. For developing the international component of this type and related services, the Commission identified the following major service requirements:

(a) Services for international shipping in harbour approaches and shipping convergence zones;

(b) Services for coastal community activities;

(c) Services for coastal protection, including coastal works;

(d) Services for search and rescue (SAR) operations;

(e) Services for special transport in coastal areas;

(f) Services for fishing;

(g) Services for fixed or floating installations at sea;

(h) Services in support of pollution monitoring and clean-up operations;

(i) Services for recreational boating.

5.2.2 In relation to the dissemination of local warnings for coastal areas and off-shore waters, the Commission was informed of the practices followed in some countries. It was noted that some Members have introduced very high frequency broadcasts by equipping a number of their coastal radio stations with VHF facilities in providing information, including warnings, with all stations using the same frequency of transmission. This service is either in the form of frequently-scheduled broadcasts or continuous broadcasts of repeated information which is updated. The Commission considered that it would be highly advantageous if VHF broadcasts of meteorological information, preferably on designated frequencies, could be introduced by Members for the benefit of shipping and other marine activities in coastal and off-shore areas and in the vicinity of ports. The Commission further requested the Secretary-General to study, in consultation with Members, ITU and IMCO, the possibility of obtaining standard designated VHF frequency bands for the dissemination of the information. Recommendation 3 (CMM-VII) was adopted.

5.2.3 The Commission was informed of the problems which existed in some areas in connexion with the availability of meteorological information in English by radio-telephony, in addition to the broadcasts in the local language. In particular, the difficulties experienced in this respect in some countries of the Mediterranean area, which were also considered by the RA VI Extraordinary Session (September 1976), were mentioned. In this connexion, the Commission referred to Technical Regulation /C.1./ 2.2.5 and urged Members to give serious attention to this requirement, in view of its importance to navigation, involving international shipping. The Commission noted with great interest that, as a partial solution to the problem, some countries have developed a special vocabulary, in English, of technical terms and brief expressions for use by local personnel for the preparation and transmission of marine meteorological products, for the benefit of international marine activities in the areas, especially the shipping interests. The Commission, in welcoming the efforts by Members in this respect, requested the future Working Group on MMS to conduct further investigations in this field, in the light of experience gained by Members, with a view to developing, if possible, uniform international practices in this regard.

Services in main harbour areas and ports

5.2.4 The Commission noted that there were no international regulations for meteorological and associated oceanographic services for harbour marine activities. At the same time, it was noted that a variety of services were provided at ports in several countries by specially established forecasting units or port meteorological officers who apart from their conventional duties carry out a number of forecasting and climatological functions. Briefing and documentation have also been introduced in some major ports. In general, the Commission listed the following services which should be provided at ports:

(a) Provision of forecasts and warnings of meteorological and associated oceanographic conditions, presenting direct hazards to the safety of ships and cargo handling, to appropriate port authorities and to ships in ports and in harbour approaches;

(b) Provision of information such as actual weather - waves - currents - density of water - sea-surface temperature - anomalies of tidal predictions - ice conditions - ice accretion - seiches - tsunamis, to appropriate port authorities and to ships in ports and in harbour approaches;

(c) Provision of necessary documentation on (a) and (b) as well as oral briefing;

(d) Provision and/or checking of selected meteorological and oceanographic instruments and supply of necessary documentation;

(e) Provision for the retrieval of meteorological log-books, water samples and any other data obtained from ships and their dissemination to appropriate authorities;

(f) Maintaining stock of published national instructions for the use of international codes by marine observers, provided by countries concerned, and supplying them to ships which need this information;

(g) Briefing of ships' personnel on observing practices and use of instruments mentioned in (d);

(h) Briefing of ships' personnel on transmission and reception of meteorological and/or oceanographic information;

(i) Monitoring of the effectiveness of the services provided and the voluntary observing programme by debriefing of personnel.

In this connexion, the Commission recognized that some of the services may be the responsibility of more than one national authority.

5.2.5 Taking into consideration the importance of such international services and the experience of countries gained in this field, the Commission recommended that Members be invited to establish or expand their port meteorological services to provide for meeting the above requirements. Further, it requested the president of CMM to arrange for adequate guidelines to be prepared in organizing these services, based on the experience of Members. The Commission further recommended that such services should be established or extended to cover all ports frequented by a significant number of ships or where other port activities call for such services. It was realized, in particular, that during the special observation periods of FGGE port meteorological officers would be called upon to play an important part in maintaining greater liaison with the ships to obtain increased observations from data-sparse areas, to ensure their quality by strict checking and certification of instruments, to arrange for prompt collection of data and to offer any other meteorological advice as might be asked for by ships participating in the programme. Finally, the Commission considered that it would greatly facilitate the work of the port meteorological officers in particular regions if they could meet and mutually discuss common problems. Recommendation 4 (CMM-VII) was adopted.

5.3 World Weather Watch support to marine meteorological services (Agenda item 5.3)

5.3.1 The Commission recognized that the basic needs of marine meteorological services are supplied by the WWW systems, namely the GOS, GTS and the GDPS. It reiterated that close co-ordination should therefore be maintained with these systems, for increased observations from ocean and sea areas, prompt collection and dissemination of basic and processed data, and for provision of output products of marine interest through WMCs and RMCs. The use of GOS and GTS facilities is considered under items 6.1 and 6.4 respectively.

5.3.2 As regards the GDPS, the Commission noted that at present a number of products in analogue and alphanumeric form are issued by WMCs and RMCs, which are of interest to the marine meteorologist when preparing marine service products. A reference to the detailed lists published in Volume B, WMO Publication No. 9 was made in this connexion.

5.3.3 In order to make full use of the GDPS facilities, the Commission decided that an inquiry should be made among Members concerned to ascertain the extent to which the GDPS products are used and what additional requirements should be met by specific centres in the GDPS. The Commission further decided that the matter should receive the continuing attention of the future Working Group on MMS to arrange for proper co-ordination of the requirements with the GDPS.

5.3.4 The Commission particularly noted the increasing availability of special facsimile charts broadcast by World, Regional and National Meteorological Centres in support of shipping, fisheries and other marine activities. In this connexion, the Commission considered that facsimile broadcasts are the preferred method of providing marine environmental information, such as:

(a) Surface-weather analyses and prognosis;

(b) Sea state;

(c) Sea-surface temperature;

(d) Ice conditions;

(e) Ice accretion;

(f) Upwelling and currents.

The Commission noted with satisfaction the increasing number of commercial ships equipped with radio facsimile receivers. It recalled Regulation 4 (b) (ii), Chapter V of the International Convention for the Safety of Life at Sea, 1960, and the revision of that Convention which was concluded in 1974, whereby Contracting Governments undertake, when practicable, to encourage the transmission of suitable facsimile weather charts. It was also noted that the process of equipping ships with facsimile receivers in some countries was rather slow, partly because shipowners are apparently reluctant to do so, in view of the costs involved. The

Commission felt, however, that the costs would be more than compensated for by the benefits that could be derived from the different kinds of information obtained which would largely contribute to the safety and economy of navigation. Finally, the Commission concluded that shipping interests should be encouraged through national efforts as well as through international organizations like IMCO, ICS and FAO, to install facsimile recorders on board ships for receiving meteorological and related information. Recommendation 5 (CMM-VII) was adopted.

5.4 Future work programme on marine meteorological services (Agenda item 5.4)

Monitoring

5.4.1 The Commission felt that monitoring of marine meteorological services would be essential for an efficient operation of the system. In particular, monitoring is needed to identify deficiencies and help to improve the quality of services. The Commission was informed that arrangements exist in several countries by which information on the adequacy and effectiveness of services provided is obtained from marine users. It was recognized that the port meteorological officers are in an excellent position for obtaining such information from shipmasters. It was also mentioned that in addition to contacts established through PMOs, the captains, in many cases, are specially requested to provide the feed-back information through appropriate questionnaires and other means. It was also clearly recognized that such contacts had positive results in the improvement of services. Recommendation 6 (CMM-VII) was adopted.

Future work programme

5.4.2 In reviewing the specific points to be dealt with in the field of marine meteorological services in the next four years, a list of major tasks was established which is contained in Annex I to this report. It was agreed that this list would be kept up to date by the president of the Commission.

5.4.3 Finally, the Commission invited its president to bring the work programme contained in Annex I to the attention of the Executive Committee and Eighth Congress in order that appropriate financial provisions could be made.

Re-establishment of the Working Group on Marine Meteorological Services

5.4.4 Since several aspects of marine meteorological services and their further development need continuing attention and study with reference to user requirements, the Commission decided to re-establish the Working Group on Marine Meteorological Services, with revised terms of reference. Further, the Commission considered that the composition of the group should be broadly based so as to ensure adequate geographical representation of regional interests in addition to experts nominated by Members. It therefore decided that the group should be made up of:

(a) An expert designated by each regional association, to ensure adequate consideration of requirements for services and their implementation in different regions of the world;

(b) Experts nominated by Members wishing to participate in the work of the group.

Resolution 2 (CMM-VII) was adopted.

5.4.5 In the interests of economy, it was agreed that most of the priority activities of the group should be conducted by correspondence and, in addition, projects of special concern could be exclusively dealt with by small study groups of experts appropriately selected from the working group membership.

6. MARINE DATA OBSERVING AND REPORTING REQUIREMENTS (Agenda item 6)

6.1 Observational data requirements (Agenda item 6.1)

6.1.1 The Commission agreed that, for the preparation of necessary service products in the form of warnings, analyses and forecasts, a steady input of basic observational data is essential. The data requirements will depend largely on the type of parameters and phenomena to be described with regard to specific marine activities. Accordingly, the Commission reviewed the needs of various marine activities on the basis of a comprehensive survey prepared by the Working Group on the MMSS at its second session and a summary of these requirements is given in Annex II to this report.

6.1.2 The attention of the Commission was drawn to the fact that there is often a paucity of observational data from coastal and off-shore waters and in zones of high traffic density. A serious handicap is thus experienced, since precisely in these areas shipping and other users need detailed and frequent information and forecasts of weather and sea conditions. This question is further considered under agenda item 6.3.

6.1.3 The Commission noted with great interest the report of the WMO Informal Planning Meeting on the Satellite Applications in Marine Activities including Oceanography (Geneva, September 1976), which showed great possibilities of marine data acquisition through satellite means. Some of the papers presented at the Technical Conference on the Applications of Marine Meteorology to the High Seas and Coastal Zone Development, which highlighted the latest developments in the field of satellite technology, were also mentioned. The Commission noted the fact that information obtained by satellites and through other remote sensing facilities had already been very effective in a number of applications, such as forecasting of storms, sea-ice reconnaissance and in oceanographic studies of certain characteristics of ocean currents. It felt that the time had come to develop more specific requirements with regard to the quantitative data observed by such means, their resolutions in time and space, the ocean areas where they are needed most, and an indication of priorities. The Commission realized that this should be an important study which should receive high-priority attention by the Commission in coming years. The IOC representative stated that the use of satellite data in various oceanographic programmes was now under study within IOC by a rapporteur who was expected to prepare a comprehensive report on the subject for

the consideration of the IOC Assembly next year. The Commission agreed that the studies which should be undertaken within CMM should be closely co-ordinated with the work being carried out in IOC. The Commission requested the president of CMM to arrange that the EC Panel of Experts on Satellites will be kept fully informed of the satellite data requirements for marine applications (including oceanography). Finally, the Commission decided to appoint a Rapporteur on Study of Satellite Data Requirements for Marine Meteorological Services. Resolution 3 (CMM-VII) was adopted.

6.1.4 The Commission noted that the study of the CMM-VI proposal for the possible institution of an international award to voluntary observing ships had revealed certain practical difficulties. In particular, the Commission noted that the practices followed by countries in recognizing the outstanding services of the ships recruited by them differed according to national requirements. Further, no uniform selection criteria for an international award system could be arrived at. In the circumstances, the Commission felt that the introduction of an interational system of awards would imply changes in the national arrangements of several countries. Further, the Commission agreed that, although national practices vary in detail, they have a common purpose in maintaining the goodwill of marine observers and the high quality of their work. The Commission, therefore, recommended that Members should be urged to institute, if they had not yet done so, national incentive programmes for voluntary observing ships recruited by them. Recommendation 7 (CMM-VII) was adopted.

6.1.5 The Commission noted with appreciation that several countries were issuing national certificates of appreciation to voluntary observing ships recruited by them and that this practice was serving a useful purpose. The Commission further recognized that there would be practical difficulties in the issue of a formal certificate by WMO and in its updating as well as in changing the certificate whenever changes in the ownership of ships or in their participation in the WMO voluntary observing ships' scheme took place. The Commission therefore recommended that Members, who had not yet done so, should be encouraged to issue national certificates to ships recruited by them, as a sign of participation in the scheme. It further requested that consideration should be given by the organizers of international research experiments, for which a special effort is required by voluntary observing ships, to express their appreciation, in a suitable form, at the conclusion of the experiment. Recommendation 8 (CMM-VII) was adopted.

6.2 Further development of observing methods and instrumentation (Agenda item 6.2)

6.2.1 In reviewing the report of the chairman of the Working Group on Technical Problems and the suggestions contained therein, the Commission agreed that continuing study of the measurement and observation of a number of elements is required as follows.

Waves

6.2.2 Although satellite data and data obtained from instrumented buoys may eventually replace the visual observations of waves by ships, the latter will still serve as the main source of information for a long time. Attention was drawn to the

new WMO Handbook on Wave Analysis and Forecasting (WMO-No. 446) which includes a description of the characteristics of visual wave observations and their interpretation. To assist the observer, a set of coloured photographs taken at Ocean Weather Station P is being prepared by Canada. An instruction film to show the development of sea states under various wind conditions could ideally serve as training material; the suggestion needed further study in view of the high costs involved in preparing such a film.

6.2.3 Further attention needs to be given to the development of simple wave-recording instruments for use on board ships. Eventually, further guidance material on the analysis of wave records and the use of the wave spectra should be included in the Handbook on Wave Analysis and Forecasting. As the wave record does not presently permit a distinction between sea and swell, there is a need to identify, in SHIP code forms, wave reports based on instrumented data, as distinct from reports of visual observations (see also paragraph 6.3).

Precipitation

6.2.4 A reliable method for measuring precipitation amount at sea has still not been found. Studies are under way in a number of countries, including the possible use of radar for this purpose. The comparison of precipitation data measured on nearby ships presents additional difficulties when distances between the ships are great. It was suggested that the high concentration of ships during the special observing periods of FGGE might present an excellent opportunity to carry out comparative studies of precipitation measurement at sea.

Surface wind

6.2.5 The height at which anemometers are installed on board ships varies greatly; at present, this height ranges from about 20 to 60 metres above sea-level. The height of sensors on meteorological buoys is much lower; it varies from about three to ten metres. The present recommended reference height of ten metres may not prove to be the most suitable value; there is also a need to review the averaging time and to develop a suitable method to reduce actual measurements to the standard level. In the meantime, more attention should be given to instructions to marine observers for reporting true wind speed and direction correctly.

Automation of meteorological observations on board ship

6.2.6 As ships officers generally have less time to make all the required meteorological observations and also to keep pace with the gradual automation of ship navigation, the installation of remote sensors on board ships in order to permit centralized reading of appropriate meteorological parameters on the bridge should be encouraged. Exchanges of information about national developments in this regard should be arranged by the Commission. As regards sea-surface temperature, studies should continue regarding the comparison of values obtained by conventional methods and from radiometers. As regards visibility, work is in progress in CIMO to develop a definition of visibility at night in terms of daytime equivalent visibility, using the "meteorological optical range" as the observational parameter. CMM should follow these developments carefully.

Future work programme

6.2.7 The Commission considered that its future work programme on these technical questions could suitably be carried out under two main projects (see Annex I) and appointed rapporteurs to carry out the priority tasks under these projects. Resolution 4 (CMM-VII) was adopted.

6.2.8 The Commission further considered that the activities of IOC in this field should be taken into account in order to permit close co-ordination of work.

6.3 Requirements for reporting codes (Agenda item 6.3)

6.3.1 In connexion with the paucity of data from coastal areas and zones of high traffic density, the Commission was informed that voluntary observing ships often cease to make and transmit observations, when they are in these areas, due to heavy navigational duties. At the same time, the Commission noted that the need for obtaining at least basic observational parameters from these areas was stated by Members in response to an inquiry held in 1974. The Commission felt that the importance of observations from these areas should be emphasized and that the ships' officers should be encouraged to continue reporting from these areas provided it does not interfere with the safety of navigation. In this relation, the Commission considered the need for any new code. It was, however, pointed out that the introduction of any new code would create problems, especially as such a code might be used on a much wider scale than originally intended and this would inevitably lead to a reduction in SHIP reports. The Commission was, therefore, not in favour of introducing any new code at this stage, but suggested that when a new SHIP code is being prepared, it should include suitable drop-out groups. Recommendation 9 (CMM-VII) was adopted.

6.3.2 It was further learned that some countries support observational programmes in coastal and off-shore areas, involving tugs, fishing boats and other craft of a similar nature which have no radio officer on board and maintain all communications only by radio telephony. National codes used by the crafts are highly simplified and contain also provision for use of plain language. The Commission, in welcoming this development on a national scale, considered that Members, who have not done so, should be encouraged to introduce the practice in their countries. The Commission felt that observations from coastal and off-shore waters would be needed by neighbouring countries as well and, for this purpose, a uniform code would be helpful. The Commission, therefore, agreed that the Working Group on MMS should co-ordinate the requirements in the matter, on the basis of various national practices, for further necessary action.

6.3.3 Further, the Commission considered that action should be taken in order to provide for the transmission from coastal and island stations, as well as from lighthouses, lightships and other marine observing platforms, of additional marine information not included in "SYNOP" code form. In particular, sea-surface temperature, sea ice and ice accretion should be dealt with by the insertion in the code "SYNOP" of suitable drop-out groups corresponding to the groups now contained in FM 21-V SHIP code. Recommendation 10 (CMM-VII) was adopted.

Reporting of waves

6.3.4 For waves measured by a recording instrument, no distinction can be made between wind waves and swell. To enable international exchanges of recorded wave data, provision should be made in WMO codes to distinguish between:

(a) A report of height, period and, if possible, direction of recorded waves, without distinction between wind waves and swell;

(b) A report of height, period and direction of visually observed waves, with a distinction between wind waves and the predominant swell if present and observable, as at present.

The reported parameters of recorded waves should be significant height and mean period of zero-upcrossings.

6.3.5 With respect to the visual observation of waves, it was stressed that instructions to marine observers should strictly follow the guidelines contained in paragraph 17.9.2.1 of the Guide to Meteorological Instrument and Observing Practices (WMO-No. 8), particularly as regards the criteria for distinguishing between "sea" and "swell". In so doing, greater uniformity may be obtained in the reporting of swell. The Commission stressed, in this connexion, that the possibility of reporting more than one swell system should be maintained.

6.3.6 In code form FM 21-V, swell periods are reported by means of code 3155 $-P_w$. This code does not permit detailed reporting of swell periods greater than 13 seconds. However, users of climatological summaries of wave data observed by ships are greatly interested in these longer swell periods; they are also important in wave forecasting. There is therefore a strong requirement for a code change which permits the reporting of all swell periods to the nearest second.

6.3.7 The Commission requested the president of CMM to submit the above wave-reporting requirements to the president of CBS for urgent action with regard to the development of suitable codes. In so doing, the president of CMM may wish to offer expert advice on this subject to assist the CBS.

6.4 Requirements for marine telecommunications (Agenda item 6.4)

6.4.1 The Commission considered this item on the basis of two documents, one submitted by the Secretary-General and the other by the U.S.A. Its discussions and main conclusions are recorded under the following headings:

(a) Report of the Informal Planning Meeting on the Improvement of Observational Data Coverage over the Oceans, in particular, its recommendations;

(b) Improvement in the efficiency of marine telecommunications:

(i) Transmission facilities aboard ships;

(ii) Receiving facilities ashore;

(c) Value of late reports;

(d) Support to developing countries for the purpose of ocean data collection and dissemination;

(e) Transfer of the regulatory material in Volume D relating to the collection of ships' weather reports into the Manual on the GTS;

(f) Activities of the CMM member on the CBS Working Group on the GTS and appointment of a rapporteur on marine telecommunications;

(g) Standardization of facsimile transmission characteristics for marine users;

(h) Border lines of zones between RA VI and RA IV for the collection and dissemination of ships' weather reports.

Report of the Informal Planning Meeting on the Improvement of Observational Data Coverage over the Oceans

6.4.2 The Commission was presented with the above-mentioned report and expressed appreciation for the comprehensive manner in which the meeting had analysed the various problems in the field of marine telecommunications and had proposed realistic solutions thereto. It noted that the report had been distributed to all Members of WMO, many of which had expressed support for the recommendations proposed.

6.4.3 The report identified four components of the communications system as important sources of data loss:

(a) Ship-to-shore links;

(b) Reception at shore stations;

(c) Communication links between coastal radio stations and associated NMCs;

(d) GTS, including interfaces at processing centres.

Each of these four components has been identified and discussed at a number of international meetings as having an impact on the availability of weather reports. Whilst the IPM did not identify new problem areas, it did present important information on which problems appear to be most critical. The report concludes that:

(a) Any increase in the number of ships' reports could not be attributed to the change, on 1 January 1976, in watch-keeping hours of radio officers on board ships because so many other factors are involved;

(b) Late (RTD or CORR) reports often are not transmitted when the reports are more than a few hours old;

(c) Certain difficulties are more prevalent in some regions than in others. For instance, while in the North Atlantic the problems of the "single-operator" watch-keeping hours are more serious than that of facilities and performance at coastal radio stations, the situation in areas covered by the WMO Tropical Cyclone Project could be said to be the reverse.

The report places emphasis on improving the ship-to-shore telecommunication links and also improving the procedures on shore for the reception of reports and their onward transmission to NMCs for insertion into the GTS.

6.4.4 Also under this heading, the Commission considered a recommendation regarding the use of the "Safety Signal" for the transmission of ships' weather reports. It noted the provisions of ITU Radio Regulations (Article 44, Regulation Nos. 1488 and 1489) which might allow for securing a higher priority for the transmission of certain weather messages. It reads as follows:

> "Messages originating in mobile stations and containing information concerning the presence of cyclones shall be transmitted, with the least possible delay, to other mobile stations in the vicinity and to the appropriate authorities at the first point of the coast with which contact can be established. Their transmission shall be preceded by the Safety Signal".

6.4.5 The representative of IMCO pointed out that, according to Regulations 2 and 3 of Chapter V (Safety of Navigation) of the International Convention for the Safety of Life at Sea, 1960, and in the revision of that Convention which was concluded in 1974, ships are required to report tropical storms, storms, icebergs and ice accretion. Such danger messages should be preceded by the Safety Signal (TTT) and that when a tropical storm or other dangerous storm has been reported, it is recommended that further observations be made and transmitted hourly, if practicable, but in any case at intervals of not more than three hours so long as the ship remains under the influence of the storm. The intention of the recommendation of the Informal Planning Meeting was to remind seafarers that the Safety Signal may be used to secure a higher priority for the transmission of such reports in WMO code forms. The Commission agreed that such a procedure would facilitate the clearance of urgent weather reports and contribute to the safety of life at sea by helping to provide prompt storm warnings. The Commission felt however that some points should be clarified before the recommendation could be endorsed, such as: a more detailed legal interpretation needed for adopting such procedures and whether, and under what circumstances, an OBS message preceded by the Safety Signal could be used by voluntary observing ships and any practical problems which might arise from the use of the Safety Signal, for example, its misuse when transmitting observations which are normal OBS messages. The Commission therefore requested the Secretary-General to seek the views of IMCO and ITU on this matter.

Improvement in the efficiency of marine telecommunications

Transmission facilities aboard ships

6.4.6 The Commission considered that one of the methods by which ship-shore communication might be considerably improved would be the use of automatic transmission systems aboard ships. In this connexion, it noted with interest developments in the provision of radioteleprinter facilities for ship-to-shore communications in the maritime frequency bands, including trials made by several telecommunication administrations using systems designed for unattended operation at the coastal stations as well as on board ships, such as the Swedish MARITEX system (HF Radio-Telex System). The Commission endorsed the conclusion of the Informal Planning Meeting on the Improvement in Observational Data Coverage over the Oceans that this development offered a hope of a more efficient means of sending observations from ship-to-shore and that its development and use should be encouraged in all possible ways. Recommendation 11 (CMM-VII) was adopted.

Receiving facilities ashore

6.4.7 The Commission was of the opinion that efforts to increase the number of voluntary observing ships should go hand in hand with efforts to improve the efficiency of coastal radio stations receiving ships' weather reports and arrangements for their subsequent dissemination. It was therefore very much concerned about major gaps in the coastal radio station network existing around certain ocean areas and the refusal or reluctance of certain coastal radio stations to accept ships' weather reports. The Commission considered that the situation must be improved as soon as possible and particularly in time for FGGE. Recommendation 12 (CMM-VII) was adopted.

Value of late reports

6.4.8 The Commission noted that many ships' weather observations were not transmitted by ships either because the radio officer had gone off duty or because another new observation had been submitted for transmission when the radio officer returned on watch. Another deterrent to transmitting late reports is the fact that some coastal radio stations are unable or unwilling to receive them. The Commission endorsed the recommendation made by the IPM that mariners should be reminded of the considerable value of observations even when they are more than six hours old and that they should transmit them up to 12 hours late. In the most data-sparse areas of the oceans, such as the South Atlantic, the South Pacific and in the southern Indian Ocean where late observations are vital to track the path of cyclones, weather reports should be transmitted up to 24 hours after the time of observation. The Commission also endorsed another recommendation of the IPM that Meteorological Services should make arrangements for the reception by coastal radio stations of all available ships' weather reports including those up to 12 hours old and in data-sparse areas up to 24 hours old. The Commission noted with satisfaction the fact that provisions regarding the transmission of delayed ships' weather reports were now included in the Manual on the GTS, Part I: Attachment I-1, paragraph 4.3. Recommendation 13 (CMM-VII) was adopted.

Support to developing countries for the purpose of ocean data collection and dissemination

6.4.9 The attention of the Commission was drawn to the fact that, if resources and technical support were available, a number of developing countries in the southern hemisphere could make a very important contribution to the increased availability of ships' weather reports by establishing and operating coastal radio stations in the gaps in the coastal radio station network which are particularly chronic along the south-western coasts of Africa and the western coast of South America. In other areas, existing coastal radio stations in some developing countries lack the facilities and performance required for efficient operation. Very often the links between these coastal radio stations and the appropriate NMCs are also inadequate and need strengthening. In order to assist developing countries to play their full part in the implementation of the World Weather Watch and, in particular, to improve the situation regarding the increased availability of ships' weather reports from the southern hemisphere in time for the First GARP Global Experiment, the Commission considered that efforts should be made to explore the possibilities of providing the necessary technical and financial support.

6.4.10 One way of providing technical expertise to developing countries would be to use the services of an area marine specialist. This expert could visit national Meteorological Services in developing countries on request and provide guidance on improvements in the collection and dissemination of ocean data and the arrangements for the reception of the observations at coastal radio stations and their subsequent insertion into the GTS. Advice could also be given on the provision of increased port meteorological services with a view to securing the co-operation of ships' officers for the efficient transmission of ships' weather reports to coastal radio stations. Recommendation 14 (CMM-VII) was adopted.

6.4.11 Whilst it was clearly understood that this project should be implemented as soon as possible if it is to increase the availability of ships' weather reports in time for the First GARP Global Experiment, the Commission stressed that this should be an ongoing project.

Transfer of the regulatory material in Volume D relating to the collection of ships' weather reports into the Manual on the GTS

6.4.12 The Commission noted with satisfaction that the Extraordinary Session of CBS (Geneva, November 1976) adopted a text for insertion in the Manual on the GTS entitled "Arrangements for the collection of ships' weather reports" which was compiled from relevant sections of Volume D; this text, after approval by the president of WMO, will be included in the Manual and come into force on 1 July 1977.

6.4.13 When adopting the above-mentioned text, CBS referred to CMM the question regarding "early morning observations" and sought its view as to whether or not the provisions regarding "early morning observations" be revised or deleted. The Commission realized that the procedures regarding "early morning observations" were established in relation to the old watch-keeping hours and that these would no longer be applicable with the introduction of the new watch-keeping hours. It therefore decided that the procedures be deleted.

Activities of the CMM member on the CBS Working Group on the GTS and appointment of a rapporteur on marine telecommunications

6.4.14 The Commission was informed of the activities of the CMM member on the CBS Working Group on the GTS, Mr. T. Tournier, and in particular of his contribution to the compilation of the relevant material for inclusion in the Manual on the GTS. The Commission took this occasion to place on record its profound appreciation to Mr. Tournier for his untiring efforts to improve the observational data coverage over the oceans throughout his long association with CMM.

6.4.15 The Commission realized that marine telecommunications, as related to ocean data collection, had many facets which are dealt with by different bodies and authorities; within WMO, both CBS and CMM are concerned; outside WMO, co-operation with and the assistance of a number of international organizations, such as ITU, IMCO, ICS and CIRM, are essential for the improvement of marine telecommunication arrangements. It therefore considered it necessary to appoint a rapporteur who will act as the focal point of CMM on marine telecommunication matters and liaise with the CBS Working Group on the GTS. Resolution 5 (CMM-VII) was adopted.

Standardization of facsimile transmission characteristics for marine users

6.4.16 The Commission recalled that CMM-VI adopted Recommendation 3 in response to Opinion 24 expressed by the 11th Plenary Assembly of the International Radio Consultative Committee (CCIR) regarding standardization of drum speed and index of co-operation for facsimile transmissions intended for reception on board ships; this recommendation proposed the following technical characteristics selected from amongst the standard characteristics adopted by WMO:

Drum speed (or scan rate): 120 revolutions (or scans) per minute;
Index of co-operation: 576.

This recommendation was, however, not approved by the Executive Committee as there was uncertainty as to whether the recommended scan rate of 120 per minute would be suitable for all marine facsimile broadcasts.

6.4.17 The Commission was informed at the same time that CCIR had under continuous study the question of "black and white facsimile transmissions over combined metallic and radio circuits in the Maritime Mobile Service" and that Recommendation 3 (CMM-VI) and the decision of the Executive Committee thereon were brought to the attention of CCIR; the purpose of this study is to bring the standards adopted by CCIR into line with those adopted by the International Telegraph and Telephone Consultative Committee (CCITT) of ITU. The problem involved in this exercise is that the standard characteristics adopted by WMO for weather facsimile transmission were endorsed by CCITT and CCIR. A slightly different Index of Co-operation has been recommended by CCITT for non-meteorological use, namely 264, whilst the WMO standards are 288 and 576. A scanning line frequency of 180 lines per minute has been accepted by CCITT for non-meteorological use whilst the WMO standards are 60, 90, 120 or 240 per minute.

6.4.18 It was therefore recognized that there are two distinct problems:

(a) The selection within WMO of a single standard from among the standards adopted by WMO, for use in facsimile transmissions intended for marine users; this is an internal WMO problem;

(b) The study of CCIR with a view to standardizing the technical characteristics of facsimile transmission over combined metallic and radio circuits in the Maritime Mobile Service (alignment of CCIR and CCITT standards).

With regard to (a) above, the Commission considered that it was desirable to select a single standard, but further technical studies were required before this could be done. It also remarked in this connexion that facsimile receivers for installation aboard ships, and presently available on the market, are usually designed in accordance with WMO standards and capable of being switched to different drum speeds and indices of co-operation.

With regard to (b) above, the Commission noted with satisfaction the conclusion of the Interim Meeting of Study Group 8 of CCIR (Geneva, March 1976) which reads as follows:

> "Despite the desirability to achieve a single set of characteristics for all maritime facsimile services (including weather charts) it seems unlikely that it will in fact be possible to achieve due to the large-scale investment that has already been made in both systems. On balance it is considered that with the possible exception of the start/stop control signal the maritime public facsimile service should adopt the CCITT standards. However, because of lack of factual information, no decision has so far been taken on the value of the scanning line frequency."

6.4.19 The Commission requested the Secretary-General to transmit to CCIR its views and conclusions contained in the preceeding paragraphs.

Border lines of zones between RA VI and RA IV for the collection and dissemination of ships' weather reports

6.4.20 The Commission was invited to comment on Recommendation 6 adopted by the Extraordinary Session of RA VI (Budapest, October 1976) in view of its submission to the twenty-ninth session of the Executive Committee for approval. This recommendation proposes that the border lines between Regions VI and IV of zones for the collection and dissemination of ships' weather reports be considered flexible so that radio officers on board ships plying the sea areas near these borders may choose the best existing possibilities to transmit ships' weather reports to a coastal radio station in one or the other region; this procedure was considered particularly useful under changing propagation conditions.

6.4.21 The Commission agreed that the adoption of such a procedure would considerably increase the efficiency of the ships' weather-reporting scheme.

7. MARINE CLIMATOLOGY (Agenda item 7)

7.1 Marine climatological summaries scheme (Agenda item 7.1)

7.1.1 The Commission noted with appreciation the accelerated publication of annual marine climatological summaries by the Members responsible. The publication of new volumes is regularly announced in the WMO Bulletin. The usefulness of these summaries has been mentioned several times in relation to studies on climatic change and the Commission was glad to learn that the initial technical problems in their preparation have now been solved and that publication can be expected to continue on a regular operational basis.

7.1.2 Wave tables take up a very large space in the annual summaries and in view of the large cost involved in the publication of summaries the Working Group on Marine Climatology proposed a reduction of volume without loss of information which might be important to users. The Commission agreed with the proposals of the working group and consequently adopted Recommendation 15 (CMM-VII) - Supplementary procedures for the preparation of marine climatological summaries. Consideration should be given to including in the tables extremes of wave height and period and their dates of occurrence.

7.1.3 In view of the fact that the present code 3155 - P_w by which the period of swell is reported does not permit detailed reporting of swell periods of 14 seconds or greater and also since reported periods of wind waves very seldom reach values greater than this amount, the Commission agreed that the tables for wave period could be truncated in the summaries at the step indicating periods of 14 seconds or greater. This procedure should be reconsidered when a change of code 3155 recommended by the Commission (see paragraph 6.3) will enable the reporting of swell periods to the nearest second of 14 seconds or greater.

7.1.4 A proposal to re-arrange the months of the year into different seasons was discussed. The Commission concluded that, as the regular publication of annual summaries is now well under way, any basic changes in the computation of the summaries such as a different grouping of months into seasons should be avoided.

7.1.5 With a view to reducing the costs of publication, the Commission agreed that the annual summaries might be published on microfiche, if financial considerations so dictate.

7.1.6 The Commission considered that, since Resolution 35 (Cg-IV) was adopted, magnetic tape had replaced the punch card as a standard medium in many countries. As long as all countries have not made this change, the two media - magnetic tape and punched cards - will need to be used in exchanges of primary data. The Commission felt that the use of magnetic tape as a standard medium should receive formal recognition in WMO regulatory material regarding the marine climatological summaries scheme and it decided that the new Working Group on Marine Climatology should study this matter and prepare suitable proposals which should include the various consequences of the use of this medium to international exchanges of marine climatological data (see Resolution 6 (CMM-VII) - Working Group on Marine Climatology).

7.1.7 As a result of recent developments it has become necessary to make new arrangements for marine climatological summaries and for data collection of the planned marine section of the World Climatic Atlas for the ocean area south of latitude 50°S which hitherto was the responsibility of South Africa. In accordance with the provision made in paragraph 3 of Part B of the annex to Resolution 35 (Cg-IV), by which re-adjustment of boundaries of the areas of responsibility should be reviewed by CMM, the Commission had been requested to make proposals for new arrangements. It considered that a southward extension of the three adjacent areas of responsibility would suit the requirements and, consequently, the Commission agreed that the Federal Republic of Germany, the Netherlands and the U.S.A. be invited to accept the responsibility for the collection of data and the preparation of decadal summaries for areas which extend southward of their respective areas of responsibility. Recommendation 16 (CMM-VII) was adopted.

7.1.8 In relation to the marine climatological summaries scheme, the Commission was informed about the current status of developing the data-collection scheme for the First GARP Global Experiment. The Commission particularly considered those components of the FGGE Data Management Scheme which relate to the mobile ship meteorological and oceanographic data collection. The Commission noted in this connexion that the FGGE Data Management Scheme envisages for these data both operational and delayed collection and that, for the latter, two special data centres (mobile ship data centre and specialized oceanographic data centre) are proposed to be established in the Federal Republic of Germany.

7.1.9 The Commission agreed that the FGGE Data Management Scheme should be supported and that every effort should be made to organize the mobile ship and oceanographic data collection according to the time schedule established by the EC Inter-governmental Panel on the FGGE. This schedule calls for the routine preparation of the complete FGGE data sets (including marine data) not more than six months after the observations are made.

7.1.10 As regards meteorological data normally observed under the WMO Voluntary Observing Ship Scheme, the above requirement means that these observations should be available at the national data-collecting centres on punched cards or on magnetic tape, within three months after observation time, so that they can be forwarded to the special FGGE mobile ship data centre within four months after observation time. Special measures need to be taken, therefore, by Members to accelerate the data collection under the marine climatological summaries scheme. The Commission considered several possible ways to achieve this goal and adopted Recommendation 17 (CMM-VII) which, it hoped, would lead to the required result if the various recommended actions for the acceleration of data collection are sufficiently monitored.

Beaufort scale of wind force

7.1.11 The Commission considered at length the decisions of Seventh Congress regarding the inclusion of the Beaufort scale in the Technical Regulations. The discussions concentrated in particular on a choice between the "new" and "old" scale and two corresponding decisions of Cg-VII which, for reasons of clarity, are summarized as follows:

(a) That the scale developed by CMM-IV and recommended by EC-XXII for use in scientific projects such as marine climatology ("new scale") should appear in the Technical Regulations;

(b) That the scale contained in an annex to the Manual on Codes ("old scale") should be included in the Technical Regulations as a scale which shall be used for observational purposes, at least until 1 January 1981. On that date, this scale shall be replaced by the scale referred to in (a) above should CMM conclude that new information was not such as to cause it to revise its present opinion.

7.1.12 The Commission was generally of the opinion that, ultimately, only one scale should appear in the Technical Regulations to be used for all purposes. It was recalled, in this respect, that the reason why EC-XXII could not accept the CMM-IV scale for all purposes was an operational difficulty regarding its applications for hurricane warnings. However, a compromise, adopted by CMM-VI as a workable solution, did not appear logical to the present session because of the creation of a gap between equivalent speeds of wind forces 11 and 12. As a new compromise, it was proposed to extend the range of wind force 11 up to 63 knots, to permit the continued use of this value as an operational criterion in the definition of "hurricane" as a tropical cyclone. This solution, initiated by the U.K. delegation, was jointly submitted by the U.K., U.S.A. and the Netherlands.

7.1.13 The Commission noted that, from a recent climatological study comparing wind measurements at ocean weather stations from selected ships in surrounding areas, the "old" scale seemed to fit better the threshold frequencies of corresponding wind speed limits. The "new" scale, which is based on a direct comparison of mean wind speeds and wind forces, has been in operational use in one country for the past 22 years, in applications such as storm-surge predictions and wave forecasting. It was also pointed out that, in one country, the "new" scale was included in the computer programs for marine climatological data processing.

7.1.14 In further discussions it appeared that a number of delegations were reluctant to accept the "new" scale for operational purposes. The Commission finally agreed, as a consensus of opinion, that the compromise solution for a single scale, (paragraph 7.1.12 above) should not be pursued and that the "old" scale should be used for all purposes. The Commission requested the president of CMM to inform the Executive Committee of this decision, so that the necessary amendments could be made to the Technical Regulations. These will include the removal of the scientific scale from Part I of Appendix H of the Technical Regulations and the adoption of the scale appearing in Part II of Appendix H for all purposes, and for general use also after 1 January 1981.

7.1.15 Recommendation 18 (CMM-VII) was adopted by a majority vote. In this connexion, a number of statements were made which were recorded in extenso in the minutes of the third plenary meeting. The delegations concerned requested that the minutes containing their statements be disseminated to all Members of the Organization and also brought to the attention of the Executive Committee, so that they would be available when the report of the Seventh Session of CMM was considered.

7.1.16 The Commission noted that national scales for scientific purposes might be used both nationally and in scientific projects. It felt that in such cases Members should include the appropriate references in the relevant publications. The Commission also urged that research be continued into the nature and representativeness of wind estimates at sea.

Technical Regulations for Marine Climatology

7.1.17 The Commission considered that, since the new Manual on Marine Meteorological Services will include a chapter on marine climatological services, the Technical Regulations should include appropriate paragraphs in chapter C.1 referring to the Marine Climatological Summaries. Recommendation 19 (CMM-VII) was adopted.

Historical Sea-Surface Temperature Data Project (HSSTD)

7.1.18 The Commission was informed of the latest development regarding the Historical Sea-Surface Temperature Data Project. This vast project carried out on the recommendation of the Executive Committee by four Members - the Federal Republic of Germany, the Netherlands, the United Kingdom and the United States of America - concerns marine data over the period of 1860 to 1960. It comprises the publication of monthly means and standard deviations, for individual years, of sea-surface temperature, air temperature, both scalar and mean vector winds and the time and space distributions of observations. The ship observations included in the project were carefully selected in order to obtain a homogeneous set of data which are important in view of their use in studies of climatic change. The project has therefore been recognized by the Joint Organizing Committee for GARP as having great value for studies related to its second objective.

7.1.19 Since this project started in 1968, about 20 million observations involved were transferred from punched card to magnetic tape and arranged in mutually agreed formats to enable their exchange between the four Members involved and the final publication of a combined set of data. The Commission learned with great interest that the first volumes, for the Pacific Ocean, are expected to be published during 1977 by the U.S.A. which has offered to undertake the publication of the entire set of summaries.

7.1.20 As this project is closely linked with the CMM project of marine climatological summaries which start with data for the year 1961, the Commission expressed great appreciation for the work accomplished by the four Members concerned because the HSSTD data, together with the marine climatological summaries, will constitute a long series of highly valuable data for use in climatological studies. It considered that the Working Group on Marine Climatology should take the results of this project into consideration with regard to keeping in review the marine climatological summaries scheme.

7.2 Marine section of the World Climatic Atlas (Agenda item 7.2)

On learning that the U.S.A. and the U.S.S.R. are in the process of preparing and publishing marine climatological atlases for all the oceans of the world, the Commission confirmed its earlier consideration that there was no urgent

need to issue the marine section of the World Climatic Atlas and that, therefore, a 30-year period, i.e. from 1961 to 1990, could be maintained as the basis for the marine section. It was pointed out in this respect that national atlases may not contain all elements which might be considered necessary by the Commission to insert in the marine section and that this project should therefore continue to have the attention of the Commission.

7.3 Sea-surface current data exchange for climatological purposes (Agenda item 7.3)

7.3.1 In considering a new plan for the international exchange of sea-surface current data obtained from ship's drift, with a view to their eventual inclusion in the marine section of the World Climatic Atlas, the Commission noted with appreciation the preparatory studies carried out by the Working Group on Marine Climatology. The guidelines for the observation and recording of sea-surface current data from ship's drift, prepared by the group, describe the nature of this type of data, their representativeness and accuracy, and contain instructions for their computation on board ship, as well as by computer. The group had, furthermore, developed a proposed exchange format for these observations, based on an 80-column punch card.

7.3.2 The Commission further noted, from an inquiry conducted by the Secretary-General, that, at present, only a few Members collect this type of observation on a regular basis from their voluntary observing ships. However, other Members have shown an interest in participating and have thus helped in increasing the data base needed for the preparation of an atlas at a later date. In view of the limited number of observations expected to become annually available, the Commission was of the opinion that it would be sufficient to designate only one international data-collecting centre.

7.3.3 The general principles of the exchange system were envisaged to be as follows: participating Members will receive sea-surface current log sheets in the same way as the meteorological log sheets. They will carry out an initial scrutiny of the observations and, if they so wish, compute the currents from the observations if this work was not already done on board ship. In the latter case, they should check the computations. Those Members who do not intend to compute the currents may leave this work to the international data-collecting centre. The format to be used for international exchanges has been so designed that it provides for this possibility. The data, placed either on punch card or on magnetic tape, are then sent to the international data-collecting centre, where they are stored after quality control and, as necessary, computation of currents. In order to ensure ready availability of the current data in conjunction with other meteorological or oceanographic data, as often requested by users, the Commission felt that the stored data should be copied at regular intervals to the World Data Centres. The role of the international data-collecting centre for sea-surface currents from ship's drift observations should be considered to lie mainly within the framework of the World Climatic Atlas and this centre will be required to advise the CMM with regard to the eventual preparation of climatological charts of sea currents or other material.

7.3.4 The Commission considered that, as these data exchanges are based on voluntary contributions by Members, the exchanges could gradually come into operation, once the international data-collecting centre is designated. It therefore requested the Secretary-General to draw up a plan along the lines indicated above which should be attached, together with the material prepared by the Working Group on Marine Climatology, to the invitations to Members to participate. The plan might usefully contain a description of the various uses which can be made of this type of data. It was furthermore decided that the Working Group on Marine Climatology should keep this plan under review. Recommendation 20 (CMM-VII) was adopted.

7.3.5 In this connexion, the Commission noted that studies were being carried out within the framework of IGOSS to investigate the need for and feasibility of real-time exchanges of sea-current data which also include measurements of sea currents by various methods. The Commission considered that the Working Group on Marine Climatology should be closely connected with these studies and suggested that a further occasion to discuss this matter between oceanographers and meteorologists might be arranged between WMO and IOC, in conjunction with the forthcoming meeting of the group scheduled in 1977.

7.4 International Maritime Meteorological Punch Card (IMMPC) (Agenda item 7.4)

7.4.1 The Commission considered a proposal of the Working Group for Marine Climatology that it would be useful to start developing a possible format for the IMMPC, excluding over-punches which are troublesome for FORTRAN programmers, and perhaps extending in magnetic tape version to more than 80 characters. The group had expressed the opinion that by the 1980s the punching of data onto 80-column punch-cards might be entirely superseded by direct keying of data to magnetic tape.

7.4.2 The Commission was generally of the opinion that the IMMPC should not undergo any major changes until direct keying of data to magnetic tape had become general practice in countries participating in the marine climatological summaries scheme. Slight changes are permissible if it can be shown that there is a strong necessity. The Commission, however, agreed with the working group's view that a study of possible major changes which might be required after 1980 should now start and the new Working Group on Marine Climatology was instructed to consider this question.

7.4.3 It was pointed out that it was absolutely necessary that Members strictly follow the punching procedures of the IMMPC as specified in Appendix F of the Technical Regulations. Deviations are difficult to accomodate in the computer programs for the preparation of the summaries.

7.5 Storage of marine data in WWW/GDPS centres (Agenda item 7.5)

With regard to the types of data to be included in the ultimate storage and retrieval systems of the WWW Global Data-processing System (GDPS), the Working Group on Marine Climatology had indicated that, for some categories of non-meteorological data which are exchanged in association with meteorological data via the Global Telecommunication System (GTS), separate international arrangements exist for their archival and retrieval, such as the system of International

Oceanographic Data Exchange. The Commission, therefore, considered that, as a general principle, it would be useful if such data, when exchanged via the GTS, could be stored at WWW data-processing centres over a period long enough to enable their use by scientists and others until the non-real time exchange is complete.

7.6 Future work programme in the field of marine climatology (Agenda item 7.6)

7.6.1 The Commission considered that the marine climatological summaries scheme continues to be one of the most important projects of the CMM. Adherence to the procedures set forth in Resolution 35 (Cg-IV) was considered a basic condition for the success and usefulness of the project and this should be reflected in clear terms in the planned Manual on the MMS. In this connexion, the Commission suggested that Members responsible provide information on their national procedures on quality-control methods to all participating Members wishing to receive it.

7.6.2 A second main project is the exchange of sea-surface current data based on ship's drift observations for climatological purposes. The Commission hoped that many Members will be in a position to participate in the data-exchange programme since a large amount of data is needed to construct meaningful sea-current charts.

7.6.3 While, until recently, most wave observations were visual estimates, a number of instruments are now operating which provide data in a non-real time mode and a few provide data in real-time. The Commission considered that many more of these measured wave data will become available in the near future and that the operational use of the data grows apace. The IOC Working Committee on International Oceanographic Data Exchange (IODE) and the Engineering Committee on Oceanographic Research (ECOR) have been active in making an inventory of these data. The Committee felt that the time had come to begin considering methods for archiving and exchanging measured wave data in both real and non-real time. It decided therefore that the Rapporteur on Guidance on the Application of Methods for Measuring Waves (see Resolution 4 (CMM-VII)) should also study this problem, in close co-operation with IOC, ECOR and the relevant CMM working groups.

7.6.4 The increasing demand for climatological data from coastal zones for industrial development and other applications should have the attention of the CMM and the Commission instructed the Working Group on Marine Climatology to develop suitable proposals and recommendations. Areas to be considered should include coastal upwelling areas and, on this point, attention was drawn to the need for improved exchanges of both meteorological and oceanographic data required for the "El Niño" investigations over the central and southern Pacific Ocean.

7.6.5 Lastly, the application to marine climatology of new methods of data acquisition, such as buoy and satellite systems, radar and various airborne sensors, should be kept under review.

7.6.6 In view of the above considerations, the Commission adopted a number of projects and priority tasks in marine climatology as given in Annex I to this report, and further decided to re-establish the Working Group on Marine Climatology with terms of reference as contained in Resolution 6 (CMM-VII).

8. SEA ICE (Agenda item 8)

8.1 The Commission noted with appreciation the report of the chairman of the Working Group on Sea Ice and, in particular, the efforts of the group to identify those activities of national sea-ice services which require international co-ordination and co-operation. In reviewing both research and operational needs for sea-ice data and products, the group had taken a new approach which enabled the Commission to identify a number of projects regarding sea ice which require priority attention of CMM.

8.2 The Commission agreed that there was a strong requirement for the development of uniform ice symbols, both for scientific and operational use. The most urgent need would be for the development of ice symbols for use on operational ice charts in order that ships plying between ports may understand pictorial ice charts received by radio-facsimile from different national centres. Such standard operational symbology may be developed most effectively by:

(a) Familiarization flights by experts of one nation in ice-reconnaissance aircraft of another nation. Nations involved in ice services are urged to facilitate such exchanges;

(b) Operational trials of various types of symbology conducted as an international experiment with the participation of several nations.

The Commission learned through the presentations at TECMAR that Canada has facilities to lead such an experiment based in an operational ice-reconnaissance aircraft. As the development of a standard symbology should receive high priority, the Commission was pleased to note that Canada has undertaken to investigate immediately whether an invitation can be provided to proceed with this experiment in March 1977.

8.3 Substantial advances have been made in recent years in ice-observing and forecasting practices and techniques, particularly with the introduction of remote sensing and numerical forecasting. In order that these techniques may be exchanged to mutual national advantage and to provide information on available ice services, the Commission agreed with the proposal that a loose-leaf publication be prepared containing information on operational sea-ice practices. In this connexion, the Commission was informed by the representative of IOC that some information on ice charts issued by a number of sea-ice services is available in the IOC Secretariat and it agreed that the Working Group on Sea Ice should review this information as soon as possible. Recommendation 21 (CMM-VII) was adopted.

8.4 In view of the requirements for broad-scale scientific studies such as climatic change and numerical modelling the Commission considered that historical sea-ice information available from national ice services would greatly assist researchers in their work as well as other users of sea-ice data. A draft outline for such a catalogue was prepared at the session and, in adopting Recommendation 22 (CMM-VII), the Commission instructed the new Working Group on Sea Ice to supervise the further preparation of the catalogue. In doing so it should make use of the MEDI Referral System.

8.5 From the information contained in the report of the Informal Planning Meeting on the Satellite Applications in Marine Activities including Oceanography (Geneva, 6-9 September 1976) and in the report of a WMO consultant, Mr. Walt Wittman, who in December 1975 visited several sea-ice services, and also from further information from Members, the Commission noted with interest the great potential for remote sensing of sea ice from aircraft and from satellites. It considered that an exchange of knowledge between sea-ice specialists on the one hand and specialists in remote sensing techniques on the other should enhance effective use of these new techniques. The Commission therefore agreed with the proposal of the working group for the convening of an international workshop on remote sensing of sea ice. It suggested that the Executive Committee Panel of Experts on Satellites should consider and support the organization of the workshop. Since the workshop is intended, amongst other things, to set a stage for the development of international procedures, as required, of data exchange and storage, the Commission attached great importance to having it organized at an early date. Therefore it felt that the Executive Committee should consider the inclusion of the necessary provisions in the 1978 budget. Recommendation 23 (CMM-VII) was adopted.

8.6 The Commission recognized that there were special regional requirements for sea-ice practices and procedures, e.g. in the Baltic. It considered, however, that local co-ordination between national sea-ice services should develop along lines compatible with the overall framework.

8.7 In view of the many aspects of sea-ice that need to be continuously reviewed and further developed, the Commission decided to re-establish the Working Group on Sea Ice. In establishing its future work programme on sea-ice services, the Commission placed emphasis on a number of well-defined tasks which should be completed before its next session. These tasks are contained in the general list of projects given in Annex I to this report. Its full programme of work was defined in the form of the terms of reference of the new Working Group on Sea Ice and this group was instructed to identify, in the course of its work, new priority activities for approval by the Commission towards the end of 1978. Resolution 7 (CMM-VII) was adopted.

9. TECHNICAL REGULATIONS (Agenda item 9)

9.1 Chapter C.1 of Technical Regulations, Volume I (Agenda item 9.1)

9.1.1 The Commission noted that Chapter C.1 of the Technical Regulations, Volume I, had recently been revised on the basis of Recommendation 21 (74-CMM). In view of this, it did not undertake an overall review of the Technical Regulations but confined itself to the points referred to it by Seventh Congress and other proposals made by Members to the seventh session of the Commission.

9.1.2 The points referred to the Commission by Seventh Congress (abridged report, general summary, paragraphs 2.4.6 to 2.4.8) were dealt with under agenda item 7.1.

9.1.3 The Commission was informed by many delegates that meteorological services to marine activities, consisting of varying types of services, both national and international, cannot be strictly called a single system. The Commission agreed with this view and accordingly decided that the word "System" should be deleted wherever it occurs in the Technical Regulations.

9.1.4 Taking into consideration the contents of the Guide to MMS, now to be published, and the layout of the proposed Manual on MMS - which will include details of marine meteorological services - the Commission decided that the notes appearing at the beginning of Chapter C.1, as well as under paragraphs [C.1] 2.1.1, [C.1] 2.1.2, [C.1] 2.1.5 and [C.1] 3.2.3 of the Chapter, should be deleted.

9.1.5 The Commission considered a proposal by New Zealand, with regard to paragraph 2.3.1 of Chapter C.1, to the effect that the term "tropical cyclone" should include tropical disturbances of all intensities. In this connexion, the Commission noted that a definition of tropical cyclones was contained in the International Meteorological Vocabulary (WMO No. 182), while the classification of tropical cyclones was left to the Regions concerned. Regional practices in this regard are shown in Section 13.1.7, Part A, Chapter I of Volume D, WMO Publication No. 9. It further noted that the question of a definition of tropical cyclones was also raised at the second session of the RA-I Tropical Cyclone Committee for the south-west Indian Ocean and, after careful consideration, the WMO Commission for Atmospheric Sciences has recently established an amended version of the definition, which now reads as follows:

> "Tropical cyclone: Cyclone of tropical origin of small diameter (some hundreds of kilometres) with minimum surface pressure usually well below 1000 mb, very violent winds, and torrential rain; sometimes accompanied by thunderstorms. It contains a central region, known as the the "eye" of the storm, with diameter of the order of some tens of kilometres, and with light winds and more or less lightly clouded sky."

In view of the above, the Commission decided that, as further explanation, a note should be added to paragraph 2.3.1 of Chapter C.1, making a cross-reference to WMO Publication No. 182 - International Meteorological Vocabulary. Recommendation 24 (CMM-VII) was adopted.

9.2 Draft Manual on Marine Meteorological Services (Agenda item 9.2)

9.2.1 The Commission noted that, while the Technical Regulations specify the standard and recommended procedures in very brief texts for obvious reasons, the Guide to MMS describes the practices, procedures and specifications which Members are invited to follow or implement in establishing or conducting their arrangements in compliance with the technical regulations and in otherwise developing the services in their respective countries. The Commission, therefore, strongly felt that there was a need for an intermediary publication, in the form of a Manual, as an annex to the Technical Regulations, to elaborate the technical regulations and explain in precise terms the international principles and the standard and recommended procedures and practices as well as the obligations involved. Further, it was decided that such a manual should include also the relevant details now contained in Volume D, WMO publication No. 9. It agreed that the purpose of a Manual on MMS should be:

(a) To facilitate co-operation in respect of the international co-ordination of marine meteorological services;

(b) To specify obligations of Members in the implementation of MMS;

(c) To ensure uniformity in the practices and procedures employed in achieving (a) and (b) above;

(d) To facilitate the development of adequate support from WWW to marine meteorological services.

9.2.2 In line with these considerations, the Commission agreed to the preparation of a Manual on MMS and approved, in principle, the layout for the Manual as given in Annex III to this report. Further, it decided that the future Working Group on MMS should take up the preparation of the Manual as a matter of priority. The Commission considered that, at the same time, the contents of Chapter C.1 of WMO Technical Regulations should be reviewed by the working group for corresponding simplification, as appropriate.

9.2.3 The Commission also agreed that the work in the preparation of the Manual on MMS should be co-ordinated, as appropriate, with IOC, particularly in view of the development of the IGOSS Data-processing and Services System (IDPSS) within the framework of the joint IOC/WMO Programme on IGOSS. The Commission felt that this would be in accordance with the IGOSS General Plan and Implementation Programme for 1977-1982 in which it has been emphasized that further development of IDPSS should be undertaken in close co-ordination with Marine Meteorological Services to ensure rational use of available resources and to avoid duplication of efforts.

10. GUIDES AND OTHER TECHNICAL PUBLICATIONS IN THE FIELD OF MARINE METEOROLOGY AND RELATED SUBJECTS (Agenda item 10)

10.1 The Commission examined the draft presented to the session on the Guide to Marine Meteorological Services and incorporated a few changes in the text. A strong plea was made by many delegates that guidance material was urgently needed by developing countries in the matter of developing or expanding their marine meteorological services and, to this effect, the Guide to MMS should be made available as soon as possible. The Commission agreed, therefore, that the Guide to MMS should be published in the present form, without any further delay, and any modifications needed to the text could be introduced as amendments at a later stage.

10.2 The Commission recalled the suggestion made at the last session to include in the Guide a chapter on prediction methods. It noted that, since then, separate publications have been issued on Wave Analysis and Forecasting and on Meteorological Aspects of Ice Accretion on Ships. The Commission felt that, as these developments have shown, guidance material on prediction methods and the various application problems involved tended to be generally of a nature that it could more suitably be prepared and issued as a separate report or publication. The Commission, therefore, decided that there was no need for additional material to be included in the Guide to MMS on prediction methods.

10.3 The Commission considered that, as regards Chapter 6 on marine instrumentation and observing practices, the material could be presented in two possible ways: the material now contained in Chapter XVII in the WMO Guide to Meteorological Instrument and Observing Practices can be shifted entirely to the Guide to MMS making appropriate cross-references to the CIMO Guide or as an alternative, the material in the CIMO Guide could be re-printed for distribution as a separate addition to the Guide to MMS. It further considered that the decision as to any suitable alternative should be made in consultation with the presidents of CMM and CIMO as well as IOC.

10.4 The Commission further considered that, in the light of details which will be included in the Manual, the contents of the first edition of the Guide to MMS should be reviewed by the working group for modifications, if any are needed.

10.5 Finally, the Commission felt that the various actions concerning publications in the field of marine meteorological services, such as immediate publication of the Guide to MMS, preparation of a Manual on MMS and consequent simplification of Chapter C.1 of WMO Technical Regulations and revision of Volume D, WMO No. 9, should be properly co-ordinated so as to ensure consistency in the material included in these publications and to avoid contradictions. Recommendation 25 (CMM-VII) was adopted.

10.6 The Commission was informed that the revision of WMO Technical Note No. 72 - Preparation and use of weather maps by mariners (1966) - had presented practical difficulties, as explained by the CMM rapporteur on the task. The text contained several references to obsolete codes and eliminating these references and enlarging the scope and content of the Note, as it was envisaged, would almost amount to the preparation of an entirely new publication. In the meantime, the Commission noted that a compendium of lecture notes in marine meteorology for Class III and Class IV personnel had been published by the same author (WMO No. 434). This compendium contains instructive material which largely covers the subject of the Technical Note. The Commission, therefore, agreed that the task of revision of the Technical Note need not be pursued and that, instead, a list of national publications intended as training aids for mariners should be compiled, including a brief description of the contents and information as to how copies can be obtained.

10.7 The Commission agreed to the suggestion by the Working Group on the MMSS that guidance material should be prepared on the following topics:

(a) Special forecast problems connected with marine off-shore activities;

(b) Forecasting of fog at sea.

The Commission requested the president of CMM to take appropriate action in the matter, in consultation with the Secretary-General of WMO.

11. TRAINING RELATING TO MARINE METEOROLOGY (Agenda item 11)

11.1 In reviewing the Organization's education and training activities related to marine meteorology, the Commission placed on record its appreciation to the Secretary-General for his efforts to increase activity in this field. It was noted however that much still remained to be done, particularly in the developing regions of the world and the conclusions of the Commission as outlined below reflect this need.

Training manuals and training aids

11.2 The Commission noted with satisfaction that the syllabi for the specialized training of meteorological personnel in marine meteorology were to be included in the revised edition of the WMO "Guidelines for the Education and Training of Meteorological Personnel". This revised edition was expected to be available early in 1977. In this connexion, the lack of training courses in marine meteorology, particularly in the developing countries, was pointed out. The Commission strongly urged that such training courses based on the syllabi in the "Guidelines" be organized at the Regional Meteorological Training Centres and, as appropriate, at the national level.

11.3 The Commission was also pleased to learn that information concerning courses in marine meteorology and oceanography would be included in the revised edition of the "Compendium of Meteorological Training Facilities" which will be issued shortly.

11.4 The Commission noted with satisfaction that a compendium of lecture notes for training Class III and Class IV personnel in the field of marine meteorology had been prepared and distributed by WMO. The text of the notes, which were prepared by Dr. H. O. Mertins, was warmly received by Members. In some countries, this publication has been used for the training of ships' officers. As regards Class I and Class II personnel in the field of marine meteorology, the Commission was informed that a second compendium containing lecture notes for these categories of personnel had been prepared and would be issued in the first half of 1977. Both of the compendia mentioned above are based on the relevant syllabi in the "Guidelines".

11.5 The Commission also agreed that the Guide to Marine Meteorological Services currently under preparation would be very valuable for training purposes. A suggestion was also made that a film on marine meteorology would be a most useful training aid.

Special courses

11.6 The Commission was informed that the special Unesco/WMO course on the Physics of the Oceans and the Atmosphere, held in Trieste from 9 September - 5 December 1975, had been extremely successful. Financed by UNDP and the Swedish International Development Authority, the course was attended by more than 90 participants, all graduates in physics, oceanography or meteorology. It was agreed that the possibility of organizing a similar course dealing with the various aspects of oceanic pollution should be investigated.

Training seminars

11.7 There was general agreement that seminars of the type held in Rome in 1974 concerning meteorological services to marine and coastal activitites would have a greater impact if held in the developing regions of the world. WMO was urged to support such seminars which could be tailored to meet the specific needs of the regions concerned. The Commission emphasized the need for the organization of such seminars in Africa and Latin America.

11.8 The session also noted that a seminar for training national meteorological instructors was scheduled to be held in Regional Association I (Africa) during 1977. The training needs in the field of marine meteorology would be one of the topics covered at this seminar.

Training surveys

11.9 It was agreed that special surveys to determine the need for training courses and personnel in meteorology, such as the one recently conducted in Africa, should be carried out in other WMO Regions.

11.10 The Commission noted some of the conclusions of the WMO expert mission to Asia and the South-west Pacific in so far as they related to training, and endorsed the recommendations formulated by the expert. In expressing the hope that these recommendations would be implemented, the Commission agreed, however, that some of them would be difficult to implement because of budgetary restrictions.

Fellowships

11.11 Noting that, since its last session, eight fellowships had been awarded by WMO for studies specifically related to marine meteorology, the Commission urged that maximum advantage should be taken of long- and short-term fellowships available through the WMO regular budget and VAP.

Co-operation with other organizations

11.12 The Commission was pleased to learn that WMO was actively co-operating with IOC in their Training Education and Mutual Assistance (TEMA) programmes through participation in sessions of the Inter-Secretariat Committee on Scientific Programmes Relating to Oceanography related to TEMA. The Commission felt that such contacts were essential and urged the Secretary-General to continue to promote this co-operation.

11.13 In like manner, the Commission wished to encourage the full participation of WMO in the education and training activities related to the United Nations Study of Coastal Area Development in the Gulf Area. Recommendations 26 (CMM-VII) and 27 (CMM-VII) were adopted.

12. JOINT IOC/WMO PROGRAMMES AND PROJECTS (Agenda item 12)

The Integrated Global Ocean Station System (IGOSS)

12.1 The Commission was informed that, despite the considerable efforts and resources so far mobilized, the implementation of IGOSS had not been as far advanced as had been hoped. Nevertheless, it noted with satisfaction that the IGOSS Observing System, particularly its core element the BATHY/TESAC Operational Programme, was making steady progress; the daily average number of BATHY and TESAC reports exchanged over the GTS is increasing; 40 reports in 1974, 45 in 1975 and 60 reports in 1976; the main source of reports has been voluntary observing ships, ocean weather stations, research vessels and, added to them lately, ocean data buoys. However, this number is still insufficient for the preparation of meaningful sub-surface analyses, except in very limited ocean areas for which oceanographic products are prepared using the data received from the BATHY/TESAC Operational Programme.

12.2 The Commission was informed that the IGOSS General Plan and Implementation Programme 1977-1982 emphasizes the closely co-ordinated development of IGOSS with WWW and Marine Meteorological Services and attempts to make maximum use of available facilities and services. In this connexion, the Commission noted that the future work programme of marine meteorological services included a project for the co-ordinated development of the IGOSS Data-processing and Services System (IDPSS) with marine meteorological services.

12.3 Again in connexion with the new IGOSS General Plan and Implementation Programme, the Commission was informed that the IGOSS Observing System includes the design of an IGOSS Basic Observational Network (IBON) aimed at synthesizing and integrating various observational facilities into a single system. Its immediate objective is to obtain as many as possible surface and sub-surface temperature data from the upper 500 m of the ocean on a regular basis, with time and space scales necessary to define the major features of the oceans of the world divided into some 60 water masses. In order that the IBON could be implemented to a reasonable degree, the Commission considered it essential to secure the wider participation of Members of WMO, particularly more active contributions from those Members having a large potential for providing bathythermal information. The Commission was also willing to continue its support to the BATHY/TESAC Operational Programme and adopted Recommendation 28 (CMM-VII).

12.4 The Commission further stressed the need to monitor the flow of BATHY/TESAC reports over the GTS. It therefore requested the CMM Rapporteur on Marine Telecommunications to assist in this matter in close co-operation with the CBS Working Group on the Global Telecommunication System and the WMO Secretariat. In this connexion, the Commission noted that the Extraordinary Session of CBS (Geneva, November 1976) had developed an overall monitoring programme for the WWW and with respect to BATHY/TESAC reports adopted Recommendation 20 (CBS-Ext.76). This recommendation requests the Secretary-General to develop in more detail the routeing arrangements for BATHY/TESAC data on the MTC and the GTS in general, with a view to ensuring the availability of these data at centres requiring them and, for this purpose, to carry out periodical monitoring of the flow of these reports.

12.5 The Commission was informed of the outcome of the second IOC/WMO Workshop on Marine Pollution (Petroleum) Monitoring (Monaco, 14-18 June 1976) at which the first results of the IGOSS Pilot Project on Marine Pollution (Petroleum) Monitoring had been evaluated. The Workshop recommended, inter alia, that:

(a) The period of the IGOSS Marine Pollution (Petroleum) Monitoring Pilot Project be extended for two more years (January 1977 - December 1978);

(b) Member States ensure as a matter of high priority that data collected within the IGOSS Marine Pollution (Petroleum) Monitoring Pilot Project be forwarded expeditiously to Responsible National Oceanographic Data Centres (RNODCs) in accordance with the Operational Plan for the Pilot Project and the IGOSS General Plan and Implementation Programme for 1977-1982 (IOC-WMO/IPLAN-III/3, Annex IV).

The Commission supported these recommendations and urged Members to continue their participation in the IGOSS Pilot Project and to submit available data to designated data centres as soon as possible.

12.6 The Commission was further informed that the twenty-eighth session of the Executive Committee approved a Programme for Monitoring Background Levels of Selected Pollutants in Open Ocean Waters, in the light of a recommendation adopted by the Joint UNEP/IOC-WMO IPLAN Meeting of Governmental Experts (Geneva, March 1976) and that the preparatory work for the implementation of this programme, including the preparatory inter-calibration phase, was being actively pursued. In this connexion, the Commission noted with appreciation the offer from the Netherlands to make its North Atlantic Ocean weather ship available for this programme.

Marine Environmental Data Information (MEDI) Referral System

12.7 The Commission heard with interest the information presented by the IOC representative regarding MEDI which is primarily intended to provide for operational and research purposes a referral service on sources of marine environmental data; it had been designed as a sectorial sub-system of the International Referral System (IRS) of the United Nations Environment Programme (UNEP). The MEDI system is an inter-agency programme and is operated by IOC which is the agency responsible for receiving input (registration of information sources), publishing a catalogue of MEDI sources, the development and operation of an automated storage/retrieval system, and responding to queries either directly or via UNEP/IRS.

12.8 The Commission was also informed that, in response to an invitation addressed by the IOC Assembly, the twenty-eighth session of the Executive Committee agreed in principle that WMO participate in the MEDI Referral System subject to further technical studies by CMM and CBS. The Commission believed that MEDI was a worthwhile undertaking and would constitute an efficient medium for the search and exchange of desired marine environmental data on a world-wide scale. It therefore endorsed the decision of the Executive Committee regarding WMO's participation in the MEDI Referral System and agreed that Members of WMO be encouraged to participate in this system by registering their marine environmental data holdings. It was

explained that, when the system becomes fully operational, agencies which registered their data holdings in the system would be expected to respond to requests for the provision or exchange of data within the limit of resources available and under mutually agreed conditions. Recommendation 29 (CMM-VII) was adopted.

Collaboration between the Commission for Marine Meteorology and the Intergovernmental Oceanographic Commission in marine data management

12.9 The IOC representative drew the Commission's attention to Resolution IX-1 of the Ninth Assembly of the IOC in which the Working Committee on International Oceanographic Data Exchange (IODE) was requested to consider, in consultation with the WMO CMM Working Group on Marine Climatology, ways and means for readily exchanging oceanographic and meteorological data between the countries participating in the "El Niño" programme. In view of this resolution, the Commission requested the Working Group on Marine Climatology to work in collaboration with the Working Committee on IODE to develop data-management arrangements to meet scientific requirements within the programme.

12.10 Recognizing also other activities of the IOC Working Committee on IODE on matters related to the development of inventory forms, data formats and procedures for the exchange of such data as waves and sea currents, the Commission felt that close collaboration should be continued between the CMM Working Group on Marine Climatology and the IOC Working Group Committee on IODE.

13. SCIENTIFIC LECTURES AND DISCUSSIONS (Agenda item 13)

13.1 The afternoon of Wednesday 8 December was devoted to scientific lectures and discussions under the chairmanship of the vice-president of CMM, Mr. M. Rebolledo. The following lectures were presented:

(1) Oceanography programme for FGGE.
By Morton J. Rubin (GARP Activities Office, WMO).

Following recommendations of the WMO/ICSU Joint Organizing Committee (JOC) for GARP, oceanographic programmes in support of the FGGE and GARP generally, are being developed by the Scientific Committee on Oceanic Research and the Intergovernmental Oceanographic Commission. Meetings of scientists who are developing such programmes were held most recently at the Joint Oceanographic Assembly (September 1976). A meeting under WMO and IOC auspices was held from 15-19 November to prepare preliminary plans for Tropical Wind Observing Ship Allocation and Ship Utilization in the southern hemisphere. The meeting pointed out that about 20 ships are still needed to participate in the Tropical Wind Sounding Ship activity in order to meet the requirement of 50 ships specified by the Joint Organizing Committee for GARP.

The Executive Committee of WMO and the JOC have stressed the importance of an oceanography programme for FGGE and of certain oceanographic data for FGGE purposes. This lecture provided details

concerning the selected oceanic and atmospheric parameters to be observed during the FGGE and the arrangements being made for their observation, collection and transmission.

The need for timely planning of arrangements for ship allocations, including research, expeditionary and merchant vessels, was emphasized.

(2) The collection and use of sea-surface currents observed from ships of the U.K. voluntary observing fleets. By D. J. Painting (United Kingdom).

Ocean current measurements have been collected and analysed in the U.K. over the past 100 years or so. The traditional methods of observation and their uses were described, leading to the present-day situation involving the use of computer methods of data processing and future prospects.

(3) A Satellite Summary (film: U.S.A.)
SMS-1 and SMS-2

These satellites have proved useful for marine as well as other meteorological observations. The film shows applications to the study and observation of hurricanes at various scales, fog and stratus, air pollution and thunderstorms, including tornadoes.

(4) An experiment at sea, relating wind speed to sea state. By Captain R. K. Alcock (United Kingdom).

Over a period of one year, H.M.S. Ark Royal carried out trials in many different areas of open ocean, examining the relationships between wind speed and sea state when the ship was always "into wind" and backed up their report with photographic evidence.

13.2 The lectures and film were greatly appreciated by those present. Each of the subjects has a strong bearing on the work of CMM and the Commission requested the Secretary-General to arrange for these lectures to be issued in suitable WMO publications.

14. NOMINATION OF MEMBERS OF WORKING GROUPS AND NOMINATION OF RAPPORTEURS (Agenda item 14)

14.1 Five working groups were established and two rapporteurs were appointed to carry out the technical work of the Commission in the period 1977-1980. These were:

The Advisory Working Group of CMM;

The Working Group on Marine Meteorological Services;

The Working Group on Marine Climatology;

The Working Group on Sea Ice;

The Group of Rapporteurs on Technical Problems;

Rapporteur on Study of Satellite Data Requirements for Marine Meteorological Services;

Rapporteur on Marine Telecommunications.

14.2 The membership of the working groups, the rapporteurs appointed and the terms of reference for each are contained in Resolutions 1 to 7 (CMM-VII).

15. REVIEW OF PREVIOUS RESOLUTIONS AND RECOMMENDATIONS OF THE COMMISSION AND OF RELEVANT EXECUTIVE COMMITTEE RESOLUTIONS (Agenda item 15)

The Commission examined resolutions and recommendations adopted at its previous sessions and still in force. It also examined those Executive Committee resolutions still in force relating to CMM activities. The decisions of the session are incorporated in Resolution 8 (CMM-VII) and Recommendation 30 (CMM-VII).

16. ELECTION OF OFFICERS (Agenda item 16)

The Commission elected Dr. K. P. Vasil'ev (U.S.S.R.) president of CMM and Mr. U. B. Lifiga (Tanzania) vice-president.

17. DATE AND PLACE OF THE EIGHTH SESSION (Agenda item 17)

In the absence of any formal invitation from Members represented at the session, the Commission decided that the date and place of its eighth session should be fixed later and requested its president to make the necessary arrangements, in consultation with the Secretary-General.

18. CLOSURE OF THE SESSION (Agenda item 18)

18.1 In his closing address, the president expressed his appreciation to the members of the Commission, the working groups and the WMO Secretariat with whose help he had been able to discharge his functions during the last four-year period and at the present session. He also thanked the conference staff who had contributed in no small measure to the success of the session. He concluded by wishing participants a safe journey home and the compliments of the season.

18.2 On behalf of the delegates, Mr. Moens thanked the president for his excellent guidance throughout the session and also the WMO Secretariat for all the support provided at the session.

The seventh session of CMM closed at 10.45 a.m. on 10 December 1976.

RESOLUTIONS ADOPTED BY THE SESSION

Res. 1 (CMM-VII) - ADVISORY WORKING GROUP OF CMM

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) Resolution 1 (CMM-VI),

(2) The report of the president of CMM,

CONSIDERING:

(1) The increased involvement of the Commission in marine meteorological support to operational and scientific programmes regarding the oceans,

(2) That there is a need for continued overall co-ordination of the work programme of the Commission and for advice on matters referred to it as the result of external developments,

DECIDES:

(1) To re-establish an Advisory Working Group of CMM with the following terms of reference:

(a) To advise the president of the Commission, as necessary, in his functions of expressing opinions or taking action on urgent or non-controversial matters;

(b) To assist the president in the co-ordination of activities of the working groups and rapporteurs of CMM;

(c) To assist the president in short- and long-term planning of the future work programme of the Commission and of its working groups;

(d) To advise the president on actions to be taken by the Commission in response to recommendations of the Executive Committee Panel of Experts on Meteorological Aspects of Ocean Affairs (MAOA), in particular with regard to those programmes of UN and IOC projects which are relevant to marine meteorology;

(2) That the Advisory Working Group will be composed of:

The president of CMM
The vice-president of CMM
The retiring president of CMM
The chairmen of all CMM working groups.

Res. 2 (CMM-VII) - WORKING GROUP ON MARINE METEOROLOGICAL SERVICES

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) Paragraph 3.3.1 of the general summary of the abridged report of EC-XXVIII,

(2) Final report of the second session of the CMM Working Group on the Marine Meteorological Services System,

CONSIDERING:

(1) That there have been increasing requests for marine meteorological information by a large variety of marine users,

(2) That it is necessary to keep under continuous review the marine meteorological services with reference to user requirements,

DECIDES:

(1) To re-establish the Working Group on Marine Meteorological Services with the following terms of reference:

(a) To keep under review the marine user requirements and to make recommendations on existing and future activities of marine meteorological services;

(b) To prepare guidelines for monitoring of marine meteorological services;

(c) To state basic requirements for meteorological support to marine activities;

(d) To keep under review the needs for guidance material and technical information on marine meteorological and related oceanographic services;

(e) To prepare a draft Manual on Marine Meteorological Services (MMS);

(f) To take action upon matters referred to the working group by the president of CMM;

(2) To give the working group the following composition:

(a) An expert designated by each regional association;

(b) Experts nominated by Members wishing to participate actively in the work of the group;

(3) To select, in accordance with Regulation 31 of the General Regulations, Mr. L. Håland (Norway) as chairman of the working group;

REQUESTS the Secretary-General to invite IOC, IMCO, ICS and FAO to participate in the work of the group.

NOTE: Experts named at the session are:

P. de la Cochetière (France)
L. Håland (Norway)
M. Hanzawa (Japan)
H. O. Mertins (Federal Republic of Germany)
W. D. Moens (Netherlands)
E. A. Moskaleva (U.S.S.R.)
G. Valdivia K. (Chile)
G. A. White (U.K.)

Res. 3 (CMM-VII) - RAPPORTEUR ON STUDY OF SATELLITE DATA REQUIREMENTS FOR MARINE METEOROLOGICAL SERVICES

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING the final report of the WMO Informal Planning Meeting on the Satellite Applications in Marine Activities including Oceanography (Geneva, September 1976),

CONSIDERING:

(1) That information obtained by satellites has already proved to be very effective in a number of applications in the field of marine meteorology,

(2) That there is urgent need to specify requirements for satellite data applications to marine meteorology in precise terms,

DECIDES:

(1) To appoint a Rapporteur on Study of Satellite Data Requirements for Marine Meteorological Services with the following tasks:

(a) To formulate specific requirements with regard to data observed by satellites, their resolutions in time and space, the ocean areas from where they are needed and the order of priorities;

(b) To work in close co-ordination with the rapporteur in IOC, engaged in a similar task with regard to oceanographic services;

(c) To submit his final report to the president of CMM within a period of one year after CMM-VII;

(2) To invite the U.S.A. to nominate an expert to serve as the Rapporteur on Study of Satellite Data Requirements for Marine Meteorological Services,

REQUESTS the president of CMM to arrange, as soon as the report is received, for necessary co-ordination with the EC Panel of Experts on Satellites.

Res. 4 (CMM-VII) - GROUP OF RAPPORTEURS ON TECHNICAL PROBLEMS

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING the report of the chairman of the Working Group on Technical Problems;

CONSIDERING that the relevant projects and tasks included in the work programme of the Commission can most suitably be carried out by specialists acting in the capacity of rapporteur;

DECIDES:

(1) To appoint a rapporteur on each of the following subjects:

Report No 5 (a) Automation of observational methods on board ship;

Report No 1 (b) Development of methods for measuring precipitation over the oceans;

(c) Guidance on the application of methods for measuring waves and methods for the exchange and archiving of measured wave data;

(d) Review of reference height for and averaging time of surface-wind measurements at sea;

(e) Intercalibration of surface-based and remote sensed data to be used in marine applications (except sea-surface temperature);

Report No 2 (f) Comparison of sea-surface temperature data observed by different methods, including remote sensing;

with the following general terms of reference:

To carry out the relevant tasks described in Annex I to the report of CMM-VII, taking into account the target dates for completion and the considerations of the Commission contained in paragraph 6.2 of the report of CMM-VII;

(2) To invite the following experts to serve as rapporteurs, respectively on items:

(a) An expert to be nominated by Japan;

(b) G. Olbrück (Federal Republic of Germany);

(c) An expert to be nominated by Norway;

(d) An expert to be nominated by the chairman;

(e) An expert to be nominated by the U.S.A.;

(f) F.S. Terziev (U.S.S.R.);

(3) To select, in accordance with Regulation 31 of the General Regulations, ~~Mr. J. Giraytys~~ (U.S.A.) as chairman of the group of rapporteurs.

Dr. Ledolph Baer (U.S.A.) 5/16'77 W/MA/CMM-VII)

Res. 5 (CMM-VII) - RAPPORTEUR ON MARINE TELECOMMUNICATIONS

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING the report of the president of CMM,

CONSIDERING the need for CMM to keep abreast of developments in marine telecommunications as related to ocean data collection and dissemination,

DECIDES:

(1) To appoint a Rapporteur on Marine Telecommunications with the following tasks:

(a) To act as focal point within CMM for marine telecommunication matters of direct interest to the Commission;

(b) To maintain close liaison with the CBS Working Group on the GTS on telecommunication matters of interest to both CMM and CBS;

(c) To assist in the monitoring activities, particularly on the flow of ships' weather reports and BATHY/TESAC reports;

(2) To invite the United Kingdom to nominate an expert to serve as Rapporteur on Marine Telecommunications.

Res. 6 (CMM-VII) - WORKING GROUP ON MARINE CLIMATOLOGY

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) Resolution 3 (CMM-VI),

(2) The report of the chairman of the Working Group on Marine Climatology,

CONSIDERING:

(1) That the projects and corresponding tasks of CMM for the period 1977-1980 in the field of marine climatology require study by a working group,

(2) That the Marine Climatological Summaries Scheme requires continued co-ordination between the responsible Members,

DECIDES:

(1) To re-establish a Working Group on Marine Climatology with the following terms of reference:

(a) To provide technical advice on the preparation of the marine climatological summaries and the marine section of the World Climatic Atlas;

(b) To keep under review the IMMPC format, content and exchange media;

(c) To keep under review material in WMO regulations, manuals and guides relevant to marine climatology;

(d) To follow closely national methods of automatic quality control and to identify and elaborate common procedures and, if possible, to prepare a proposal for recommended international practices in collaboration with the CBS Working Group on the Global Data-processing System;

(e) To continue the study on the representativeness of climatological data from selected ocean areas;

(f) To keep under review the plan for the climatological exchange and storage of ocean-surface current data derived from ship's set and drift and to prepare proposals for the preparation of ocean current climatic charts in the World Climatic Atlas;

(g) To develop recommendations for the preparation of climatological analyses of coastal zones, taking note of the increasing demand for this information for industrial development and other applications;

(h) To keep under review the application to marine climatology of new methods of data acquisition, such as buoy and satellite systems, radar and various airborne sensors;

(i) To take action on questions referred to the working group by the president of CMM;

(2) To give the working group the following composition:

(a) An expert designated by each Member responsible for the preparation of marine climatological summaries;

(b) An expert of any other Member wishing to participate actively in the work of the group;

(3) To select, in accordance with Regulation 31 of the General Regulations, Mr. E. W. K. Chu (Hong Kong) as chairman of the working group.

NOTE: Experts named at the session are:

E. W. K. Chu (Hong Kong)
D. W. Phillips (Canada)

Res. 7 (CMM-VII) - WORKING GROUP ON SEA ICE

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) Resolution 4 (CMM-VI) - Working Group on Sea Ice,

(2) The report of the chairman of the Working Group on Sea Ice to CMM-VII,

CONSIDERING:

(1) That there is a continuing need for a Working Group on Sea Ice to carry out relevant tasks and projects included in the work programme of the Commission,

(2) That this working group is to be considered as a nucleus of sea-ice experts within CMM which will draw upon other expertise as necessary,

DECIDES:

(1) To re-establish a working group on sea ice with the following terms of reference:

(a) To review and promote international co-operation in the acquisition, exchange, processing, storage and dissemination of sea-ice information, including:

(i) User requirements, both operational and scientific;

(ii) Sea-ice nomenclature;

(iii) Sea-ice codes;

(iv) Sea-ice chart symbology;

(v) Sea-ice observational and forecasting methods;

(vi) Special regional requirements;

(b) To keep under review developments in the remote sensing of sea ice with a view to:

(i) Facilitating international co-operation in connexion with other data analysis, dissemination, storage and retrieval systems;

(ii) Developing particular requirements for remote sensing of sea ice, including space and time resolution, accuracy and parameters to be observed for various specified purposes;

(c) To compile the information to be included in a WMO loose-leaf publication on operational sea-ice practices;

(d) To compile the information to be included in a WMO catalogue, listing historical sea data available on an international level;

(e) To identify specific projects and tasks in the field of sea ice for adoption by the Commission as part of its general work programme;

(2) To invite the following experts to serve on the working group:

M. Akagawa (Japan)
B. A. Krutskihk (U.S.S.R.)
W. E. Markham (Canada)
T. Thompson (Sweden)
An expert to be nominated by Argentina
An expert to be nominated by the U.S.A.,

(3) To select, in accordance with Regulation 31 of the General Regulations, Mr. W. E. Markham (Canada) as chairman of the working group.

Res. 8 (CMM-VII) - REVISION OF PREVIOUS RESOLUTIONS AND RECOMMENDATIONS OF THE COMMISSION FOR MARINE METEOROLOGY

THE COMMISSION FOR MARINE METEOROLOGY,

CONSIDERING that all resolutions adopted prior to its seventh session are now obsolete,

NOTING the action taken on the recommendations adopted prior to its seventh session,

DECIDES:

(1) To keep in force Recommendations 25 (CMM-V), 38 (71-CMM), 2 (CMM-VI), 6 (CMM-VI), 10 (CMM-VI), 12 (CMM-VI), 19 (CMM-VI) and 22 (75-CMM), the texts of which are incorporated in this report;

(2) Not to keep in force Resolutions 1 - 7 (CMM-VI);

(3) To note with satisfaction the action taken by the competent bodies on its Recommendations 4 (CMM-V), 37 (71-CMM), 1 (CMM-VI), 3 - 5 (CMM-VI), 7 - 9 (CMM-VI), 11 (CMM-VI), 13 - 18 (CMM-VI), 20 (CMM-VI), 21 (74-CMM), which are now redundant.

RECOMMENDATIONS ADOPTED BY THE SESSION

Rec. 1 (CMM-VII) - GRAPHICAL REPRESENTATION OF INFORMATION ON FACSIMILE CHARTS INTENDED FOR MARINE USE

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) WMO Technical Regulations, Volume I, paragraph /C.1/2.5,

(2) WMO Technical Regulations, Volume I, Appendix E,

(3) Abridged final report of CMM-VI, general summary, paragraph 6.4.3 and Annex I to the report,

(4) The report of the second session of the CMM Working Group on the Marine Meteorological Services System,

CONSIDERING that there is need for uniformity in the presentation, in radio-facsimile charts, of special information for marine users, such as sea-surface temperature and waves;

RECOMMENDS that methods such as those described in the annex to this recommendation be followed, on an experimental basis, for graphical representation of information on radio-facsimile charts;

REQUESTS the president of CMM to arrange for an evaluation of the results after about a period of one year of trials.

ANNEX

METHODS FOR GRAPHICAL REPRESENTATION OF INFORMATION ON SPECIAL MARINE FACSIMILE CHARTS

Sea-surface temperature:	Solid continuous isolines at intervals suitable to the geographical area and clearly labelled
Waves and swell:	Wave heights in solid lines, each metre from 2 to 6 m; every two metres after 6 m

Swell heights in broken lines, intervals as for waves

Wave and swell direction to be indicated by a suitable arrow

Other information: As described in WMO Technical Regulations, Volume I, Appendix E and in the Guide to the Global Data-processing System, Volume II - Preparation of Synoptic Charts and Diagrams (WMO No. 305)

Rec. 2 (CMM-VII) - CO-ORDINATION OF BROADCASTS OF METEOROLOGICAL AND NAVIGATIONAL WARNINGS

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) The plan for the Establishment of a World-wide Navigational Warning System, jointly developed by IMCO and IHO,

(2) The view expressed in the plan that it would be of great assistance to mariners if meteorological warnings relating to safety of navigation could be included in the same broadcasts as navigational warnings,

CONSIDERING:

(1) That co-ordination of broadcasts of meteorological and navigational warnings would enhance the safety and efficiency of marine operations, especially in areas of dense traffic,

(2) That, as the IMCO/IHO Plan is being implemented in individual areas, one by one, the desired co-ordination should correspondingly be achieved also on a regional basis for the same areas,

RECOMMENDS that the presidents of regional associations be requested to arrange, as a matter of high priority, for regional studies for the purpose of achieving maximum possible co-ordination of broadcasts of meteorological warnings of hazardous phenomena and navigational warnings in their Regions:

REQUESTS:

(1) The president of CMM to arrange for the necessary guidelines to be prepared in the matter,

(2) The Secretary-General to take necessary action with IMCO to obtain an official statement of requirements on the elements of meteorological information and their criteria, which would be needed for broadcasting by an amalgamated system.

Rec. 3 (CMM-VII) - VHF BROADCAST OF METEOROLOGICAL INFORMATION FOR COASTAL AREAS AND OFFSHORE WATERS

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING that very-high-frequency broadcasts of meteorological information have been introduced by some countries, with advantage,

CONSIDERING that VHF communications have proved to be reliable in meeting the needs of short-distance dissemination of meteorological information,

RECOMMENDS that Members be encouraged to study the possibility of providing, in the form of frequently-scheduled or a continuous VHF broadcast, meteorological information, including warnings, for shipping and other marine activities in coastal areas, offshore waters and in the vicinity of ports, preferably on standard designated frequencies,

REQUESTS the Secretary-General to study, in consultation with Members, ITU and IMCO, the possibility of obtaining standard designated VHF frequency bands for the dissemination of this information.

Rec. 4 (CMM-VII) - PORT METEOROLOGICAL SERVICES

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) That increased activities in ports in recent years often call for marine meteorological services on the spot and that, accordingly, a variety of services have been organized in major ports in several countries,

(2) That, in addition to the regular meteorological work, the ships are called upon with increasing frequency to participate in special scientific research programmes such as those organized under GARP,

(3) That the port meteorological officers are in an excellent position to explain such programmes and the requirements to the ships' officers by personal contact thus enlisting their voluntary co-operation and, at the same time, maintaining their goodwill,

CONSIDERING:

(1) That there are at present no international regulations for meteorological and associated oceanographic services to harbour marine activities,

(2) That the port meteorological services will need to be strengthened,

(3) That these services will be of particular importance with regard to the special observational periods of the First GARP Global Experiment,

(4) That regular exchange of experience between port meteorological officers of neighbouring countries greatly contribute to the effectiveness of services in the region,

RECOMMENDS:

(1) That port meteorological services should be established or extended to cover all ports frequented by a significant number of ships or where increased port activities call for such services;

(2) That Members pay particular attention to the establishment or extension of port meteorological services in support of ships operating in the tropics and the southern hemisphere and in support of the First GARP Global Experiment;

(3) That, in addition to usual services through port meteorological officers, consideration should be given to establishing marine forecasting services for major port locations;

(4) That Members consider the convening of regular meetings between port meteorological officers of neighbouring countries to facilitate mutual discussions of common problems and exchange of experience.

Rec. 5 (CMM-VII) - USE OF FACSIMILE BROADCASTS FOR MARINE ENVIRONMENTAL PURPOSES

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) Resolution 3 (Cg-VII),

(2) Regulation 4 (b) (ii), Chapter V of the International Convention for the Safety of Life at Sea, 1960, and the revision of that Convention concluded in 1974,

(3) The increasing number of ships equipped with radio facsimile receivers,

(4) The increased availability of marine environmental information from World, Regional and National Meteorological Centres,

CONSIDERING that further enhancement of meteorological support to marine operations, such as:

(i) Shipping;

(ii) Fisheries;

(iii) Coastal, offshore and harbour activities;

(iv) Recreational boating;

(v) Marine pollution clean-up operations;

(vi) Search and rescue operations;

calls for the formulation of clear requirements regarding facsimile broadcasts intended for different kinds of uses;

RECOMMENDS that an inquiry be conducted by the Secretary-General among Members of WMO, as well as IMCO, ICS, FAO and other international organizations, concerned with a view to ascertaining their requirements for meteorological and related oceanographic information in support of their marine activities, including such details as regards contents and area coverage, times of issuance, period of validity, form of presentation (graphical and alphanumeric) on facsimile charts, chart projection and scale, time and scale resolution of the elements presented;

REQUESTS the president of CMM to arrange, on the basis of the information received, for the necessary co-ordination of the requirements with the GDPS.

Rec. 6 (CMM-VII) - MONITORING OF MARINE METEOROLOGICAL SERVICES

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) The abridged final report of EC-XXVIII, general summary, paragraph 3.3.1,

(2) The report of the second session of the CMM Working Group on the Marine Meteorological Services System,

CONSIDERING:

(1) That marine meteorological services constitute an important contribution to the safety of life at sea and to the efficient and economic operation of marine and coastal activities,

(2) That regular monitoring of these services is required to maintain the highest possible standards,

RECOMMENDS:

(1) That Members, who have not already done so, undertake a monitoring function by obtaining from marine users opinions and reports on the efficiency and effectiveness of marine meteorological services provided to national and international interests;

(2) That Members take such remedial measures, as necessary, in case the reported deficiency is within their responsibility and, if the deficiency concerns the services provided by another Member, take such action, as necessary, directly with the Member concerned or, if necessary, through the Secretariat.

Rec. 7 (CMM-VII) - INCENTIVE PROGRAMMES FOR VOLUNTARY OBSERVING SHIPS

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) Recommendation 15 (CMM-VI) - WMO Incentive Programme for Voluntary Observing Ships,

(2) Abridged report of Seventh Congress, general summary, paragraph 3.3.2.3,

(3) Final report of the third session of the CMM Advisory Working Group,

CONSIDERING:

(1) That many Members have instituted a national incentive programme for voluntary observing ships recruited by them,

(2) That, although these programmes greatly vary according to national concepts and circumstances, they have in common that they express the appreciation of the national Meteorological Service for the highly valued contribution of ships' officers to meteorological data acquisition from the oceans and seas,

(3) That a study of the possible institution of a uniform system under WMO auspices has led to the view that national programmes, despite their diversity of nature, are more effective,

RECOMMENDS that Members, who have not yet done so, institute a national incentive programme for voluntary observing ships recruited by them, in the most effective way, according to national circumstances.

Rec. 8 (CMM-VII) - APPRECIATION TO VOLUNTARY OBSERVING SHIPS

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) Recommendation 15(CMM-VI) - WMO Incentive Programme for Voluntary Observing Ships,

(2) The results of the inquiry by the president of CMM on incentive programmes for voluntary observing ships,

(3) Final report of the third session of the CMM Advisory Working Group, Annex III,

CONSIDERING:

(1) That several Members are already issuing certificates of appreciation to voluntary observing ships recruited by them,

(2) That these certificates are found to serve a useful purpose,

RECOMMENDS:

(1) That Members be encouraged to issue national certificates to selected, supplementary and auxiliary ships recruited by them, or to the ships' personnel, as a sign of their participation in the WMO Voluntary Observing Ships' Scheme;

(2) That consideration be given by the organizers of research experiments such as the FGGE, for which a special effort is required by voluntary observing ships, to express their appreciation in a suitable form at the conclusion of the experiment, following the procedures contained in the annex to this recommendation.

ANNEX

APPRECIATION TO VOLUNTARY OBSERVING SHIPS
CONTRIBUTING TO RESEARCH EXPERIMENTS

Procedures

1. Appreciation, in a suitable form, is made to Selected, Supplementary and Auxiliary Ships which have specially contributed to meteorology and oceanography research experiments;

2. Appreciation is made in the appropriate official language of the United Nations, pertaining to the Member which has recruited the ship;

3. Appreciation is prepared by the appropriate international authority which has organized the research experiment.

Rec. 9 (CMM-VII) - MARINE METEOROLOGICAL OBSERVATIONS FROM OFF-SHORE WATERS AND AREAS OF HIGH TRAFFIC DENSITY

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) The report of the first session of the CMM Working Group on the Marine Meteorological Services System,

(2) The results of the inquiry, conducted by the president of CMM in December 1974, on the need for obtaining observations at least of important parameters from areas of high traffic density,

CONSIDERING:

(1) That voluntary observing ships often cease to make and/or transmit meteorological observations in the full SHIP or SHRED code forms when they are in coastal waters or areas of high traffic density,

(2) That the strongly increased maritime activities in coastal and off-shore areas require the provision of more detailed and more frequent information on atmospheric and ocean conditions in these areas,

FURTHER CONSIDERING that it is not necessary to introduce any new short international code for the purpose,

RECOMMENDS:

(1) That Members concerned be urged to encourage voluntary observing ships to endeavour to furnish radio weather messages particularly from those areas for which detailed and frequent forecasts and warnings are needed in support of shipping and other marine activities;

(2) That CBS be requested, when preparing a revised SHIP code, to develop suitable procedures which will permit ships' officers to report the basic information such as position of ship, time of observation, air pressure, wind speed and direction, visibility, sea temperature and sea state as an obligatory part when there is difficulty for ships'officers in making and transmitting observations in full code forms in the areas mentioned; there should also be provision for reporting the rest of the elements now contained in the present SHIP code, as drop-out groups when these elements present hazards to navigation.

Rec. 10 (CMM-VII) - REPORTING OF MARINE METEOROLOGICAL OBSERVATIONS FROM FIXED SEA STATIONS

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING that lighthouses, lightships, drilling sites, coastal stations and other marine platforms constitute an important source of marine information,

CONSIDERING that the existing "SYNOP" code does not contain provision for the reporting of important marine elements from the above-mentioned fixed sea stations,

RECOMMENDS that CBS be requested to develop coding procedures for inclusion in the "SYNOP" code, drop-out groups for reporting information such as sea-surface temperature, sea ice, ice accretion and waves.

Rec. 11 (CMM-VII) - EXPANDED USE OF RADIO-TELEPRINTER FACILITIES

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) The report of the WWW Informal Planning Meeting on the Improvement in Observational Data Coverage over the Oceans,

(2) The present developments in the provision of radioteleprinter facilities for ship-to-shore communication in the maritime frequency bands, including trials made by several telecommunication administrations using systems designed for unattended operation at the coast stations as well as aboard ships, such as the Swedish Maritex system (a HF radio telex system),

CONSIDERING that such developments offer the hope of a more efficient means of sending observations from ship to shore,

RECOMMENDS:

(1) That Members be encouraged to take full advantage of the development in the radio-teleprinter system, particularly the HF radio telex system, for the transmission of ships' weather reports to coastal radio stations,

(2) That a list of coastal radio stations available for the reception of ships' weather reports by teleprinter be published in Volume D as a matter of urgency,

(3) That Members keep the Secretariat informed of the names of coastal radio stations available for the reception of ships' weather reports in the RTT mode and their particulars, namely, the location, call signs, working transmission and reception frequencies as specified in paragraph 2.7.1, Part I, Volume I of the Manual on the Global Telecommunication System,

REQUESTS the Secretary-General to investigate, in consultation with ITU, the tariff settlement problems resulting from the transmission by radio-telex ships' weather reports direct to meteorological collecting centres.

Rec. 12 (CMM-VII) - IMPROVEMENTS TO FACILITIES FOR RECEIVING SHIPS'S WEATHER REPORTS

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) Resolution 6 (Cg-VII) - Improvement in observational data coverage over the oceans,

(2) The report of the WWW Informal Planning Meeting on the Improvement in Observational Data Coverage over the Oceans (Geneva, June 1976), in which the arrangements at coastal radio stations are again identified as a key factor in the availability of ship reports,

(3) Resolution Mar 2-18 of the World Maritime Administrative Radio Conference sponsored by the International Telecommunication Union, Geneva, 1974, in which the problems of coastal radio stations for the receipt of ship's weather reports are recognized and the potential for assistance to developing countries is identified,

CONSIDERING:

(1) The special importance of ship reports, especially over the southern hemisphere oceans, to the FGGE,

(2) The likelihood that automated or greatly improved ship-to-shore communications will not be available on a significant number of ships before the end of FGGE in 1979,

(3) The need to add new coastal radio stations in critical areas,

RECOMMENDS:

(1) That Members do everything possible to establish coastal radio stations in areas where this is necessary and to improve the effectiveness of existing stations, especially in the eastern South Pacific (the western coast of South America) and the south-eastern Atlantic Ocean, the southern Caribbean Sea and the western Indian Ocean;

(2) That the Members concerned ensure that coastal radio stations designated for the collection of ships' reports have the necessary means available to render a rapid and fully effective service;

(3) That all Members concerned should monitor the operational effectiveness of their coastal radio stations designated for marine environmental data collection and dissemination to ensure that these stations provide a satisfactory service,

REQUESTS the Secretary-General to bring the present recommendation to the attention of the Secretary-General of ITU.

Rec. 13 (CMM-VII) - VALUE OF LATE REPORTS

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) The report of the WWW Informal Planning Meeting on the Improvement in Observational Data Coverage over the Oceans,

(2) The provisions for the transmission of late reports from ships contained in the Manual on the GTS, Part I, Attachment I-1, paragraph 4.3,

CONSIDERING that ships' weather reports transmitted up to 12 hours late are very valuable for Meteorological Services, and in data-sparse ocean areas, reports up to 24 hours late are even more valuable,

RECOGNIZING the discouraging effect on ships' personnel if coastal radio stations are unable or reluctant to receive their observations,

RECOMMENDS:

(1) That Members bring to the attention of their voluntary observing ships' personnel the value of late reports for Meteorological Services and the consequent feedback for improved forecasts and warnings for shipping,

(2) That Members should approach their telecommunication administrations with a view to arranging for the reception of ships' weather reports up to 12 hours late and, in data-sparse ocean areas, up to 24 hours late.

Rec. 14 (CMM-VII) - AREA MARINE SPECIALISTS TO EXPEDITE AND IMPROVE THE COLLECTION AND DISSEMINATION OF OCEAN DATA

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) Resolution 6 (Cg-VII) - Improvement in observational data coverage over the oceans,

(2) The report of the WWW Informal Planning Meeting on "Improvements in Observational Data Coverage over the Oceans" (Geneva, June 1976), in which adequate ship-shore communication was identified as a key area where improvements are required to increase the availability of ship reports,

CONSIDERING:

(1) The importance of ships' weather reports from the vast ocean areas of the southern hemisphere,

(2) That a significant number of developing countries are in the southern hemisphere and thus are in a position to provide an important contribution to the collection of ship reports through coastal radio stations,

(3) That the technical expertise required to monitor the acquisition of ship reports through such coastal radio stations may be sometimes limited in the Meteorological Services of developing countries,

RECOMMENDS:

(1) That consideration be given to providing a roving area marine specialist who, when invited, could visit national Meteorological Services in developing countries and provide advice and assistance on:

(a) Means for improving the collection and dissemination of ocean data, including the arrangements for the reception of observations at coastal radio stations and their subsequent insertion into the GTS; and

(b) The provision of increased port meteorological services with a view to securing the co-operation of ships' officers for the efficient transmission of ships' weather reports to coastal radio stations;

(2) That consideration be given to asking appropriate Members to second the services of an expert who would act as an area marine specialist;

(3) That additional funding needed for such a marine specialist be considered from VAP.

Rec. 15 (CMM-VII) - SUPPLEMENTARY PROCEDURES FOR THE PREPARATION OF MARINE CLIMATOLOGICAL SUMMARIES

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) Resolution 35 (Cg-IV),

(2) Recommendation 36 (68-CMM),

(3) The report of the chairman of the Working Group on Marine Climatology to CMM-VII,

NOTING FURTHER with appreciation the accelerated publication by responsible Members of the annual marine climatological summaries for the years of the decade 1961-1970,

CONSIDERING:

(1) That there is a continued need for the publication of annual summaries of marine climatological data of high quality,

(2) That the high costs involved in the publication of annual summaries call for reduction of some tables without, however, altering the minimum requirements set forth in the annex to Resolution 35 (Cg-IV),

RECOMMENDS that the supplementary procedures for the publication of summaries of wave data, shown in the annex to this recommendation, be adopted for application to the data of 1971 and onwards.

ANNEX

SUPPLEMENTARY PROCEDURES FOR THE MARINE CLIMATOLOGICAL SUMMARY PROJECT

Supplement to the annex to Recommendation 36 (68-CMM)

1971 ——→

Paragraph 10 - Wave (Table 11)

10.6 In the annual summaries, instead of the seasonal Table 11, the following set of seasonal tables should be included: direction v. height; direction v. period, height v. period, the first-mentioned parameter being arranged along the vertical. Provision should be made for a line or column "undetermined" with respect to wave period and direction respectively.

2 ele 4 season

10.7 In the decadal summaries, the seasonal Table 11 should be included and, in addition, the set of tables described in paragraph 10.6 above, but on a monthly basis.

3 ele monthly

(1961 – 1970)

Rec. 16 (CMM-VII) - MARINE CLIMATOLOGICAL SUMMARIES FOR THE OCEAN AREA SOUTH OF LATITUDE 50° S

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) Resolution 35 (Cg-IV),

(2) That, as a result of recent developments, it has become necessary to make new international arrangements for marine climatological summaries and for data collection of the planned marine section of the World Climatic Atlas for the ocean area south of latitude 50° S, which had hitherto been the responsibility of South Africa,

CONSIDERING:

(1) That, with a view to ensuring continuation of the collection of marine climatological data from this ocean area, there is an urgent need for the implementation of the required new arrangements,

RECOMMENDS that the Federal Republic of Germany, the Netherlands and the United States of America be invited to expand their areas of responsibility southwards, to include respectively:

(a) For the Federal Republic of Germany - the ocean area south of latitude 50° S and from the meridian of 70° W, eastward to the meridian of 20° E;

(b) For the Netherlands - the ocean area south of latitude 50° S and from the meridian of 20° E eastward to the meridian of 170° W;

(c) For the United States of America - the ocean area south of latitude 50° S and from the meridian of 170° W eastward to the meridian of 70° W.

Rec. 17 (CMM-VII) - COLLECTION OF MARINE CLIMATOLOGICAL OBSERVATIONS FOR THE FIRST GARP GLOBAL EXPERIMENT

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING the FGGE Data Management Scheme established by the Executive Committee Inter-governmental Panel and in particular the components of the scheme relating to the mobile ship data collection;

RECOMMENDATION 17

CONSIDERING:

(1) That only a certain proportion of the potentially available mobile ship and oceanographic data can be collected by telecommunication means,

(2) That these data, especially for areas insufficiently covered by other meteorological observations (e.g. tropics and southern hemisphere), are of extreme importance for the Global Experiment,

(3) That the marine data can only be included in the FGGE data set if the time schedule established for the FGGE data collection can be followed,

(4) That, in view of existing procedures, there is a need for temporary special measures to accelerate the collection of observations from voluntary observing ships under the marine climatological summaries scheme, in order to meet this schedule,

RECOMMENDS that Members:

(a) Participate in the non-real-time marine data-collection scheme for the FGGE; and, for this purpose,

(b) Review the operation of their facilities, so that the marine data required for the FGGE receive the highest priority;

(c) Take the measures indicated in the annex* to this recommendation, so as to ensure that, in addition to the normal exchange procedures under the marine climatological summaries scheme, marine data reach the FGGE mobile ship data centre and the specialized oceanographic data centre according to the FGGE data-management time schedule;

REQUESTS the Secretary-General:

(1) To arrange for the urgent preparation of the detailed plan for the non-real-time marine data collection for the FGGE and the follow-up implementation;

(2) To arrange for the preparation of a short pamphlet intended for distribution to the port meteorological officers and ship captains and explaining the FGGE objectives, implementation plans, marine data-collection scheme with the emphasis on the importance of the FGGE for improving meteorological services, in general, and ship operation services, in particular. This pamphlet should be available in appropriate languages.

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* See Annex IV.

Rec. 18 (CMM-VII) - BEAUFORT SCALE OF WIND FORCE

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) Paragraphs 2.4.6 to 2.4.8 of the general summary of the abridged final report of Seventh Congress;

(2) Appendix H, Part I of Volume I of the WMO Technical Regulations;

CONSIDERING:

(1) The advantage of having one single scale for all purposes;

(2) That ongoing studies create sufficient doubt regarding the absolute nature of the Beaufort scale of wind force for scientific purposes to merit the necessary alterations in practices and records which would be involved if the scale were to be introduced for observational purposes on 1 January 1981;

(3) That the time has come to cease further discussion, bearing in mind the long debate on this subject,

RECOMMENDS:

(1) That Part I of Appendix H to the Technical Regulations be removed;

(2) That Part II of Appendix H to the Technical Regulations be used for all purposes;

(3) That Regulation /C.1./2.2.10 be amended to read:

"The conversion from Beaufort force of the wind into wind speed in metric units should be as given in Appendix H."

Rec. 19 (CMM-VII) - INCLUSION OF REGULATIONS REGARDING MARINE CLIMATOLOGICAL SERVICES IN CHAPTER C.1 OF THE TECHNICAL REGULATIONS

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) Chapter C.1 of Technical Regulations, Volume I,

(2) Resolution 35 (Cg-IV),

CONSIDERING that, in connexion with the preparation of a new Manual on Marine Meteorological Services, there is a need to include regulations regarding marine climatological services in Chapter C.1 of the Technical Regulations,

RECOMMENDS that the regulations proposed in the annex to this recommendation be included in Volume I, Chapter C.1 of the Technical Regulations.

ANNEX

INCLUSION OF REGULATIONS REGARDING MARINE CLIMATOLOGICAL SERVICES IN CHAPTER C.1 OF THE TECHNICAL REGULATIONS

New regulations, based on Resolution 35 (Cg-IV), proposed for insertion in Chapter C.1:

/C.1./5
Marine climatological summaries

/C.1./5.1
General

/C.1./5.1.1
Members operating fixed ship stations, selected, supplementary and auxiliary ship stations should ensure that all surface observations from these stations are punched or put on magnetic tape in accordance with the lay-out of the international maritime meteorological punch-card, sorted half-yearly and despatched to the Members having accepted the responsibility for the preparation and issue of marine climatological summaries.

/C.1./5.1.2
Members having accepted the responsibility for the preparation of marine climatological summaries annually for a number of selected representative areas in their area of responsibility shall make these summaries available in the internationally agreed formats.

Note: Procedures and practices are set out in Annex V (Manual on Marine Meteorological Services).

Rec. 20 (CMM-VII) - EXCHANGES FOR CLIMATOLOGICAL PURPOSES OF SEA-SURFACE CURRENT DATA OBTAINED FROM SHIP'S DRIFT

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) Resolution 3 (CMM-VI), operative paragraph (1) (f),

(2) The report of the chairman of the Working Group on Marine Climatology,

(3) The results of an inquiry amongst Members regarding their interest in international exchanges, for climatological purposes, of sea-surface current data obtained from ship's drift,

CONSIDERING:

(1) That the present knowledge of the general surface circulation of the oceans is almost entirely based on observations of ship's set and drift,

(2) That there is a need to increase the data base of this type of data with recent observations, with a view to an eventual preparation of climatic charts within the framework of the World Climatic Atlas,

(3) That sufficient interest has been shown by Members to participate in an international data-observing and exchange programme,

(4) That the limited number of observations, which are expected to become annually available, call for the designation of only one international data-collecting centre,

(5) That data, thus collected, should be made available to the World Data Centres at regular intervals to ensure their retrieval in association with other oceanographic and meteorological data,

RECOMMENDS:

(1) That Members be invited to contribute to the data base of sea-surface currents obtained from ship's drift observations, according to a plan of which the principles are contained in the annex* to this recommendation,

(2) That the United Kingdom be invited to assume the functions of the international data-collection centre, as indicated in the principles of the plan,

(3) That Members wishing to contribute start their participation in the plan at the earliest date possible,

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* See Annex V.

REQUESTS the Secretary-General:

(1) To issue to Members a complete plan of these data exchanges, based on the principles shown in the annex to this recommendation,

(2) To assist in the implementation of the plan.

Rec. 21 (CMM-VII) - WMO PUBLICATION ON OPERATIONAL SEA-ICE PRACTICES

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING the report of the chairman of the Working Group on Sea Ice to CMM-VII,

CONSIDERING:

(1) That a reference manual describing the current state of the art in the provision of sea-ice services is required to provide the basis for development of national services along common lines and to enable users fully to understand and use various national products (services include observational practices, nomenclature, codes, symbology and forecast methods);

(2) That the information compiled in such a publication will consitute the necessary background for the further development of international standards regarding sea-ice practices;

RECOMMENDS:

(1) That a WMO publication on operational sea-ice practices be prepared along the lines indicated in the annex to this recommendation;

(2) That available information be reviewed;

(3) That Members be invited to provide the required information for inclusion in this publication.

ANNEX

WMO PUBLICATION ON OPERATIONAL SEA-ICE PRACTICES

General layout of chapters of the publication:

1. Observational methods (includes also types of instruments, qualification of observers)

2. Networks of observations

3. Data-collection systems

4. Data-processing systems
5. Ice-forecasting models (numerical; statistical; subjective methods)
6. Products
7. Methods of dissemination of ice information
8. Consultative services
9. Training courses.

Rec. 22 (CMM-VII) - WMO CATALOGUE OF HISTORICAL SEA-ICE INFORMATION

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING the report of the chairman of the Working Group on Sea Ice to CMM-VII,

CONSIDERING:

(1) That there is a vast amount of historical sea-ice information available in the various national sea-ice services,

(2) That an inventory of this information will be of great use in broad-scale scientific studies, such as climatic change and numerical modelling,

RECOMMENDS that a Catalogue of Historical Sea-ice Information be prepared and published by WMO on the basis of information obtained from National Sea-ice Services, using the Marine Environmental Data Information (MEDI) Referral System, along the lines as indicated in the annex to this recommendation.

ANNEX

WMO CATALOGUE OF HISTORICAL SEA-ICE INFORMATION

General layout of the catalogue:

Main headings

Satellite data

Aircraft observed data

Ship observed data

Composite charts

Specifications to be included under each heading

Area coverage

Season

Frequency of coverage

Period (number of years of data)

Presentation (chart; digital; coded data; picture; etc.)

Media (tape, punched card, film, etc.)

Resolution

Spectral bands

Retrieval capacity

Costs

Rec. 23 (CMM-VII) - WMO WORKSHOP ON THE REMOTE SENSING OF SEA ICE

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) The report of the chairman of the Working Group on Sea Ice to CMM-VII,

(2) The information on remote sensing by satellite presented to CMM-VII,

CONSIDERING:

(1) That the remote sensing of ice, both by aircraft and satellite, is becoming an important method for acquisition of sea-ice data and that this method appears to hold great future potential,

(2) That an exchange of knowledge between sea-ice specialists, on the one hand, and specialists in remote sensing techniques, on the other, should enhance effective use and further development of these new techniques,

(3) That, in view of the rapid development of techniques, there is an urgent need for such exchanges of knowledge,

RECOMMENDS:

(1) That an international workshop on remote sensing of sea ice be organized by WMO;

(2) That the EC Panel of Experts on Satellites be invited to consider and support the organization of the proposed workshop;

(3) That the Executive Committee consider the inclusion of the necessary provisions in the 1978 budget of WMO.

Rec. 24 (CMM-VII) - AMENDMENTS TO CHAPTER C.1, VOLUME I, OF THE TECHNICAL REGULATIONS

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING Chapter C.1, Volume I, of WMO Technical Regulations,

CONSIDERING the need for changes in the Technical Regulations arising out of considerations at the seventh session of the Commission,

RECOMMENDS that amendments to Chapter C.1 of Technical Regulations, as contained in the annex to this recommendation, be adopted.

ANNEX

PROPOSED AMENDMENTS TO CHAPTER C.1, VOLUME I, OF THE TECHNICAL REGULATIONS

(a) Delete the word "System" wherever it occurs in Chapter C.1 of Volume I, WMO Technical Regulations;

(b) Delete the NOTES appearing in the beginning of Chapter C.1, as well as under paragraphs /C.1./2.1.1, /C.1./2.1.2, /C.1./2.1.5 and /C.1./ 3.2.3 of the Chapter;

(c) Add the following NOTE to paragraph /C.1./2.3.1 of Chapter C.1:

"NOTE: Definition of a tropical cyclone is contained in the International Meteorological Vocabulary (WMO No. 182) and classification of tropical cyclones is left to the Regions concerned."

Rec. 25 (CMM-VII) - CONSOLIDATED ACTION ON PUBLICATIONS IN THE FIELD OF MARINE METEOROLOGICAL SERVICES

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) Abridged final report of CMM-VI, general summary, paragraph 12.1,

(2) Final report of the third session of the Advisory Working Group of CMM,

(3) Final report of the second session of the CMM Working Group on the Marine Meteorological Services System,

CONSIDERING:

(1) That publication of guidance material in the field of marine meteorological services is urgently needed by developing countries,

(2) That there is a need for preparation of a Manual on MMS, as an annex to the Technical Regulations,

(3) That contents in the various publications in the field of marine meteorological services should be fully co-ordinated to ensure consistency in the material included in them,

RECOMMENDS:

(1) That the Guide to Marine Meteorological Services be published, in a loose-leaf form, as a matter of urgency, in the official languages of the Organization;

(2) That a Manual on Marine Meteorological Services be prepared and issued, as an annex to the WMO Technical Regulations, describing the principles, procedures and practices in international arrangements for marine meteorological services and the obligations involved in their implementation;

INVITES the president of CMM to take appropriate action for the preparation of the Manual on Marine Meteorological Services and the consequential simplification of Chapter C.1 of Volume I, WMO Technical Regulations, in time for adoption by Congress or the Executive Committee;

REQUESTS the Secretary-General:

(1) To revise Volume D, WMO Publication No. 9 TP. 4, taking into consideration the guidance given by CMM;

(2) To assist in the implementation of the recommendation.

Rec. 26 (CMM-VII) - TRAINING IN MARINE METEOROLOGY

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING Resolution 11 (EC-XXV),

CONSIDERING:

(1) The existing inadequacies in meteorological education as regards programmes for marine meteorology and oceanography,

(2) The need to encourage contacts between meteorologists specializing in services in support to marine activities and marine users,

RECOMMENDS:

(1) That Members ensure that courses in marine meteorology, including elements of physical oceanography, are given adequate importance in the meteorological training establishments within their territory;

(2) That Members with maritime interests make arrangements enabling meteorological personnel engaged in training and the provision of services in the marine field to familiarize themselves with the marine environment;

REQUESTS the Secretary-General to approach the appropriate bodies with a view to facilitating, by all possible means, participation by meteorologists in marine activities requiring meteorological services.

Rec. 27 (CMM-VII) - ASSISTANCE FOR TRAINING IN MARINE METEOROLOGY AND OCEANOGRAPHY IN THE DEVELOPING COUNTRIES

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) The decisions of Seventh Congress concerning the training of meteorological personnel,

(2) The arrangements made by the Organization following the work of the seventh session of the Executive Committee Panel of Experts on Meteorological Education and Training with regard to marine meteorological and physical oceanography,

(3) Resolution 11 (EC-XXV),

CONSIDERING:

(1) The need for maritime developing countries to have Meteorological Services responsible for contributing to marine safety and to the efficient exploitation of marine resources,

(2) The need expressed by these countries for qualified personnel in all categories in the field of marine meteorology,

(3) The possibilities of assistance offered by the United Nations Development Programme and the WMO Voluntary Assistance Programme,

RECOMMENDS that assistance under UNDP, VAP, bilateral or multilateral programmes in education and training in marine meteorology and oceanography should give priority attention to the following:

(a) Granting of scholarships for on-the-job training in countries having schools with adequate teaching in the field of marine meteorology and oceanography;

(b) Offering to countries, so requesting, the aid of experts to help in organizing and/or training of personnel;

(c) Providing courses and instruction manuals in marine meteorology and oceanography in the WMO official languages used by the nationals in the countries concerned;

(d) Allowing for participation in appropriate research campaigns undertaken within the framework of studies in marine meteorology and oceanography, preferably when the sea area investigated is situated in the neighbourhood of the country of the candidates.

Rec. 28 (CMM-VII) - SUPPORT TO THE BATHY/TESAC OPERATIONAL PROGRAMME

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) Recommendation 11 (CMM-VI) - Bathythermal observations on board voluntary observing ships,

(2) Resolution 18 (Cg-VII) - the Integrated Global Ocean Station System,

(3) Recommendation 1 (IPLAN-III) - Improved BATHY/TESAC data coverage and efficient data transmission over the GTS - approved by Resolution 4 (EC-XXVIII) - Report of the third session of the Joint IOC/WMO Planning Group for IGOSS,

(4) Resolution 5 (EC-XXVIII) and IOC Executive Council Resolution 9 (EC-VII) approving the IGOSS General Plan and Implementation Programme 1977-1982,

CONSIDERING:

(1) That the amount of BATHY/TESAC data presently available is insufficient for IGOSS product preparation,

(2) The increasing needs for improvement and expansion of the existing BATHY/TESAC data base,

(3) That a number of voluntary observing ships are already making bathythermal observations,

(4) That Port Meteorological Officers could play an active role in the recruitment of ships capable of making BATHY/TESAC observations,

RECOMMENDS:

(1) That Members be encouraged to increase the number of their appropriate voluntary observing ships participating in the BATHY/TESAC Operational Programme;

(2) That Members operating ocean data buoys arrange for the retransmission over the GTS of information obtained from these buoys in appropriate WMO code forms;

(3) That Members operating ocean weather stations continue to support the BATHY/TESAC Operational Programme by arranging for oceanographic observations to be made and for their transmission over the GTS;

(4) That Members associate their Port Meteorological Officers or other appropriate personnel closely with the BATHY/TESAC Operational Programme with a view to recruiting more ships making sub-surface observations;

REQUESTS the Secretary-General to assist Members in the implementation of this recommendation, particularly by advising them on ways and means for obtaining the assistance required to participate in the BATHY/TESAC Operational Programme.

Rec. 29 (CMM-VII) - MARINE ENVIRONMENTAL DATA INFORMATION (MEDI) REFERRAL SYSTEM

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) Resolution 1X-30 of the Ninth IOC Assembly inviting, amongst others, WMO to participate in the MEDI Referral System,

(2) Resolution 7 (EC-XXVIII) in which the Executive Committee agreed in principle that WMO participate in the MEDI Referral System subject to further technical studies by CMM and CBS,

CONSIDERING that the MEDI Referral System will constitute an efficient medium for research and exchange of desired marine environmental data on a world-wide scale,

RECOMMENDS that Members of WMO should participate in the MEDI Referral System by registering their marine data holdings with the IOC Secretariat;

REQUESTS the Secretary-General to follow the development of the MEDI and inform Members of WMO as appropriate.

Rec. 30 (CMM-VII) - REVISION OF RESOLUTIONS OF THE EXECUTIVE COMMITTEE BASED ON PREVIOUS RECOMMENDATIONS OF THE COMMISSION FOR MARINE METEOROLOGY

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING with satisfaction the action taken by the Executive Committee on the previous recommendations of the Commission for Marine Meteorology,

CONSIDERING that many of these recommendations have become redundant in the meantime,

RECOMMENDS:

(1) That Resolutions 19 (EC-III) and 11 (EC-XXV) be no longer considered necessary;

(2) That Resolutions 15 (EC-XVII), 15 (EC-XXI), 12 (EC-XXV) and 14 (EC-XXV) be maintained in force.

ANNEX I

Annex to paragraphs 5.4.3, 6.2.7, 7.6.6 and 8.7 of the general summary

PROJECTS AND CORRESPONDING TASKS OF CMM FOR THE PERIOD 1977-1980

Project	Execution	Task	Target date
1. Development of Marine Meteorological Services	Working Group on MMS with rapporteurs on specific tasks	(a) Development of guidelines for monitoring of marine meteorological services	1978 (session WG/MMS)
	By regional action, e.g. through regional planning and implementation meetings	(b) Co-ordination of marine meteorological services with other marine services, such as:	
	Advisory Working Group, as appropriate	(i) Navigational warnings (with IMCO and IHO)	Continuous
		(ii) Search and rescue operations (with IMCO)	Continuous
		(iii) IGOSS (with IOC)	Continuous
		(c) Assessment of user requirements for marine meteorological services	Continuous
		(d) Investigation of requirements for the coding and reporting of marine meteorological data	Information to be transmitted to relevant CBS WG sessions

ANNEX I (contd.)

Project	Execution	Task	Target date
1. (contd.)		(e) Evaluation of necessary support for WWW systems to MMS	Information to be transmitted to relevant CBS WG sessions
		(f) Co-ordination of implementation of MMS by Members and regional associations	Continuous
2. Manual on MMS	Working Group on MMS or rapporteurs with a specified task	(a) Preparation of draft texts of standard and recommended practices and procedures	1978 (CMM rec. for approval by Cg-VIII)
		(b) Revision of regulatory part of WMO Publ. 9.TP.4, Volume D	
3. Marine meteorological services in main ports	Working Group on MMS or rapporteurs with a specified task	(a) Review of requirements for services and development of international procedures	Continuous
		(b) Review of the manual for PMO activities	1978 (session WG/MMS)
		(c) Special arrangements for PMO activities in support of FGGE	1977

ANNEX I (contd.)

Project	Execution	Task	Target date
4. Guidance material on marine meteorological practices and services	Working Group on MMS	(a) Review of the Guide to MMS	1978 (session WG/MMS)
		(b) Preparation of new guidance material on marine meteorological services	1978 or 1979
5. Co-ordination between CMM and CBS	Relevant working groups	Close co-ordination with GOS, GTS and GDPS on matters of concern to CMM	Continuous
6. Co-ordination between MMS and IDPSS	Working Group on MMS	Co-ordinated development of IDPSS with MMS	Continuous
7. Automation of observational methods on board ship	Rapporteur of the group of rapporteurs on technical problems	(a) Review of relevant technological developments and their impact on the work and training of the marine observer	Continuous
		(b) Study of the impact on future marine data collection using advanced telecommunication means such as satellites	Continuous
		(c) Preparation of guidance material	Continuous

ANNEX I (contd.)

Project	Execution	Task	Target date
8. Marine observation and instrument practices	Group of rapporteurs on technical problems	(a) (See Project 7)	
		(b) Development of methods for measuring precipitation over the oceans	1978 (for possible implementation in a pilot project using dense concentrations of ships during FGGE)
		(c) Guidance on the application of methods for measuring waves and methods for the exchange and archiving of measured wave data	Continuous
		(d) Review of reference height for and averaging time of surface wind measurements at sea	1978
		(e) Intercalibration of surface-based and remote sensed data (except sea-surface temperature) to be used in marine applications	Continuous
		(f) Comparison of sea-surface temperature data observed by different methods, including remote sensing	1978

ANNEX I (contd.)

Project	Execution	Task	Target date
9. Exchange and storage of marine climatological data under Res. 35 (Cg-IV)	Working Group on Marine Climatology	(a) Review of publication and data exchange for marine climatological summaries and preparation of marine section of World Climatic Atlas	1977 (session W/G on Marine Climatology)
		(b) To keep under review the IMMPC format, content and exchange media	1977 (session W/G on Marine Climatology)
		(c) Quality control	Continuous
		(d) Study of representativeness of marine climatological data from selected areas	Continuous
		(e) Development of coastal zone climatology	Continuous
		(f) Investigate expansion of exchange procedures for data from all ocean areas among responsible Members	1977 (session W/G on Marine Climatology)
10. Exchange and storage of sea-surface current data from ship's set and drift for climatological purposes	Working Group on Marine Climatology	(a) Finalization of plan for implementation	1977
		(b) Study of representativeness of this type of sea-surface current data	1977

ANNEX I (contd.)

Project	Execution	Task	Target date
10. (contd.)		(c) Preparation of inventory of available sea-surface current data of all types, in co-operation with IOC	1977
11. Exchange and archiving of measured wave data	Rapporteur	Develop methods for exchange, in both real and non-real time, and archiving of measured wave data, in co-operation with IOC and ECOR and relevant CMM working groups	1978, first report
12. Sea Ice Services	Working Group on Sea Ice; consultant(s)	(a) Review of formats and procedures for exchange, storage and retrieval of historical sea-ice data, in co-operation with IOC and the CMM Working Group on Marine Climatology	Continuous
	"	(b) Development of a WMO catalogue of historical sea-ice information, taking full advantage of the MEDI system	Before CMM-VIII (1980)
	"	(c) Review and updating of the WMO Sea Ice Nomenclature	Continuous

ANNEX I (contd.)

Project	Execution	Task	Target date
12. (contd.)	"	(d) Review and development of ice data acquisition by visual and remote sensing methods and appropriate review and development of WMO sea-ice codes	Continuous
	Working Group on Sea Ice with project team 1977	(e) Preparation of WMO sea-ice symbology for operational and scientific purposes*	Continuous first set of operational symbols 1978
	Working Group on Sea Ice	(f) Specification of sea-ice user requirements*	Continuous First list at first meeting of WG on Sea Ice
	"	(g) Preparation of a WMO loose-leaf publication on operational sea-ice practices	Before CMM-VIII
	"	(h) Planning a workshop on remote sensing of sea ice, as a step towards utilization of the great potential of this technique, and follow-up action*	1978

* Priority tasks

ANNEX II

Annex to paragraph 6.1.1 of the general summary

PARAMETERS AND PHENOMENA INCLUDED IN REQUIREMENTS OF MARINE USER GROUPS FOR MARINE METEOROLOGICAL AND SUB-SURFACE INFORMATION

	Parameters and phenomena	Shipping		Fisheries		Coastal, offshore & harbour activities		Recreational boating		Marine pollution		Search & Rescue operations	
		Synop.	Climat.	Synop.	Climat.	Synop.	Climat.	Synop.	Climat.	Synop.	Climat.	Synop.	Climat.
1.	Surface winds	X	X	X	X	X	X	X	X	X	X	X	
2.	Sea and swell	X	X	X	X	X	X	X	X	X	X	X	
3.	Surface visibility	X	X	X	X	X	X	X		X		X	
4.	Ice accretion	X	X	X	X	X	X					X	
5.	Sea ice	X	X	X	X	X	X					X	
6.	Icebergs	X	X	X	X	X	X					X	
7.	Precipitation and cloud cover	X	X	X	X	X	X	X		X	X	X	
8.	Air temperature	X	X	X	X	X	X	X				X	
9.	Humidity	X	X	X	X	X	X						
10.	Sea surface temperature	X	X	X	X	X	X	X		X		X	
11.	Surface currents	X	X	X	X	X	X	X	X	X		X	
12.	Atmospheric pressure	X	X	X	X	X	X	X	X			X	
13.	Mixed layer depth			X	X	X	X						
14.	Water density	X		X		X							
15.	Tsunami	X		X		X		X					
16.	Water-level anomalies	X	X	X	X	X	X	X	X	X	X		
17.	Tidal current deviations	X	X	X		X		X		X	X	X	
18.	Harbour seiche	X	X	X	X	X		X					
19.	Bar conditions	X	X	X		X		X				X	
20.	Sand waves	X		X		X							
21.	Surf and breakers					X	X	X				X	
22.	Storm surge	X	X	X	X	X	X	X		X	X		
23.	Water discolouration			X						X		X	
24.	Sea subsurface temperature			X	X	X	X						
25.	Freak waves	X	X	X	X								

Note: The CMM Working Group on Sea Ice is also responsible for considering user requirements for sea ice data, both for operational and research purposes.

A N N E X III

Annex to paragraph 9.2.2 of the general summary

LAYOUT OF MANUAL ON MARINE METEOROLOGICAL SERVICES

PART I Principles, organization and functions of MMS

1. Principles;
2. Organization;
3. Functions.

PART II Services for the high seas

1. Organization;
2. Provision of weather and sea bulletins for the high seas;
3. Marine meteorological support to search and rescue operations;
4. Provision of information by means such as radio facsimile;
5. Provision of marine climatological information;
6. Provision of marine meteorological expertise.

PART III Services for coastal and offshore activities

1. Organization;
2. Principles;
3. Procedures - international, regional and national regarding:
   (a) Services for international shipping in harbour approaches and shipping convergence zones;
   (b) Services for coastal community activities;
   (c) Services for coastal protection, including coastal works;
   (d) Services for search and rescue (SAR) operations;
   (e) Services for special transport in coastal areas;
   (f) Services for fishing;

(g) Services for fixed or floating installations at sea;

(h) Services in support of pollution monitoring and clean-up operations;

(i) Services for recreational boating.

PART IV Services* available in ports

Principles and procedures regarding:

(a) Provision of forecasts and warnings of meteorological and associated oceanographic conditions presenting direct hazards to the safety of ships and cargo handling, to appropriate port authorities and to ships in ports and in harbour approaches;

(b) Provision of information such as actual weather - waves - currents - density of water - sea-surface temperature - anomalies of tidal predictions - ice conditions - ice accretion - seiches - tsunamis, to appropriate port authorities and to ships in ports and in harbour approaches;

(c) Provision of necessary documentation on (a) and (b) as well as oral briefing;

(d) Provision and/or checking of selected meteorological and oceanographic instruments and supply of necessary documentation;

(e) Provision for the retrieval of meteorological log-books, water samples and any other data obtained from ships and their dissemination to appropriate authorities;

(f) Maintaining stock of published national instructions for the use of international codes by marine observers, provided by countries concerned and supplying them to ships which need this information;

(g) Briefing of ships' personnel on observing practices and use of instruments mentioned in (d);

(h) Briefing of ships' personnel on transmission and reception of meteorological and/or oceanographic information;

(i) Monitoring of the effectiveness of the services provided and the voluntary observing programme by debriefing of personnel.

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* It is recognized that some of the services may be the responsibility of more than one national authority.

PART V International programme for guidance material and training related to MMS

NOTE: Provision of services relating to oceanographic and hydrographic information should be co-ordinated with the appropriate organizations such as the IOC, IHO, IMCO, Unesco, dealing with one or other aspect of these services.

A N N E X IV

Annex to Recommendation 17 (CMM-VII)

COLLECTION OF MARINE CLIMATOLOGICAL OBSERVATIONS FOR THE FIRST GARP GLOBAL EXPERIMENT

With regard to the collection of marine climatological observations special measures are recommended to accelerate the collection of data required for the First GARP Global Experiment.

According to the time schedule for the FGGE established by the Executive Committee, the FGGE data collection should begin in January 1978, that is, four months after the FGGE build-up year starts and should be fully implemented during the FGGE operational year. Within the operational year, the highest priority should be assigned to the two Special Observing Periods (SOP) - January-February 1979 (SOP-I) and May-June 1979 (SOP-II).

Measures

1. Shipmasters should be requested to deliver completed meteorological log-sheets containing observations not older than three weeks to the Port Meteorological Officer or ship agent at ports of call, for immediate posting by airmail, where necessary, to the national marine data-collecting centre.

2. Ship logbook data of this period should be given highest priority as regards their quality control and transfer to either punch card or magnetic tape, so as to ensure that they are available on these media within three months after observation time.

3. The punched cards or magnetic tapes should be forwarded to the special FGGE mobile ship data centre within four months after the observation time of the oldest observations contained therein.

Supplementary measures

4. Port meteorological officers should be encouraged to frequently check ships' meteorological instruments, the barometer in particular, including those of ships of other national registry, as far as possible.

ANNEX V

Annex to Recommendation 20 (CMM-VII)

EXCHANGES, FOR CLIMATOLOGICAL PURPOSES, OF SEA-SURFACE CURRENT DATA OBTAINED FROM SHIP'S DRIFT

Principles of the plan

1. Members wishing to contribute to the data base, should instruct their voluntary observing ships, willing to participate, to make sea-surface current observations in accordance with the attached guidelines (attachment 1).

2. On receipt of the completed log sheets, Members should undertake a first scrutiny of the entries and, where necessary, advise marine observers of possible improvements.

3. If the entries contain computed currents, the computations should be checked. If not, the currents are computed by Members wishing to do so.

4. The initial observations needed for the computation of currents are placed on punch cards or on magnetic tape, according to the format shown in attachment 2. Computed currents are also keyed. Members who do not intend to carry out the computations themselves, nor to check any computations made on board ship, should leave the appropriate columns blank.

5. The punched cards or magnetic tapes are sent once a year, in the month of January, to the designated international data collecting centre.

6. The functions of the designated international data collecting centre are as follows:

(a) To conduct a quality control of data received;

(b) To compute currents from observations, as necessary;

(c) To store the data in view of an eventual preparation of climatological charts or other material within the framework of the World Climatic Atlas. This particular function does not include any international obligations regarding the climatological processing of the data, as such obligations will be considered by CMM at a later date;

(d) To forward, at regular intervals, a copy of the stored data to the World Data Centres, according to arrangements agreed mutually;

(e) To make available any data requested by users, on the usual conditions of data-storage centres.

7. The plan and its operation should be kept under review by the CMM Working Group on Marine Climatology. Co-operation with the IOC Working Committee on International Oceanographic Data Exchange is required.

Attachments: 2

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ANNEX V, ATTACHMENT 1

GUIDELINES FOR THE OBSERVATION AND RECORDING OF SEA-CURRENT DATA ON BOARD SHIP

(Prepared by the CMM Working Group on Marine Climatology)

1. Introduction

The knowledge which we now possess regarding surface currents in the world seas is, for the most part, based on information from current observations taken on board ships.

The systematic collection of surface current information had already begun in the middle of the nineteenth century. The famous Lieutenant Matthew F. Maury, of the U.S. Navy, was one of the first who saw the importance of gathering wind and current data from ship logbooks. In 1845, he published the first of a series of "Wind and current charts".

For constructing current charts, as many observations as possible are required, covering many years. As the variability of local currents can be examined only on the basis of a large number of observations, and as the number needed has not been reached for any place at sea, there is still a great need of current observations, especially from areas less frequented by ships outside the major shipping lanes. More observations are also needed to establish, year to year, variations in currents, as some of these are of great significance for marine science, e.g., the El Niño. The only way of obtaining enough observations is by the co-operation of voluntary observers.

By making and reporting observations of currents experienced, the seaman not only gains practical knowledge himself, but benefits shipping generally ba adding to our statistical knowledge, so that up-to-date information can be published.

2. Methods of ocean-current observations and some definitions

The method of making current observations is to calculate the difference between the dead reckoning (DR) position of the ship after making due allowance for leeway, and the position by a reliable astronomical, land, radio, radar, electronic or satellite fix. The result is the set and drift over the ocean floor experienced by the ship during the interval since the previous reliable fix was obtained, and applies to a mean depth of about half the ship's draught.

The set of current is the direction in which it acts; that is the direction toward which it flows. So, the current set is from the DR position to the fix.

The drift of a current is the distance measured in nautical miles from the DR position to the fix.

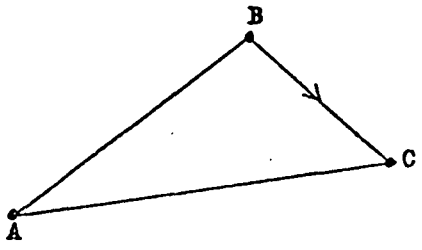
The leeway is the angular difference between the ship's course and the ship's direction of movement through the water (i.e., the direction shown by the wake). Leeway occurs when a ship is subjected by the wind to a pressure from abeam. The angle is rarely more than a few degrees, but there is a considerable loss of accuracy in the observation of current if a realistic allowance is not made for leeway.

The "FROM" position is the true position at the beginning of the stretch over which the current is calculated.

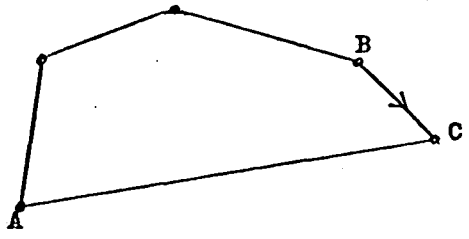
The "TO" position is the true position at the end of the stretch over which the current is calculated.

The dead reckoning (DR) position is the position of the ship determined by applying to the last well determined position (the "FROM" position), the run that has since been made, using only the true courses steered (corrected for leeway, if necessary) and the distance run, as determined by log or engine revolutions, without considering current. It is important that the true course is corrected for the influence of the wind, so that the difference betewen the DR position and the true fix is caused only by the current.

3. The calculation



A: Position "FROM"
B: "DR" position
C: Position "TO"
AB: True course steered, corrected for leeway and distance run
AC: Course and distance made good
BC: Current set and drift



When more courses are steered between A and B, the "DR" position B has to be calculated in steps

The calculation is done in two steps and is based on the following data:

First step - Calculation of the DR position

Data: (a) Position FROM;

(b) Course(s) steered, corrected for possible wind influence without considering current;

(c) The distance, calculated from speed and time, run along each of the course lines without considering current.

Second step - Calculation of the current

Data: (a) DR position;

(b) Position TO.

It is possible to do both calculations by computer. In this case, it is necessary that all three data for the first step and also the position TO are entered in the logbook by the observer.

The advantages of doing the calculation by computer are that the extra work involved for the observers on board is avoided and that errors in the calculation are practically eliminated. A disadvantage, however, is that errors in the basic data cannot be discovered, and this inevitably leads to incorrectable faulty results. On the other hand, the observer is in a position to check the basic data for possible mistakes; also, he can check if the data are reliable enough for current calculation.

Calculation by computer therefore means an increased responsibility of the observer for entering the basic data correctly and for their reliability. For this reason, it is advisable always to enter the data carefully, and then, to check them.

However, in many cases, the officer will wish to calculate the current for his own interest and use, and this is to be encouraged. When the current is calculated on board, it should be entered in the logbook, along with the data from which it was calculated.

4. The observation

The following notes are intended to give practical guidance on the ways in which the most useful observations of currents can be made. The usefulness of an observed current depends largely on its representativeness and its accuracy. Nevertheless, an observation which might normally be rejected as being unlikely to have the desired accuracy might still be of value if it came from an area of sparse shipping, i.e., one about whose currents little was known. The observation of currents is particularly desirable in such areas.

The representativeness and accuracy of current observations are now dealt with in more detail:

(a) Representativeness of observed currents

Ideally, each observation would represent a single current. In practice, though an observation is made over a distance over which there is likely to be some variation in current. An observation is not required if it is likely to incorporate currents from two different systems. In particular, it is desirable to interrupt an observation when passing a cape, a strait or a current rip, since these are likely to form boundaries between different current systems. Also, observations should not be made with the distance between FROM and TO positions, in excess of about 500 nautical or with the time interval between these positions in excess of about 24 hours. Observations should not be made where there are tidal influences, e.g., on coastal passages.

(b) Accuracy of fixes

The accuracy of current observations depends largely on the accuracy of the two fixes. In general, fixes accurate to within two nautical miles are required. Observations based on noon (sun) posisions, derived by running fix, usually have less than the desired accuracy; the accuracy of such fixes depends on a due appreciation of the currents experienced - the very element we are trying to determine. On the other hand, the fixes derived from observing two or more planets or stars at twilight, are likely to be very suitable for calculating currents. When suitable equipment is available, fixes by such accurate methods as satellite navigation or OMEGA give especially useful current observations;

(c) Course

The true course, corrected for compass error, must be used. An error in the DR position, due to an incorrect course, has a direct influence on the current calculation. Therefore, the course must be corrected for leeway, whenever necessary. Estimating the correction for wind is not simple and can only be made by experience. However, at a meteorological service receiving current observations, it is hardly possible to make such corrections, because they are so very dependent on the type of ship and on its draught. If estimation of the leeway is impossible, for example, because of stormy weather, no current observation should be made. When, for some reason, the ship is stopped, it is also better to make no current observation if the wind is more than Beaufort force 3;

(d) Speed

It is of great importance that the speed of the ship through the water is known as accurately as possible. An electronic type of log is especially useful. With other, more common, types of log, the speed cannot be determined so precisely, and a compromise between log distance and distance by engine revolutions, making due allowance for slip, possibly gives the best results. The slip depends on several factors (such as the draught, the loading conditions, sea and swell and the time elapsed since the ship was in dry dock), the effects of some of which are often hard to determine;

(e) Changes in course and speed between the FROM and TO positions

Between the FROM and TO positions, it is possible for the course to have been changed one or more times; also, it can happen that different corrections for leeway must be applied over a distance sailed with a constant course. In such circumstances, the distance is divided into parts, each with a constant course and speed through the water. If the current is not calculated on board, but later by computer for each part, each distance must be determined from speed and time noted in the logbook. More than three parts are not acceptable;

(f) Period between FROM and TO positions

The main considerations are that the period should be long enough for the current to have a measurable effect, yet short enough to make it unlikely that any large variation in current would have occurred over the distance covered. Thus, the desirable period depends on the accuracy of available navigational data. Exceptionally, with very accurate data, e.g., satellite fixes and speed through the water measured by electronic log, the current might justifiably be measured over a period as short as one or two hours. Also, when coasting, a period of a few hours between two shore fixes may be taken. Usually, however, a longer period is desirable and a period of about 12 hours between stellar fixes, determined at dusk and at dawn, for instance, would be very suitable. A period of about 24 hours is necessary when the only positions determined have been by running fix, e.g., noon (sun) positions, but such observations are barely acceptable. Observations from still longer periods are not acceptable. Since observations of current should be independent, periods of observation should not overlap.

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ANNEX V, ATTACHMENT 2

PROPOSED EXCHANGE FORMAT FOR OCEAN CURRENT DATA

(Prepared by the CMM Working Group on Marine Climatology)

Columns	Item	Code	Code definition	Remarks
1-2	Year	00-99	Last two figures of year	Of mid-position
3-4	Month	01-12	January-December	Of mid-position
5-15	Mid position			
5-6	Day	01-31	Day of month	
7	Octant	0-3,5-8	WMO code 3300	
8-11	Latitude	0000-9000	Degrees and minutes	
12-15	Longitude	0000-9959	Degrees and minutes	Without hundreds
16-21	Current			
16-18	Direction	000-360	Whole degrees, true	000 = no current
19-21	Rate	000-999	Tenths of knots	
22-37	Position from			
22-23	Day	01-31	Day of month	
24-27	Time	0000-2359	Hours and minutes (GMT)	
28	Octant	0-3,5-8	WMO code 3300	
29-32	Latitude	0000-9000	Degrees and minutes	
33-36	Longitude	0000-9959	Degrees and minutes	Without hundreds
37	Method of position fix	0-9		0 = unknown
38-55	Distance run through water			
38-43	First part			
38-40	Course, allowing for leeway	000-360	Whole degrees, true	000 = ship stopped
41-43	Distance	000-999	Whole nautical miles	
44-49	Second part			
44-46	Course, allowing for leeway	000-360	Whole degrees, true	000 = ship stopped
47-49	Distance	000-999	Whole nautical miles	
50-55	Third part			
50-52	Course, allowing for leeway	000-360	Whole degrees, true	000 = ship stopped

Columns	Item	Code	Code definition	Remarks
53-55	Distance	000-999	Whole nautical miles	
56-71	Position to			
56-57	Day	01-31	Day of month	
58-61	Time	0000-2359	Hours and minutes (GMT)	
62	Octant	0-3,5-8	WMO code 3300	
63-66	Latitude	0000-9000	Degrees and minutes	
67-70	Longitude	0000-9959	Degrees and minutes	Without hundreds
71	Method of position fix.	0-9		0 = unknown
72	Ships' draught	0-9		
73-74	Country	00-99	Country which recruited the ship	As for IMMPC
75	Indicator	0,1,2		Concerning columns 76-80
76-80	Ship number			Or call sign, or logbook number

RECOMMENDATIONS OF THE COMMISSION FOR MARINE METEOROLOGY ADOPTED PRIOR TO ITS SEVENTH SESSION AND MAINTAINED IN FORCE

Rec. 25 (CMM-V) - COLLECTION OF UPPER-AIR REPORTS FROM MOBILE SHIPS

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING:

(1) The World Weather Watch plan,

(2) Recommendation 46 (CSM-IV), and

(3) The experience acquired in collecting and distributing upper-air reports from mobile ships,

CONSIDERING:

(1) That there is a need for all upper-air reports from mobile ships to be collected at coastal radio stations with a minimum time delay and promptly distributed to all Members requiring these data,

(2) That co-ordination and monitoring of the collection and distribution of upper-air messages is needed for the programme in order to identify quickly any shortcomings of the system,

RECOMMENDS:

(1) That, when a Member establishes an upper-air programme on board a mobile ship, the Member should send the following information, as appropriate, to the Secretary-General:

(a) Name and call sign of the ship;

(b) Information on the route(s) or area(s) in which the ship will make upper-air observations;

(c) Name(s) of the coast radio station(s) suggested for clearing the reports, if applicable;

(d) Expected dates of departure and arrival at various harbours;

(e) Scheduled observation programme of the ship (surface and upper-air observations, etc.);

(f) Information on any special radio transmission facilities used for weather messages aboard ship;

(2) That the above information should be included in the METNO messages issued by the Secretary-General to ensure that Members are informed of all details;

(3) That Members with coastal radio stations accepting ships' weather reports should inform the Secretary-General which of them are best suited for the collection of upper-air reports from mobile ships;

(4) That Members having designated a coastal radio station for this purpose should ensure that all upper-air reports from mobile ships, including "delayed" reports up to 24 hours old, received at stations are speedily transmitted to the National Meteorological Centre and from there to the appropriate Regional Telecommunications Hub;

REQUESTS:

(1) CMS and regional associations to arrange for rapid regional and global distribution of upper-air reports from mobile ships;

(2) The Secretary-General to assist in the implementation of this recommendation to the fullest extent.

Rec. 38 (71-CMM) - UPPER-AIR OBSERVATIONS ON BOARD MOBILE SHIPS

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) The World Weather Watch plan,

(2) Recommendation 2 (CMM/WGOMT-I),

CONSIDERING:

(1) That it is of utmost importance to increase the number of upper-air observations from ocean areas,

(2) That there is a particular need for more upper-wind observations in the tropics,

(3) That in many cases there are serious financial difficulties which prevent the establishment of upper-air observing stations at sea,

RECOMMENDS that Members be encouraged:

(1) To develop techniques for upper-wind finding from ocean areas, particularly from mobile ships;

(2) To consider the implementation of upper-wind programmes in ships plying in the tropics where wind data are especially useful;

(3) To consider making requests to WMO for assistance under the VAP which, if granted, would result in an increase in the number of upper-air observations over the oceans.

Rec. 2 (CMM-VI) - SATELLITE DATA-COLLECTION SYSTEM

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING that the Members concerned are at present studying the feasibility of setting up a "Satellite Data-collection System" taking into account the requirements of the WWW and GARP,

CONSIDERING that such a system would also be most useful for marine meteorology in its various applications, in view of the numerous shortcomings of the present collection system using coastal radio stations,

WELCOMES very strongly the proposed establishment of a "Satellite Data-collection System";

RECOMMENDS that, in this context, studies should take into consideration the following desirable features:

(1) Co-ordinated geostationary systems with the capability for collecting observational data from fixed and mobile stations including ocean platforms;

(2) Technical compatibility between the different meteorological satellite systems in so far as telecommunications are concerned, including development of a terminal telecommunication package (modulator and accessories, discriminator/decoder, radio transmitter and receiver and antennae) for installation aboard ships, on marine automatic weather stations and on remote islands;

(3) Operational organization (call signs, schedules, system access methods, codes, transmission control, network administration, efficiency checks);

(4) Study of costs and outline of a possible co-operative programme for installation of such terminal telecommunication packages on board ships.

Rec. 6 (CMM-VI) - MODIFIED PROCEDURES FOR THE PREPARATION OF MARINE CLIMATOLOGICAL SUMMARIES FOR ARCTIC AND ANTARCTIC REGIONS

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) Resolution 35 (Cg-IV),

(2) The report of the first session of the Polar Panel of the CMM Working Group on Marine Climatology,

CONSIDERING that the scarcity of marine meteorological observations in polar regions* and the climatic requirements of these regions necessitate, in certain respects, special procedures for the preparation of meaningful Marine Climatological Summaries,

RECOMMENDS that the modified procedures as shown in the annex to this recommendation be adopted for the preparation of Marine Climatological Summaries for Arctic and Antarctic regions.

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* NOTE: For the purpose of this recommendation, polar regions are defined as the regions north of 60°N and south of 50°S.

Annex to Recommendation 6 (CMM-VI)

DATA TO BE INCLUDED IN MARINE CLIMATOLOGICAL SUMMARIES FOR SELECTED AREAS IN POLAR REGIONS

1. Dry-bulb temperature

(a) Monthly means;

(b) Frequency table in 3°C steps based on the intervals 0.0 to 2.9°C (positive values), -0.1 to -3.0°C (negative values), or where and when necessary in 1°C steps based on the intervals 0.0 to 0.9°C (positive values), -0.1 to -1.0°C (negative values);

(c) Extreme values should be included when 3°C steps are used under (b);

(d) Standard deviations, if the number of observations is sufficiently large;

(e) Monthly number of observations.

2. Sea temperature

(a) Monthly means;

(b) Frequency table in 1°C steps based on the intervals 0.0 to 0.9°C (positive values), -0.1 to -1.0°C (negative values), e.g. 9.0 to 9.9°C, -1.1 to -2.0°C;

(c) Monthly number of observations.

3. Air-sea temperature difference

(a) Monthly means;

(b) Frequency table in 1°C steps based on the intervals 0.0 to 0.9°C (positive values), -0.1 to -1.0°C (negative values), e.g. 9.0 to 9.9°C, -1.1 to -2.0°C;

(c) Monthly number of observations.

4. Visibility

(a) Number of observations for each month for each code figure 90-99 (WMO Code No. 4377);

(b) Monthly number of observations.

5. Weather

(a) Monthly number of occasions with rain or drizzle at the time of observation (ww = 50-67, 80-82 (WMO Code No. 4677));

(b) Monthly number of occasions with snow or snow and rain at the time of observation (ww = 68-79, 83-86);

(c) Monthly number of occasions with hail at the time of observation (ww = 87-90);

(d) Monthly number of occasions with current or recent thunderstorms with or without precipitation at the time of observation (ww = 17, 91-99);

(e) Monthly number of observations with:

(i) Gales (Beaufort force 8 or more);

(ii) Storms (Beaufort force 10 or more);

(iii) Hurricane force winds (Beaufort force 12);

at the time of observation;

(f) Monthly number of occasions of precipitation at the time of observation (ww = 50-97, 99);

(g) Monthly number of occasions of visibility less than 1 km;

(h) Monthly number of observations.

6. Wind direction and force

(a) Monthly number of observations for each month for each Beaufort number 0, 1, 2, etc., and for direction by sectors of 30 degrees, true north bisecting the first sector;

(b) Monthly total of observations for each sector irrespective of wind force;

(c) Monthly number of observations for each Beaufort number irrespective of direction;

(d) Monthly number of observations.

7. Pressure

(a) Monthly means and extremes for all hours of observation;

(b) Frequency table in:

4 mb steps, based on the intervals
0.0 to 3.9 mb, e.g. 996.0 to 999.9 mb;

(c) Standard deviations, if the number of observations is sufficiently large;

(d) Monthly number of observations.

8. Cloud

(a) Monthly mean of total cloud amount;

(b) Monthly mean amount for low cloud only (defined as cloud for which h is any code figure from 0 to 8 inclusive (WMO Code No. 1600));

(c) Monthly number of observations in the following ranges of total cloud amount:

(i) 2 oktas or less;

(ii) 3 to 5 oktas inclusive;

(iii) 6 or 7 oktas;

(iv) 8 oktas;

(d) Monthly number of observations.

9. Waves

List of original observations or, where number of observations is sufficient, seasonal tables may be prepared as indicated in paragraph 4.10 of the annex to Recommendation 36 (68-CMM).

10. Period of summaries

Monthly summaries for polar regions shall be prepared for individual years where 40 or more observations per individual month are usually available, at least for the summer months. Otherwise they shall be prepared only for the ten-year periods 1961-70, 1971-80, 1981-90. Usually observations will be available only for the summer months but if in a particular selected area summaries can be prepared for each month of the year then annual summaries should also be included as in the case of non-polar regions.

11. Minimum number of observations

For the preparation of monthly summaries for individual years the same criteria are applicable as indicated in Recommendation 36 (68-CMM).

For the ten-year summaries the following criteria apply:

(a) When 40 or more observations are available from the ten months of the same name the data shall be summarized;

(b) When less than 40 observations are available over the ten months concerned the data shall be examined for time distribution:

(i) If the data represent observations taken on ten or more different days of the month they shall be summarized;

(ii) If the data represent observations taken on less than ten different days of the month, they shall be listed;

(c) When the data are summarized, a cautionary note should be included in an appropriate place in the summary if the distribution of observations over the ten years is very irregular.

12. Maximum size of selected area

The recommended maximum size of a selected area is 20 one-degree squares in latitudes 50° to 60°, 30 one-degree squares in latitudes 60° to 70° and 50 one-degree squares in latitudes greater than 70°.

13. Changes in selected areas

Once selected, the areas shall remain fixed in their size, shape and position to cover as many ten-year periods as possible. If a change is unavoidable however, e.g. due to insufficient data, the substituted area shall not overlap the one originally chosen and the data for the original area shall be listed in order to preserve continuity between ten-year periods.

* * *

Rec. 10 (CMM-VI) - MEASUREMENT OF OCEAN WAVES

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) The report of the Rapporteur on Observation, Measurement and Forecasting of Waves,

(2) Recommendation 13 (CMM-V) - Increased reporting of wave observations,

CONSIDERING:

(1) That the many uses of ocean wave observations could be made more effective by an improvement of the accuracy of wave height observations,

(2) That a wave recorder gives a more reliable observation of resultant wave height than a visual observation,

(3) That the wave recorders which are now being developed might be used on board stationary and research ships,

RECOMMENDS:

(1) That Members be encouraged to continue their efforts in developing reliable wave recording instruments for use on board ships;

(2) That Members be encouraged to equip ocean weather ships and research vessels with wave recorders to assist ships' officers in making ocean wave reports.

Rec. 12 (CMM-VI) - INTENSIFIED OBSERVATIONAL PROGRAMMES IN RELATION TO CO-OPERATIVE SCIENTIFIC INVESTIGATIONS

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) That scientific programmes such as the GARP Atlantic Tropical Experiment (GATE) and the First GARP Global Experiment (FGGE) etc. are scheduled to take place in 1974 and subsequent years,

(2) That IOC and other international organizations also co-ordinate co-operative scientific investigations of the oceans,

CONSIDERING that the success of some of these scientific programmes could be enhanced, to a great extent, through observations received from Voluntary Observing Ships,

RECOMMENDS:

(1) That, when invited by the Secretary-General of WMO, Members should make efforts to intensify their observing programmes on voluntary ships within the framework and co-ordination processes of CMM, for given periods and areas relative to the specific investigation programmes;

(2) That the invitation of the Secretary-General of WMO to intensify such programmes on Voluntary Observing Ships be issued to Members in ample time to enable them to take appropriate action.

Rec. 19 (CMM-VI) - SUPPORT TO MARITIME DEVELOPING COUNTRIES

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) Recommendation 5 (CMM-V) - Maritime meteorology and developing nations,

(2) The endorsement of Recommendation 5 (CMM-V) by Sixth Congress, which requested the Secretary-General to take the necessary steps to arrange for assistance to developing countries through advising, inter alia, on ways and means of developing adequate marine meteorological services,

(3) That follow-up action on this Congress decision has already yielded useful results,

CONSIDERING:

(1) That the rapid increase in demands for marine meteorological services

resulting from fast-growing ocean activities warrants very active follow-up action on the above decision of Sixth Congress,

(2) That experience has shown that two different types of surveys may be needed, namely short-term exploratory and preparatory surveys and long-term advisory missions,

(3) That the long-term advisory missions should only be organized when the country concerned has a minimum of suitable facilities in operation and staff prepared to specialize in marine meteorology including a counterpart for the adviser,

RECOMMENDS:

(1) That Members in developing parts of the world be advised:

(a) To consider requesting WMO to organize short-term expert surveys (of the order of a few weeks) to assist them in the evaluation of their marine support requirements aimed at developing progressively suitable marine meteorological data acquisition and service systems;

(b) That the experts' reports would be forwarded through the Secretary-General of WMO to the Members concerned to enable them to assess their needs for help under UNDP, WMO and other assistance programmes, with a view to complementing their national efforts in the field of equipment and training for marine meteorological purposes;

(c) To examine the usefulness of following up the first expert mission by a request for a long-term advisory mission aimed at assisting the Members concerned in the organization or further development of their marine meteorological activities;

(2) That Regional Associations concerned be invited to examine the desirability of supporting the above actions, proposed to be taken on a country basis, through requests for similar projects within a regional framework;

(3) That, in view of the growing emphasis being put on the provision of meteorological support services to ocean activities, WMO give due attention to requests by Members for assistance related to the development of their marine meteorology activities.

Rec. 22 (75-CMM) - FREAK WAVES

THE COMMISSION FOR MARINE METEOROLOGY,

NOTING:

(1) That freak waves, although a rare phenomenon, constitute a great danger to shipping,

(2) The need expressed by the International Chamber of Shipping for assessing the probability of freak waves occurring in any particular sea area,

CONSIDERING:

(1) That, although reports on freak waves are being collected and published by some countries, it would be very useful to accumulate reports of this phenomenon on an international basis in one centre, to enable a statistical analysis to be made in due course for any frequented sea area,

(2) That in national meteorological logbooks, apart from the columns for reporting waves, space is usually provided for remarks in which phenomena such as freak waves would surely be reported whenever encountered,

NOTING further with appreciation the offer of the United Kingdom to undertake the task of accepting reports from Members on freak waves, publishing reports of special interest, analysing the data in due time and publishing the results,

RECOMMENDS:

(1) That Members operating voluntary observing ships be invited:

(i) To encourage marine observers to enter in meteorological logbooks detailed information on freak waves, as outlined in the annex;

(ii) To send such information when received by them to the United Kingdom Meteorological Office, Bracknell, for further action;

(2) That marine observers should use the following definition to record information relating to freak waves:

A freak wave may be defined as a wave of very considerable height ahead of which there is a deep trough. Thus, it is the unusual steepness of the wave which is its outstanding feature and which makes it dangerous to shipping. Reports so far available suggest that such waves have usually occurred where a strong current flows in the opposite direction to a heavy sea.

Annex to Recommendation 22 (75-CMM)

Guidelines for

(1) information on freak waves to be included in meteorological logbooks

Date: Time: Ship's position

....

Full description of freak wave (including height and horizontal distance between crest and trough, if possible):

Weather condition: .....

.....

State of sea: .....

.....

Any other factors that may have influenced the state of sea: .....

.....

Any damage sustained by ship: .....

.....

(2) information to be attached to freak wave reports by national meteorological centres when forwarding them to the Bracknell collecting centre:

Ship's name: .....

Gross registered tonnage : .....

Ship's radio call-sign: .....

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5	Draft report of Committee B to plenary on item 5 - Marine Meteorological Services Monitoring	5	Chairman of Committee B
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17	Report of Committee A to plenary on item 6.3 - Requirements for reporting codes Reporting of waves	6.3	Chairman of Committee A
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29	Report of Committee A to plenary on item 7.1 - Marine climatology Marine climatological summaries scheme - Beaufort scale of wind force	7.1	Chairman of Committee A
30	Report of Committee B to plenary on item 6.3 - Requirements for reporting codes	6.3	Chairman of Committee B
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