WORLD METEOROLOGICAL ORGANIZATION

COMMISSION FOR MARITIME METEOROLOGY

ABRIDGED FINAL REPORT
OF THE
FOURTH SESSION

Geneva, 23 November - 8 December 1964

WMO-No. 164. RP. 61

Secretariat of the World Meteorological Organization - Geneva - Switzerland

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LIST OF REPRESENTATIVES ATTENDING THE SESSION

1. Officer of the session

H. Thomsen	president	

2. Representatives of Members of WMO

L.M. de la Canal	principal delegate	Argentina
R.J. Greet	principal delegate	Australia
M. Dury	principal delegate	Belgium
K.T. McLeod	principal delegate	Canada
R. Stein	principal delegate	Chile
T.Y. Chu	principal delegate	China
Yang-hai Liu	adviser	
H. Thomsen	principal delegate	Denmark
J.S. Fabricius	delegate	
S.N. Venho	principal delegate	Finland
J. Castro	principal delegate	France
J. Romer	alternate	
T. Tournier	delegate	
P. Corfa	delegate	
M. Rodewald	principal delegate	Germany, Federal Republic of
H. Walden	delegate	
H. Reshad	principal delegate	Iran
S.L. Tierney	principal delegate	Ireland
S. Gadish	principal delegate	Israel
E.P. Haran	delegate	
M.N. Bavli	delegate	
M. Piloni	principal delegate	Italy
D. Bottari	delegate	
G. Roncali	delegate	
G. Zoli	delegate	
Y. Shibata	principal delegate	Japan
J.W. Termijtelen	principal delegate	Netherlands
A.A. Fresco	alternate	
G. Verploegh	delegate	
H.E. van Rheenen	adviser	
A.M. Valkenburg	adviser	
F. Spinnangr	principal delegate	Norway
K.U. Siddiqi	principal delegate	Pakistan
V.A. Pacis	principal delegate	Philippines
R.L. Kintanar	principal delegate	

J. Malicki	principal delegate	Poland
A. Silva de Sousa	principal delegate	Portugal
M. Seck	principal delegate	Senegal
H. Lovat	delegate	
A.B. Crawford	principal delegate	South Africa
F. Balén	principal delegate	Spain
B.C.F. Thorslund	principal delegate	Sweden
A. Jeannet	principal delegate	Switzerland
S. Buspabutr	principal delegate	Thailand
Ch. Phandhudawi	delegate	
A. Zribi	principal delegate	Tunisia
I. Tarbeev	principal delegate	Union of Soviet Socialist Republics
G.M. Tauber	delegate	
E. Botsieva	interpreter	
C.E.N. Frankcom	principal delegate	United Kingdom of Great Britain and Northern Ireland
G.P. Britton	delegate	
N. Bradbury	delegate	
G.A. Tunnell	delegate	
P.H. Kutschenreuter	principal delegate	United States of America
R.E. Mottern	delegate	
A.E. Sik	delegate	
W.W. Shinners	delegate	
G.P. MacDowell	delegate	

3. Observers

(a) Intergovernmental organizations

K. Terada	Food and Agriculture Organization of the United Nations
G. Dente	Inter-Governmental Maritime Consultative Organization
H. Thomsen	International Council for the Exploration of the Sea
Sh. Hase	International Telecommunication Union
R. Froom	
A.Y. Takenouti	United Nations Educational Scientific and Cultural Organization

(b) Other organizations

R.G. Swallow	International Chamber of Shipping
R.G. Swallow	International Radio Maritime Committee
K.T. McLeod	International Union of Geodesy and Geophysics
A. Jeannet	Permanent International Association of Navigation Congresses

4. WMO Secretariat

K. Langlo	representative of the Secretary-General
J.M. Rubiato	conference officer
G.K. Weiss	chief of section
H.C. Morales	permanent secretary for CMM
A.M. Drevikovsky	technical officer
F.P. Alves	technical officer
R. Crémet	technical division
R. Mathieu	technical division
J. Peeters	technical division
P. Rogers	technical division
E. Cormenzana	technical division
L.M. Michaud	technical division
M. Miller	technical division
S. Mizuno	technical division
J. van Egmond	technical division

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GENERAL SUMMARY OF THE WORK OF THE SESSION

In accordance with the decision of the sixteenth session of the Executive Committee, the Commission for Maritime Meteorology of the World Meteorological Organization held its fourth session in the Headquarters Building of WMO in Geneva from 23 November to 8 December 1964, under the chairmanship of Mr. Helge Thomsen, elected president of the commission for the duration of the session.

1. ORGANIZATION OF THE SESSION (Agenda item 1)

1.1 Opening of the session (Agenda item 1.1)

1.1.1 The session was opened by the President of the World Meteorological Organization, Dr. A. Nyberg, at 11 a.m. on 23 November 1964. Dr. A. Nyberg extended a warm welcome to all delegates and representatives of international organizations. He expressed deep regret at the untimely passing of Mr. J.A. van Duijnen Montijn and recalled the great services rendered by the late president to the Commission for Maritime Meteorology. At his invitation the meeting rose and observed a minute of silence in memory of Mr. van Duijnen Montijn, who had been for many of the participants not only a president but also a friend whose absence was deeply regretted.

Mr. D.A. Davies, Secretary-General of WMO, briefly welcomed all participants. He also paid a sincere tribute to the memory of Mr. van Duijnen Montijn, whose untimely death constitutes a great loss for the Commission for Maritime Meteorology and WMO as well as for the Royal Meteorological Service of the Netherlands.

Mr. J.W. Termijtelen (Netherlands) expressed his thanks for the kind and appreciative words concerning Mr. van Duijnen Montijn and recalled the work undertaken by the late president in preparing the session.

1.1.2 Since Vice-Admiral Charoon V. Bunnag, vice-president of the commission and president ad interim since the death of Mr. van Duijnen Montijn, had not been able to participate at the fourth session, the commission elected Mr. Helge Thomsen (Denmark) as its president for the duration of the session.

1.1.3 There were 64 participants at the session, including representatives of 31 countries and 9 international organizations. Dr. K. Langlo represented the Secretary-General after the opening session. A complete list of delegates, observers and members of the WMO Secretariat participating in the session is given in the beginning of this report.

1.2 Consideration of the report on credentials (Agenda item 1.2)

A provisional list of persons present and the capacities in which they were attending the session was presented by the WMO Secretariat. This list, with the necessary additions, was accepted as the first report on credentials and the commission did not consider it necessary to establish a credentials committee.

1.3 Adoption of the agenda (Agenda item 1.3)

The provisional agenda was adopted without amendment at the first plenary meeting on the understanding that, at any time in the course of the session, items could be added or deleted. The final agenda is reproduced in the beginning of this report.

1.4 Establishment of committees (Agenda item 1.4)

1.4.1 Working committees

Two working committees were set up to examine in detail the various agenda items:

(a) Committee A to deal with questions of observing practices and general maritime questions. Mr. G. Verploegh (Netherlands) was elected chairman of this committee;

(b) Committee B to deal with questions of collection and dissemination of information including codes. Commander C.E.N. Frankcom (United Kingdom) was elected chairman of this committee.

Details about the allocation of agenda items are given in the agenda reproduced in the beginning of this report. The working committees were assisted by Dr. G.K. Weiss Dr. H.C. Morales and other members of the Technical Division of the WMO Secretariat.

1.4.2 Co-ordination Committee

A Co-ordination Committee was established with the usual composition to co-ordinate the activities of the session.

1.4.3 Nomination Committee

A Nomination Committee was established consisting of Messrs. M. Seck (Senegal), I. Tarbeev (U.S.S.R.), L. M. de la Canal (Argentina), P. H. Kutschenreuter (U.S.A.), R. L. Kintanar (Philippines) and J. Castro (France).

1.5 Programme of work of the session (Agenda item 1.5)

Under this item the commission fixed its working time-table for the duration of the session. It also decided that the minutes of the plenary meetings, which it had not been possible to approve during the session, could be approved by the president of the session, Mr. Helge Thomsen, on behalf of the commission. Seven plenary meetings were held during the session. The minutes of the first two plenary meetings were approved by the commission.

2. REPORT BY THE PRESIDENT OF THE COMMISSION (Agenda item 2)

2.1 The commission noted with appreciation the report submitted by the president on the activities of CMM since its third session.

2.2 To facilitate the work of the president of CMM, the commission agreed to entrust him with the authority to nominate experts to serve on working groups of other technical commissions (if necessary) and to attend sessions of other WMO technical bodies, as required. While Members, in instructing their delegations to the fourth session of the Commission for Synoptic Meteorology (CSM), will no doubt take into account those maritime matters dealt with at the fourth session of CMM, which may require consideration by CSM, the commission agreed that it is of importance that the president of CMM, or a member of the commission who attended the fourth session of CMM, be nominated by him to attend the forthcoming session of the Commission for Synoptic Meteorology.

2.3 The commission also examined under this item the request of the sixteenth session of the Executive Committee for the preparation of guidance material on the problem of the organization of meteorological activities in developing countries in various fields of meteorology. With regard to the problems relating to maritime meteorology, the commission decided to refer this question to the president, requesting him to select suitable topics and to take appropriate action for the preparation of the necessary material as soon as possible. With regard to the items on which CMM should give aid to the developing countries, the commission drew attention to the topics mentioned in paragraph 6 on page 3 of CMM-IV/Doc. 64.

Distribution of information on progress in studies of interest to CMM

2.4 The commission noted that Members have been requested to undertake studies on a certain number of technical problems of interest to CMM. It agreed that, with a view to keeping the commission informed of the progress in these various studies, the WMO Secretariat should collect the relevant information and forward it to the president of the commission for inclusion in his periodical circular letters to members of CMM. All members interested in obtaining full reports of the studies could then directly contact the Members concerned.

3. REPORTS BY CHAIRMEN OF WORKING GROUPS ESTABLISHED BY THE COMMISSION (Agenda item 3)

The commission noted the reports of the various working groups established at its previous session. It expressed its appreciation for the work carried out by the chairman and the members of these groups. The reports were formally presented to plenary and then studied in detail by the working committees under the corresponding items of the agenda, as indicated below.

3.1 Working Group on Marine Climatology (Agenda item 3.1)

This report was considered under agenda items 10.1, 10.2, 10.3, 11.7 and 14.2.

3.2 Working Group on Sea Ice (Agenda item 3.2)

This report was considered under agenda items 12.1, 12.2, 12.3, 12.4 and 11.9.2.

3.3 Working Group on the Preparation and Use of Weather Maps by Mariners (Agenda item 3.3)

This report was considered under agenda items 11.1 and 11.5

3.4 Working Group on Technical Problems (Agenda item 3.4)

This report was considered under agenda items 5.1 to 5.8, 6.3, 11.9.1 and 11.9.3.

3.5 Working Group on Weather Advice for Fishing Operations (Agenda item 3.5)

This report was considered under agenda items 9.2 and 11.2.

3.6 Working Group for the Study of a World-Wide Network of Surface and Upper-Air Sea Stations (Agenda item 3.6)

This report was considered under agenda item 8.

3.7 Working Group on the Collection of Ships' Weather Reports and the Provision of Shipping Forecasts (Agenda item 3.7)

This report was considered under agenda items 7.1, 7.2, 7.3, 9.1, 9.3, and 14.4.

3.8 Working Group on the Preparation of Syllabi on Oceanographic Training of Meteorological Personnel (Agenda item 3.8)

This report was considered under agenda item 11.3.

4. REPORTS OF MEMBERS OF THE COMMISSION DESIGNATED TO PARTICIPATE IN THE WORK OF OTHER BODIES OF THE ORGANIZATION (Agenda item 4)

The commission noted with appreciation the reports of its representatives on working groups of other technical commissions. These reports were formally submitted to plenary and then studied in detail under the relevant agenda items, as indicated below.

4.1 CMM representative on the CSM Working Group on Codes (Agenda item 4.1)

This report was considered under agenda item 6.

4.2 CMM representative on the CCl Working Group on Climatic Atlases (Agenda item 4.2)

This report was considered under agenda item 10.2.

4.3 CMM representative on the CSM Working Group on the Minimum Performance Characteristics of Automatic Weather Stations Suitable for the World-Wide Network of Surface Observations (Agenda item 4.3)

This report was considered under agenda item 8. The commission was of the opinion that no action on it was necessary at this stage.

5. METEOROLOGICAL OBSERVATIONS MADE ABOARD SHIPS (Agenda item 5)

5.1 Measurement of sea surface temperature (Agenda item 5.1)

5.1.1 Reports on investigations and on comparative studies were submitted by the Working Group on Technical Problems and by delegations attending the session. The discussion was first focused on the reliability of measurements obtained from a condenser intake thermometer as compared with those obtained by other means, mainly the bucket thermometer but also distant reading devices. From the results of these investigations there was no evidence that either the bucket or the intake method was to be preferred in all instances, each of them giving, under certain circumstances and conditions, better results than the other. Interesting results were noted with the use of more complex instruments, but their cost limited the possibility of using them in routine work all over the world.

5.1.2 The commission also considered the practical aspect of this question and regretted that no important step has been achieved in the development of a simple, rugged, cheap and reliable instrument for daily use on board selected ships. It decided to draw the attention of Members to this particular aspect of the question and adopted Recommendation 1(CMM-IV).

5.1.3 The commission further considered that in many cases the existing measurements of sea surface temperature at mobile ship stations could be improved for instance by introducing better buckets, by installing precision thermometers at more suitable places on the intake

pipe, or by additional instructions to the observers. The commission further noted that serious errors are introduced in certain observations of sea temperatures, due to lack of adequate instrumentation or exposure. This may result in some erroneous data being introduced into a mass of accurate observational data so that serious consequences may subsequently arise from the use of the data as a whole. The commission therefore recommended that the Secretary-General should address a suitable letter to Members on this subject (see Recommendation 1(CMM-IV)). For the same purpose, the commission agreed that certain amendments were required in paragraph 10.8.3 of the Guide to Meteorological Instrument and Observing Practices. It was decided to request the president of CMM to forward the revised text of paragraph 10.8.3 (see Annex I) to the president of CIMO for inclusion in the Guide to Meteorological Instrument and Observing Practices.

5.2 Precipitation measurements at sea (Agenda item 5.2)

When discussing this question, the commission took into account the relevant part of the report of the Working Group on Technical Problems and the information provided by a number of delegations on the studies undertaken on precipitation measurements at sea. These investigations concern in particular the type of raingauge to be used and its exposure on the observing platform; comparative measurements are being made on board ships, at shore stations and on buoys. Some promising results have already been obtained, but they do not yet justify the adoption of a standard method and a standard instrument. It is therefore necessary that studies continue to be carried out.

The commission noted that precipitation measurements are made on board certain ocean weather stations for research purposes but that the relevant data are not always included in the surface synoptic reports. Although it was aware of the limitations affecting such measurements at present, the commission supported, subject to concurrence by ICAO, the proposal made by the Working Group on Technical Problems that ocean weather stations measuring precipitation include this data twice a day in their synoptic reports. Recommendation 2(CMM-IV) was adopted.

5.3 Wind structure at sea (Agenda item 5.3)

The commission, having considered the report of the working group on this matter, concluded that further studies were required and adopted Recommendation 3(CMM-IV).

In this connexion the commission also considered the desirability of recommending standard heights above sea-level for investigational studies on wind structure. It was felt that this would be of particular interest for comparison purposes in the case of studies conducted with buoys, but might be difficult to apply in the case of measurements carried out aboard ships. Mention was also made that if standard heights were proposed, corrections for small height differences might be calculated in submitting the results. Finally it was felt that, one of the objects being to obtain wind profiles with height, a recommendation on standard heights was not desirable at this stage.

5.3.1 Studies on the régime of land and sea breezes over the sea (Agenda item 5.3.1)

When discussing this agenda item, the commission realized that this problem largely depends both on the geographical location of the country concerned and on the local conditions such as terrain configuration. The importance of the effects of this phenomenon also varies with the type of shipping operations in the area affected. The problem is of interest to a number of countries, some of which for many years have already carried out investigations and will probably continue to do so, but there is no evidence that sufficient requirements exist for recommending the conduct of a special study of this question on an international basis.

5.4 Measurement of relative and true wind at sea (Agenda item 5.4)

The commission discussed the various methods of obtaining true wind observations in a moving ship without instrumental aid and also with the aid of instruments of the following types :

(a) Electrical anemometers (including revolution counters) with the sensors at fixed positions and a remote recorder showing relative wind speed and direction for subsequent conversion by graphical or other means to true wind speed and direction.

(b) Electrical anemometers (including revolution counters) with the sensors at a fixed position to indicate relative wind speed only.

(c) Hand anemometers to indicate relative wind speed at any selected position with good exposure.

As the ship's profile influences wind measurement, considerable experimentation is necessary to determine the best exposure for the sensing device in all ships.

From experience, it may be concluded that careful readings made by fixed anemometers with good exposures will generally lead to greater precision of true wind, especially when the latter exceeds thirty knots, than will be obtained by means of visual estimation.

On the other hand, visual observation remains a good general method which may even be superior at low wind speeds when the direction is abaft the beam, with the proviso that at all speeds visual observation might lose accuracy at night.

Comparison of all instrumental readings with the direct visual observation is desirable as a matter of routine in order to avoid substantial errors.

A hand anemometer is a desirable instrumental addition to aid visual observation when the wind exceeds Beaufort force 7.

Finally, the commission adopted Recommendation 4(CMM-IV).

5.5 Equivalent speeds for the Beaufort numbers

5.5.1 The commission considered in detail the information available from additional investigations relating to the Beaufort wind speed equivalents. The majority of the commission considered that this matter had been studied for more than eight years by the commission and that it was now necessary to make a final decision. It was pointed out that the new scale proposed by the CMM working group had various advantages both from a scientific and practical point of view. In particular it was stressed that it would take many years, perhaps twenty years, to obtain more reliable equivalents for the higher Beaufort ranges. It was also pointed out that the change to the new scale should be made now when a new scheme for climatological summaries is being introduced.

5.5.2 The minority of the commission considered, however, that due to the limited amount of data available, there remains some doubt as to the validity of the proposed new scale, especially for force 9 and above, and further investigations would be necessary before adopting a new scale.

5.5.3 The minority was also of the opinion that wind speed data derived from Beaufort scale equivalents are of significant interest to several of the WMO technical commissions in their areas of responsibility, notably CCl, CSM and CAe, it was felt that their views in the matter of any changes should be sought. This could be achieved by setting up an appropriate Executive Committee panel on which the views of the respective commissions are adequately represented.

5.5.4 The commission finally adopted Recommendation 5(CMM-IV) by nine votes to six with four abstentions.

5.6 Estimating wind at sea, especially during the night (Agenda item 5.6)

The commission noted with great interest the results of investigations carried out on this question which are attached to the report of the Working Group on Technical Problems. This seems to be the only case where such systematic comparative studies were carried out at ??, and the relevant results were taken into account when considering agenda items 5.4 and 5.5. The views of the commission concerning the question of wind observations at sea as a whole are recorded under these items.

5.7 Observations of waves (Agenda item 5.7)

The commission noted that wave data provided by mobile ship stations are normally obtained through visual observations. Results of investigations which are being made as regards the nature of observational errors were submitted during the session.

The commission was also informed of various devices available for measuring and/or recording ocean waves with a view to using these devices on board ocean-going vessels. Such instruments would need to be constructed for use in deep water and to enable the records to be evaluated in a very short time. At present, the most promising devices for deep water measurements seem to be :

(a) Accelerometers measuring the true vertical acceleration with an additional device enabling double integration of the record;

(b) Poles or buoys with equipment for eliminating vertical movements so that the oscillations of the water surface due to waves may be measured directly.

The British-made "ship-borne wave recorder" is at present in use in some ocean weather ships. This device records the vertical accelerations of the ship and also the water pressure at the ship's hull at a depth of some metres. The simultaneously measured values are combined to determine the wave parameters. Buoy-borne accelerometers have been constructed in the United Kingdom, the Netherlands, U.S.A. and Germany, some of them gyro-stabilized, others in gimbals. They are suitable for the measurement of the energy spectrum and thus of the significant height and period of the waves. Two of these include a device for measuring also the directional distribution of the wave energy. None of these records are currently being evaluated in sufficiently short time to enable their inclusion in the routine weather reports. It has not been possible, up to now, to measure the ocean waves by radar on board ships and from aircraft, although research is continuing in both fields.

The commission noted that investigations and experiments are being carried out by a number of countries and decided that a working group should consider the results of these investigations and experiments so that if important developments occur in this field, the president of CMM may take appropriate measures to inform all Members concerned accordingly.

5.8 Required accuracy of measurements (Agenda item 5.8)

The commission considered the reports of the president and the working group on this question and noted the request by CIMO that other commissions should, in submitting statements of accuracy requirements, do so in terms of accuracy of observational data, rather than accuracy of reading.

The request of Congress that the proposal of Recommendation 4(CMM-III) be reviewed was noted, and it was agreed that the accuracy of reading was a matter for CIMO to decide. The commission, however, felt that the wording as proposed in Recommendation 4(CMM-III) for

the reading of atmospheric pressure and of sea surface temperature would be preferable to the present wording in the Guide. A complete text for sea surface temperature to be included in the Guide is given under agenda item 5.1.

The commission reviewed its requirements in the light of the request of CIMO, and its conclusions are given in summarized form in Annex II.

5.9 Difficulties encountered by fishing vessels in making weather observations (Agenda item 5.9)

5.9.1 The commission examined the report of the Working Group on Weather Advice for Fishing Operations. Its decisions on the report are recorded under agenda item 9.2.

5.9.2 The commission agreed that in some circumstances small craft other than fishing vessels could also be recruited to make and record observations which would be mainly of climatological value. It was thought that the booklet to be prepared on "Fishermen and the weather" (see agenda item 11.2) would also be of value for such small craft and might act as an incentive to their co-operation with meteorological services.

5.10 Re-establishment of the Working Group on Technical Problems

Since several of the points discussed under agenda item 5 still required continuing attention, it was felt necessary to re-establish the Working Group on Technical Problems. Resolution 3 was adopted.

6. REPORTING OF METEOROLOGICAL OBSERVATIONS BY SHIPS (Agenda item 6)

6.1 Reporting of sea surface temperature (Agenda item 6.1)

The commission noted with concern the disturbing percentage of errors in the reporting of sea surface temperature. It was considered that this is due to an unsatisfactory code which imposes an undesirable additional task on an observer. It was concluded that the only solution is to introduce a direct reading code for this element. It was felt that this should be considered an urgent matter since accurate sea surface temperature is necessary for the forecasting of fog, the supply of information for fishing operations and the preparation of sea surface temperature charts. Considering that the present procedure for reporting sea surface temperature is no longer acceptable due to the excessively high percentage of errors which result from it, the commission decided to request its president to call the attention of the president of CSM to the great importance attached by CMM to the introduction at the earliest possible date of reporting sea surface temperature in a direct reading form in place of the present unsatisfactory system.

The commission noted in this connexion that the introduction of a coding device suitable for observers at sea could, in the meantime, reduce to some extent the number of errors of this and other elements of the code.

The detailed requirements of CMM as regards sea surface temperature have been developed under agenda item 6.11.

Sea temperature - Coding

The commission noted that some Members had stated that errors in coding sea temperature data in ships' weather messages averaged 25 per cent of all reports received. After considering Resolution 30 (Cg-IV), it was agreed to request CSM to consider revising existing coding procedures to permit reporting sea temperature, directly as read, in half-degrees

Celsius; these instructions to be implemented as introduced by Resolution 30 (Cg-IV) on 1 January 1965 or as soon as all Members have arranged for their reporting ships to report all temperature data in degrees Celsius and if possible before any general revision of codes takes place.

6.2 Reporting of rainfall observations (Agenda item 6.2)

Further to a request expressed by the president of CMM in relation to the reporting of precipitation data by ships during the International Indian Ocean Expedition, the third session of CSM examined code table 4080 t_Rt_R. Amendment to this code table was proposed in Recommendation 28 (CSM-III) in order that the period over which the precipitation reported by RR is measured be specified in each case. This code change was introduced on 1 July 1962.

The session agreed that the revised code table 4080 t_Rt_R was satisfactory for reporting the results of rainfall measurements at mobile ship stations and ocean weather stations (see paragraph 6.11.1).

6.3 Reporting of visibility (Agenda item 6.3)

6.3.1 The commission noted that CSM, by adopting Recommendation 26 (CSM-III), had agreed to changing the instructions for reporting visibility, as requested by CMM-III. According to the new instructions which came into force on 1 January 1964, ocean weather stations use only code figures 90-99 for reporting visibility in the same manner as mobile ship stations do.

6.3.2 As regards the question of uniformity in the reporting of visibility, the commission noted that while a majority of Members are reporting minimum visibility, a substantial minority use some form of visibility index. Since CSM at its third session could not agree on a uniform method for reporting visibility and decided that the matter could be reconsidered at a further session, it was considered that CMM was not in a position to contribute appreciably to the solution of this problem at this stage. It was,however, pointed out by some Members that for operational reasons the mariner might prefer minimum visibility. It was considered that the use by observers at sea of the code figures 90-99 minimized to a large extent the effects on visibility reports which result from the existence of different reporting procedures.

6.4 Reporting of the state of the sea (Agenda item 6.4)

At the third session of CMM a strong demand was expressed that an early code change be made to the present group 1 $d_wd_wP_wH_w$ to achieve an increased accuracy in the value reported and to avoid the large number of errors inherent in the artificial procedure in encoding wave heights. This problem was further studied by a working group which presented to the president of CMM a set of requirements. After consultation with Members, the president recommended to CSM an amended code and code tables for wave reporting (Recommendation 33 (62-CMM)).

CSM has not yet taken action on this recommendation but at its third session informed CMM and other technical commissions that future requirements in respect of codes should be stated in the elements to be reported, their relative importance, the intervals desired, the precision needed, etc., rather than in terms of specific codes.

The detailed requirements of CMM as regards wave reports have been developed under agenda item 6.11. The commission decided to put on record the great importance it attaches to an early solution of this problem of reporting wave observations. It decided to request its president to inform the president of CSM accordingly.

The commission studied the coding of the state of the sea by means of the S code but, for want of an undisputed definition of the term "State of the sea" itself, was unable to reach a conclusion. It therefore decided to refer the question to the Working Group on Technical Problems for study as a matter of urgency.

6.5 Reporting of ice accretion on ships (Agenda item 6.5)

The commission, in studying the problem of ice accretion on ships and in reviewing the optional code group 2 $I_SE_SE_SR_S$, recognized the following points :

(a) Ice accretion upon vessels plying higher latitude waters is a serious hazard under certain meteorological conditions;

(b) Quantitative reports of rate of ice accretion upon vessels would be of greater value than descriptive terms for forecasters in developing forecasting techniques and in providing warnings of dangerous icing conditions;

(c) Practical procedures for quantitative determination of rate of ice accretion and even of total ice accretion on vessels are not known at present.

The commission agreed that studies should be carried out on the causes of ice accretion and on practical means of measuring the rate of ice accretion. As these studies could be readily carried out by, inter alia, ocean weather stations, the commission agreed that in such cases ICAO should be consulted. Recommendation 6 (CMM-IV) was adopted to this effect.

6.6 Codes and coding devices for fishing vessels (Agenda item 6.6)

6.6.1 The commission examined with great interest the redesigned slide-rule weather coder demonstrated at the session by the delegate of South Africa, in his capacity as a member of the Working Group on Weather Advice for Fishing Operations. After hearing an explanation of the improvements made since the prototype model shown at the third session of CMM, the commission expressed the view that this device appeared to have considerable advantages for use on auxiliary ships and particularly for fishing vessels.

6.6.2 The commission then discussed how the coder could best be brought to the attention of those interested and the arrangements that could be made to make it available to those desiring to purchase it. It was noted that some enquiries had already been made concerning the commercial production of the coder. It was decided to request the Secretary-General to carry out a pilot-project to bring the coder to the attention of all those interested with a view to determining the probable demand. The Secretary-General was therefore requested to take the following action :

(a) To obtain a full description of the instrument and its uses;

(b) To distribute the above description, together with an estimate of the probable cost, to all Members of WMO and to interested governmental and non-governmental organizations such as FAO, IMCO, the International Chamber of Shipping, etc.;

(c) To ask all recipients of the description to make a provisional estimate of the number of coders they would wish to purchase, it being understood that it would not constitute a binding agreement at that stage;

(d) To endeavour, on the basis of the probable demand for the coder as shown from the replies received, and with the assistance of the president of CMM, to make arrangements for its commercial production.

6.6.3 The commission felt that a pilot-project of the above type would serve to indicate the future demand for such an instrument and the further steps necessary to meet this demand.

6.7 Locust reports from ships (Agenda item 6.7)

The commission noted that as a result of Recommendation 16 (CMM-III), the Anti-Locust Research Centre in London had received 35 reports of locusts seen at sea, from ships of seven nationalities; some of these reports being the first evidence received by the Centre of substantial locust swarm movements. Taking into account the economic importance of the problem, to which FAO is also devoting great attention, the commission agreed with the request of the Anti-Locust Research Centre that ships should be invited to forward to the Centre as expeditiously as practicable, wherever possible, specimens of the locusts observed. A new Recommendation 7 (CMM-IV) replacing Recommendation 16 (CMM-III) was adopted to this effect.

The commission also considered a suggestion from FAO to provide ships' officers with a leaflet explaining the relationship between locust movements and meteorological conditions. It was considered that WMO Technical Note No. 54 - Meteorology and the migration of Desert Locusts - contained all necessary information and no further action from WMO was necessary in this respect. It was also felt that action with a view to obtaining additional locust reports from fishing boats could best be handled by FAO, which was in more direct contact than WMO with the national authorities concerned.

6.8 Ship position verifying group (Agenda item 6.8)

The commission recognized the requirement for accurate reception of position reports, particularly for computer processing of meteorological data. Recommendation 29 (CSM-III) proposing the use of Marsden squares as parts of a position verifying group for all reports from sea stations was not accepted. Evidence presented to the session showed that position data errors in weather reports from ship stations have a low frequency of 0.4 per cent, and it was the opinion of the commission that this did not warrant the additional cost and difficulties that would result from introducing such a ship position verifying group. It was noted that pressure errors had a sensibly higher frequency.

It was therefore decided to request the president of CMM to inform the president of CSM that the ship position verifying group, as proposed in Recommendation 29 (CSM-III) is not acceptable, and to communicate to him CMM-IV/Doc. 56 in view of possible code changes in the future as an indication of the requirements for verification of the meteorological elements included in SHIP reports. The commission also expressed the view that Members should take urgent steps through their port meteorological officers to urge observing and radio officers to encode and transmit their weather reports accurately, and particularly the position and pressure groups.

6.9 Terms of intensity of meteorological phenomena (Agenda item 6.9)

The commission considered the criteria drawn up by CSM for describing the intensity of precipitation and found them unacceptable for use at sea due to special observing conditions on board ships. It therefore concluded that further investigations should be carried out as regards reporting of precipitation intensity by mobile ship stations. In this relation, the commission was invited to consider a proposed Guide to reporting precipitation at sea presented by the United Kingdom, (see Annex XII), the object of which is to assist an observer at sea in the correct choice of the figures in the ww code for present weather by personal observation of precipitation effects on visibility and radar displays. This last aspect would aid more accurate observations, particularly at night and in low visibilities. Although correspondence between all columns of the table may not be achieved in all cases, it was emphasized that the primary objective of individual descriptions in columns 1, 3 and 4 is to lead to the choice of the correct figure which appears in column 2. In particular, the descriptions in column 4 only apply to 3-cm radar sets in good order with controls in the prescribed positions.

It was felt that further experience by observers at sea is needed before a finalized table can be recommended for the general use of seamen. It was agreed to recommend that Members be invited to carry out trials with this table. It could be issued in its present or similar forms to certain selected ships to ensure trial for at least one year in all oceans of the world. The reports from these ships should be co-ordinated by the CMM Working Group on Technical Problems with the objective of presenting a table for adoption for general use at the fifth session of CMM. Recommendation 8 (CMM-IV) was adopted to this effect.

6.10 Units used in coded messages for international exchange (Agenda item 6.10)

6.10.1 The commission noted Resolution 31 (Cg-IV) dealing with the introduction of metres per second as the unit for the reporting of wind speed in all coded meteorological messages for international exchange. The commission recognized the need for urgent action towards complete uniformity in the reporting of wind speed from ships, and noted that action would be taken to this end by the World Meteorological Organization.

6.10.2 The commission considered ways and means to facilitate this uniformity. Two practical solutions were mentioned :

(a) To provide ships with simple coding devices for conversion of the observed wind speed into metres per second;

(b) To develop a standardized code table for reporting wind speed (corresponding to the symbolic letters "ff" in present WMO codes).

6.10.3 The commission favoured the second solution for immediate action to establish a code table, bearing in mind that by doing so no disruption of present climatological records (i.e. ranging of values) should be caused and bearing in mind also long-established practices in the estimating and reporting of wind speed at sea. The commission adopted Recommendation 9 (CMM-IV).

6.10.4 It is understood that the code table for reporting wind speed developed in accordance with paragraph 6.10.3 above will be investigated once more when a major review of WMO codes is contemplated.

6.11 General code questions (Agenda item 6.11)

6.11.1 CMM requirements as regards codes

The commission was informed that CSM and particularly its Working Group on Codes is now engaged in the study of fundamental requirements for the international exchange of meteorological information. It therefore decided to develop a consolidated statement of CMM requirements for transmission to CSM. When doing so, it took into account the wish of the third session of CSM that such requirements should be stated in terms of the elements to be reported, their relative importance, the intervals desired, the precision needed, etc., rather than in terms of specific codes. The commission also decided to provide CSM with background information of the technical considerations which led to the drawing up of these requirements. The conclusions of the commission are summarized in Annex III. The president of CMM is requested to bring these requirements to the notice of the president of the Commission for Synoptic Meteorology.

6.11.2 Use of the solidus in weather records

The commission was of the opinion that confusion had arisen as a result of the introduction of the use of the solidus in ships' weather records. Difficulties have been experienced in particular in entering weather data in ships' meteorological log-books where the solidus can frequently be mistaken for the figure 1. As this change was made to

facilitate telecommunications operations, some Members proposed recommending that the "x" continue to be used for recording missing data in ships' weather records provided it were altered to a solidus when coded messages were handed to radio operators. The opinion was expressed that this was a matter for Members to handle on a national basis. Finally the commission decided that the only action to be taken was to request the president of CMM to inform the president of CSM of the difficulties encountered by CMM in this field.

6.11.3 Indication of the height of the observing platform in the International List of Selected and Supplementary Ships

When discussing the question of requirements with particular reference to measurements of wind and air temperature, the commission felt that it would be useful for the comparative use of ships' reports for general analysis and forecasting purposes and also for research purposes to know, at the ship's mean draft, the height above the sea surface of the platform from which the observer estimates or measures meteorological parameters included in weather reports. It therefore decided to invite the Secretary-General to take appropriate measures to have information on this height provided by Members for inclusion in the International List of Selected and Supplementary Ships.

6.12 Provision for checking wind speed exceeding 33 knots in ships' reports (Agenda item 6.12)

The commission considered a proposal for the introduction of a provision in the SHIP code form for a check figure for wind speed whenever the reported wind speed is more than 33 knots in areas frequented by tropical cyclones. It was observed that, in strong wind conditions, the probability of an error in the wind speed entered in SHIP reports is of a very low order. Most errors result from faulty transmission of the report. It was also mentioned that a check relating only to wind speed is of no real value if the other data in the report are not similarly checked. It was considered that the optional wind shift group suggested under agenda item 6.11, by providing an indication of a recent change of wind speed, could, in some cases, remove doubt on the reliability of the wind speed report. It is suggested that Members draw the attention of ships' officers to this requirement for accurate reporting of wind speed, especially in tropical areas during the tropical storm season.

7. COLLECTION AND DISSEMINATION OF METEOROLOGICAL OBSERVATIONS FROM SHIPPING (Agenda item 7)

7.1 Review of the present system of areas of responsibility and procedures relative to the collection and dissemination of ships' weather reports (Agenda item 7.1)

7.1.1 The commission examined with great interest the detailed and comprehensive report submitted to the session by the CMM Working Group on the Collection of Ships' Weather Reports and the Provision of Shipping Forecasts, under the chairmanship of Commander C.E.N. Frankcom (United Kingdom). It felt that the report and the recommendations of the group constituted a valuable contribution to the re-organization of the present scheme, which has proved insufficiently effective.

7.1.2 The new plan developed by the working group and adopted by the session gives ships' radio officers a larger degree of freedom in transmitting messages to coastal stations. The new plan is expected to provide for receipt of additional weather messages, which could not be received under the present plan because it is too restrictive.

7.1.3 The new plan is aimed to simplify and facilitate the work of the radio officer aboard ships in all oceans and thereby achieve a greater number of reports. The commission

recognized that the success of the "selected" ship plan depends upon the enthusiasm and goodwill not only of the voluntary observing officers, but also of the radio officers. The conclusion was that the simpler the plan, the more reports will be received.

7.1.4 Under the new plan the oceans were divided according to (1) WMO Regions and (2) each Region then subdivided into a small number of zones (see Annex XIII to the present report).

7.1.4.1 The radio officer should be guided by instructions relating to transmitting weather messages to coastal stations in the order given below :

(a) Ships' radio officers should send their weather messages to the nearest coastal station in the zone in which the ship is navigating.

(b) Ships' radio officers failing to contact the nearest coastal station promptly owing to heavy traffic, radio propagation conditions or other reasons should then endeavour to send their weather messages to the nearest convenient coastal station in the zone in which the ship is navigating.

(c) When propagation conditions or other circumstances prevent ships' radio officers from sending their weather messages promptly to any shore station in the zone in which the ship is navigating, radio officers should relay their reports :

(i) To the nearest convenient coastal station* in an adjacent zone in the same region; or

(ii) To the nearest convenient coastal station in any zone of the region;

(d) On occasions when ships' officers are unable to contact any shore station in the region owing to propagation conditions or for any other reasons, officers should send their reports to coastal stations in an adjacent region.

7.1.4.2 The attention of the presidents of regional associations concerned is invited to the need for inter-regional action to implement the new plan for the collection and dissemination of ships' weather reports in (1) the Mediterranean Sea, (2) the Red Sea, (3) the South China Sea and possibly other areas.

7.1.5 To all Members whose territory lies at the coastal border of continents or on islands, ships' reports from the oceanic area close to their coasts are of the same importance and are needed with the same degree of urgency, for the purpose of meteorological services to shipping and other meteorological activities, as the synoptic reports from land stations in their own territories.

7.1.6 The ships' reports received at a radio coastal station must be promptly transmitted to the territorial broadcast (or similar) centre of the Member. The Member should ensure prompt retransmission of all ships' reports to the subregional centre(s) concerned for inclusion in the respective broadcasts (see Technical Regulation 6.2.2.7).

7.1.7 The commission agreed that strict adherence to the plan by all concerned would make available to all Members the ships' reports they need for discharging their meteorological responsibilities (e.g. forecasting for shipping).

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* NOTE : The expression "nearest convenient coastal station" means the nearest coastal station with which the ship can communicate. On several occasions, for example, ships skirting the North Atlantic coast of the U.S.A. were unable to transmit their weather messages to the nearest coastal stations on LF or MF frequencies. Hence, the messages were transmitted by the ships to shore stations on the North Pacific U.S. coast on HF frequencies and relayed promptly to Washington.

7.1.8 In conclusion, the commission adopted Recommendation 11 (CMM-IV).

7.1.9 During the consideration of this item the question of the addressing of ships' weather reports was examined and it was agreed that the commission's conclusions on this matter are reflected in the decisions taken on agenda item 14.4.

7.2 Difficulties encountered in the collection of ships' weather reports (Agenda item 7.2)

7.2.1 The commission noted a number of deficiencies in the collection of ships' reports relating to the absence of adequate HF coastal radio stations in some areas, e.g. Regions I, II, III and V. The fact-finding study on difficulties encountered in the collection of ships' weather reports contained in CMM-IV/Doc. 17, and in the map appended to CMM-IV/Doc.16, (Appendix B, Annex III), up-dated as necessary, should be examined by the regional associations concerned with a view towards resolving any difficulties that may continue to exist.

7.2.2 The commission felt that Members should continue to collect, from their selected ships, reports on difficulties met in clearing weather messages with coastal radio stations, and also take prompt action to resolve any difficulties reported individually or bilaterally between Members or regional associations concerned.

7.2.3 The question of collecting ships' weather messages employing HF R/T (radiotelephony) was considered. The International Telecommunication Union (ITU), International Radio Maritime Committee (CIRM), and the International Chamber of Shipping (ICS) representatives informed the commission that any such plans formulated at present would be premature and therefore the commission decided to take no further action at the present time.

7.2.4 The commission also noted with much satisfaction that Brazil intends to establish an HF coastal radio station (cf. CMM-IV/INF.5).

7.3 Co-ordination between times of observation aboard ships and the times of watch of radio-officers in single-operator ships in various zones (Agenda item 7.3)

7.3.1 The commission noted that "single-operator" ships furnish the majority of weather messages from the oceans. At the same time, radio officers are off duty daily, when one and sometimes two weather messages, containing observations taken at standard times, are ready for transmission. The CMM Working Group on the Collection of Ships' Weather Reports and the Provision of Shipping Forecasts investigated various possibilities, including consultation with the International Radio Maritime Committee (CIRM), for overcoming these difficulties. Additionally, a joint working group comprising ICAO, IMCO, ITU and WMO representatives examined the question of changing radio watch hours aboard ships in order to coincide with the standard times of observations established by WMO. The commission confirmed the views expressed by the working group that apart from the practical difficulties of revising the Radio Regulations in order to change the times of watches, it would be wise to consider all the consequences from the point of view of both safety and public correspondence.

7.3.2 With regard to the difficulties resulting from fixed radio watch hours of "single-operator" ships, the commission felt that Technical Regulation 3.3.1.5 and WMO Publication No. 9.TP.4, Volume D, Part D, paragraph 5.2 provides some latitude in taking and transmitting weather messages aboard ships. The decisions of the commission to this effect are embodied in Recommendation 12 (CMM-IV) adopted by the session.

7.3.3 The commission dealt at length with the question of obtaining as many weather messages as possible from "single-operator" ships when the operator is not on watch. A national

scheme was also noted by the commission which has been developed by a Member to obtain additional reports from such ships. A similar scheme for use on an international basis which would have enabled the early morning synoptic observation to have been received two hours earlier was suggested by another Member and was fully discussed. For operational reasons this scheme was not pursued.

Re-establishment of the Working Group on the Collection of Ships' Weather Reports and the Provision of Shipping Forecasts

7.3.4 The commission felt that it was essential to re-establish the Working Group on the Collection of Ships' Weather Reports and the Provision of Shipping Forecasts for the purpose of studying the relevant problems and formulating recommendations. Resolution 4 (CMM-IV) was adopted.

8. ORGANIZATION OF METEOROLOGICAL NETWORKS AT SEA (Agenda item 8)

8.1 The commission examined with great interest the detailed and comprehensive report submitted to the session by the Working Group for the Study of a World-Wide Network of Surface and Upper-Air Sea Stations under the chairmanship of Mr. W. Shinners (United States). It felt that this report constituted a very valuable contribution to the planning now being undertaken by WMO in connexion with the concept known as the World Weather Watch by indicating the various ways and means available to fill some of the major gaps in the network over the oceans. It wished to record its appreciation of the work performed by the group and noted that a preliminary report had already been made available to Fourth Congress with regard to the estimated costs associated with the various methods of improving the network.

8.2 The commission gave detailed consideration to the action that could be taken with respect to each type of observation and its decisions are recorded below under the appropriate headings :

8.2.1 Surface observations

8.2.1.1 Marine automatic weather stations

The need for progress from the present mainly experimental use of buoys to the stage where they become part of the operational network at sea was stressed. The commission noted the report of its representative on the CSM Working Group on the Minimum Performance Characteristics of Automatic Weather Stations suitable for the World-Wide Network of Surface Observations and expressed the view that the requirements for sea stations were similar to those for land stations. It also noted the interest shown by the Inter-governmental Oceanographic Commission (IOC) in this matter and the request of Fourth Congress in its Resolution 26 (Cg-IV) for strengthening collaboration between WMO and IOC. The commission accordingly decided that it would be desirable to hold a technical conference at an early date to discuss the operational characteristics of buoys, their servicing and other related problems. It therefore decided to request the Secretary-General to arrange, within the framework of the global observational survey of the World Weather Watch, for a technical conference to be held and to invite all interested Members of WMO and governmental and non-governmental organizations to participate therein.

With respect to the probable number and distribution of buoys in an ocean network, the commission felt that this question could only be decided in the light of the findings of the studies now being carried out on the desirable mixing of different observational methods in a global observational system.

8.2.1.2 Fixed ocean stations

The commission discussed in great detail the proposals of the working group concerning fixed ocean stations and considered that their establishment was of great importance, particularly in sparse areas situated far from the trade routes. It also noted that the world-wide network development plan attached to Resolution 22 (Cg-IV) includes additional fixed ocean stations.

The commission was of the opinion that the establishment of such stations is at present only in the planning stage and that they could only be envisaged if they carried out a full programme of both surface and upper-air observations. It was also evident that support of and participation by several disciplines would contribute substantially to the implementation of additional fixed ocean stations. The commission considered that such programmes would be of great value in improving the availability of meteorological data from the ocean areas, and wished to encourage this development. With this purpose in mind, it decided to request the Secretary-General to arrange that a small meeting of technical experts be held, within the framework of the planning for the World Weather Watch, to draw up a plan for the establishment, management and operation of fixed ocean stations, together with a detailed estimate of their probable cost. Interested Members of WMO and representatives of governmental and non-governmental organizations, such as IOC and FAO, should be invited to participate in this meeting.

8.2.1.3 Mobile ship stations

The deficiencies in the present ship reporting scheme were discussed at length. The commission noted that there were a number of areas along regular shipping routes where the number of selected and supplementary ships' reports received by Members was inadequate for forecasting and warning purposes. It felt that Members should continue their efforts to recruit more selected and supplementary reporting ships.

The commission also noted that, while progress has been made by Members in recruiting auxiliary ships to furnish reports from sparse areas, Members must continue their efforts to recruit additional auxiliary ships, with particular attention being given to providing more reports from the southern hemisphere. As a first step, it was decided to replace the chart entitled "Map Showing the Density of Voluntary Ships Reporting Surface Weather Observations over the Oceans", as contained in WMO Publication No. 9.TP.4, Volume D, Page D-D-1-7, by a revised map. Copies of this map should be made available to WMO Members in quantities to aid in recruiting auxiliary ships. The commission also decided to request Members to send to the WMO Secretariat, at six-monthly intervals, lists of auxiliary ships recruited, for distribution to Members to aid port liaison officers in concentrating efforts on ships not yet recruited.

An offer was made by the representative of the International Chamber of Shipping to initiate discussions within his organization to encourage further participation in the voluntary ship scheme, which was enthusiastically welcomed by the commission.

In view of the importance of giving adequate publicity to the contribution that ships can make to their own safety and economic operations by reporting weather observations, it was also suggested that IMCO and other maritime organizations be approached and provided with information on the subject. The substance of the International Convention for the Safety of Life at Sea (1960), Chapter 5, Regulation 4 (which becomes effective 26 May 1965) should be brought to the attention of all WMO Members.

It was also pointed out by several delegations that good results have been achieved by educating ships' officers in understanding the importance of meteorology for the safety of navigation and the commission felt that action on those lines should continue.

Additionally, it was also agreed that the Secretariat could play an important role by undertaking fact-finding studies of networks at sea, similar to those already made for

networks on land. The Secretary-General was therefore asked to intensify activities in this field and to approach Members of WMO to obtain the required information from their own national maritime authorities.

The substance of these decisions was embodied in Recommendation 13 (CMM-IV).

8.2.1.4 Maritime observing platforms

The commission was informed of the potential uses of various types of fixed or floating platforms other than ships as a source of observations additional to those considered by the working group. The commission noted with much interest this further method of securing data from ocean areas, but considered it premature to make any recommendation on the subject at this stage.

8.2.2 Upper-air observations

8.2.2.1 Fixed ocean weather stations

The views of the commission as regards these stations are recorded in paragraph 8.2.1.2 above, and no additional text was felt to be necessary with respect to upper-air observations.

8.2.2.2 Mobile ship stations

The report of the working group concerning the operation of a world-wide mobile ship radiosonde programme was warmly welcomed by the commission. It was felt that fixed ships would only be established at a few isolated points in the vast ocean areas of the world. Mobile ship programmes could be established at an earlier date and would also cover larger areas of the oceans; they are therefore considered essential to the establishment of an effective world-wide network at sea. In order to strengthen the existing world-wide programme for the provision of upper-air information from sparse data areas, and to provide a broader basis for evaluation of an expanded programme, the commission recommended that :

(a) Members be urged to establish one or more mobile ship radiosonde programmes aboard ships travelling through sparse data areas, or to assist other Members to establish co-operative programmes;

(b) Such programmes be started as soon as practicable and that efforts be made to obtain winds aloft by visual or electronic means.

Members planning such programmes should keep the Secretary-General informed.

The commission noted that the working group had drawn up a list of ships, country of registry and route of travel on which a radiosonde programme would help materially in reducing the gap in data over the oceans. Although this list represented only a small percentage of the total number of selected ships and was intended only to be representative of the routes of travel, the commission considered that it provided valuable guidance. It decided to reproduce a map showing recommended mobile ship routes as an appendix to the recommendation adopted on this subject.

In urging Members to play their full part in this initial programme of radiosonde observations, the commission stressed the particular value of all such programmes on ships travelling through sparse areas wholly or partly south of the equator. The decisions of the commission on this subject are embodied in Recommendation 14 (CMM-IV).

8.3 Meteorological log-book for auxiliary ships

The commission considered a proposal submitted by the Netherlands for the preparation of a standardized meteorological log-book which could be issued to auxiliary ships. It

was felt that there were many advantages to this proposal and the commission decided to circulate the Netherlands log-book as a model from which Members could print their own forms, if they wish. It accordingly requested the Secretary-General to arrange for copies of this log-book to be made as a model and to distribute them to all Members of the Commission for Maritime Meteorology.

9. WEATHER BULLETINS AND WARNINGS FOR SHIPPING AND FISHING (Agenda item 9)

9.1 Review of present areas of responsibility for shipping forecasts (Agenda item 9.1)

9.1.1 The commission examined the report of the Working Group on the Collection of Ships' Weather Reports and the Provision of Shipping Forecasts and relevant decisions of other WMO constituent bodies. After thorough study and lengthy discussion, the commission agreed to a revised Map B, to be published in WMO Publication No. 9.TP.4, Volume D, showing the allocation of areas of responsibility, which complies with Technical Regulation 10.2.1.1. Recommendation 15 (CMM-IV) was adopted.

9.1.2 The commission agreed that more than one Member can be responsible for the issue of weather bulletins for any given area and there is no objection to overlapping areas of responsibility.

9.1.3 The commission also agreed that it is of paramount importance that Members responsible for issuing forecasts for shipping inform the president of the regional association concerned and the Secretary-General at least six months in advance whenever they are no longer able to provide this service (reference, Recommendation 15 (CMM-IV)).

9.1.4 The commission noted that the CMM Working Group on the Collection of Ships' Weather Reports and the Provision of Shipping Forecasts had prepared a world map showing areas covered by bulletins of categories A, C and D for the high seas, and also by selected "B" bulletins for coastal shipping. It was found that this map was broadly on the same lines as Map B - Areas of Responsibility for Shipping Forecasts, as contained in WMO Publication No. 9.TP.4, Volume D. Action to bring Map B contained in Volume D up to date and to remedy the serious shortcomings in the implementation of services was taken by adopting Recommendation 15 (CMM-IV).

9.1.5 The commission agreed that it would be extremely useful to Meteorological Services and ships' officers to have available on one map as much information as possible about the coverage of weather bulletins. Therefore, the Secretary-General was requested to publish a world map showing the areas at present covered by bulletins A, C and D for high seas and also for selected "B" bulletins for coastal shipping, and to keep this map up to date.

9.1.6 In principle, there is nothing to stop any Member issuing such a weather bulletin for any ocean area, but it is important that a common nomenclature should be evolved in cases where any particular area is given a name. In the North Sea, for example, the forecast areas are related to well-known points of land or banks and a common nomenclature was worked out by regional agreement. The commission felt that a similar procedure should be followed in other regions to avoid confusion. In particular, Regional Association II is invited to investigate questions concerning the China Sea area, where a number of countries have contiguous and overlapping areas.

9.1.7 The commission confirmed that the delineation of forecast areas should, as far as possible, be indicated as specified in Technical Regulation 10.2.3.11 (i.e. with reference to well-known landmarks or in terms of latitude and longitude) for plain language bulletins or by indicators (AAA) if used with the MAFOR code.

9.1.8 Technical Regulation 10.2.3.6 stipulates that Parts II and III of weather bulletins should be broadcast in the language of the issuing Member and in English. The commission noted that this regulation is not yet implemented in all cases, and the MAFOR code could be used for this purpose (Technical Regulation 10.2.3.6.1).

9.1.9 The commission examined the decision of the third session of RA II on the request of India to have an overlapping area with Burma for the issue of broadcasts for shipping in the Bay of Bengal. It was agreed that the decision was fully in accordance with the policy of the commission on this subject and it therefore recommended that the revised area should be approved by the Executive Committee for publication in Volume D of WMO Publication No. 9 (map B).

9.1.10 The commission discussed the request of ICAO contained in Recommendation 8/19 (CAeM-III-MET/OPS) that WMO continue its efforts to achieve, in cyclone warnings, an adequate coverage of all ocean areas of the world. The commission considered that storm and tropical cyclone warnings should contain specific information only for shipping and that the present situation was satisfactory from this point of view. Since the tropical cyclone messages only take into account the shipping requirements and not those of aviation, such messages should be transmitted by the centre issuing them to designated meteorological offices which would determine the best use to be made of them for aviation purposes. The commission decided, however, to refer this question to its re-established Working Group on the Collection of Ships' Weather Reports and the Provision of Shipping Forecasts (see agenda item 3.7), requesting it to take the following action as soon as possible :

(a) To establish principles concerning the preparation and use of tropical cyclone warnings for shipping and the extent to which such warnings could be made available to meet aeronautical purposes;

(b) To study the arrangements for the dissemination of tropical cyclone warnings, taking into account the requirements of ICAO, IMCO and other interested organizations, and for which it will be necessary to seek the views of the Commission for Aeronautical Meteorology and the Commission for Synoptic Meteorology.

9.1.11 Finally the commission decided to request the working group to report to the president of CMM on these questions within one year and to invite representatives of ICAO and IMCO, as well as CAeM and CSM,to participate in the work of the group as necessary.

9.2 Weather advice for fishing operations (Agenda item 9.2)

9.2.1 With regard to the preparation of a booklet containing instructions and advice for fishermen, the commission noted that this question was dealt with mainly under agenda item 11.2. Its discussion of this question under this item was therefore confined to reaffirming the need for the booklet to be both brief and as simple as possible and to the requirement for it to be applicable under the different weather conditions found in the northern and southern hemispheres. Further details of the commission's decisions are given under agenda item 11.2. The commission also noted with satisfaction the results already accomplished by close collaboration between WMO and FAO and expressed its desire that this collaboration be continued in the future in all matters of common interest to the two organizations.

9.2.2 Since weather advice for fishing operations largely depends on weather reports obtained from fishing vessels, the commission then dealt with the various problems which arise in efforts to obtain reports from fishing vessels. The simple presentation of codes was regarded as essential, and the agreement of CSM to allow the use of a limited number of the present weather code "ww" (where initial difficulties are experienced in the use of the full code) was also welcomed. It was noted that the reluctance of skippers of fishing vessels to send reports sometimes stems from their wish not to divulge their position. In this connexion

the commission drew attention to private company codes and to the cipher scheme which was already in operation in whaling ships and which provided a partial solution to this problem.

9.2.3 Another difficulty concerned the transmission of reports from fishing vessels since some have no radio equipment at all on board and others have only radio-telephone with a short range. The commission considered that national authorities should encourage fishermen to equip their vessels with suitable radio equipment, especially when they operate far from their bases. The commission was informed that radio operators often have to wait a long time before clearing their messages to coastal stations and that this results in a loss of interest in making weather reports.

The commission felt that the attention of Members should be drawn to the provisions of the Radio Regulations (1959), Article 37, Chapter IX (Radio telegrams and Radiotelephone calls) and also to additional regulations, Article 24, paragraph 2054, concerning the use of "OBS".

9.2.4 The commission considers that prior to the production of the booklet referred to in paragraph 9.2.1, there is no reason why Members should not recruit the more advanced type of fishing vessels for making and transmitting simple observations in the SHRED code or even in plain language and urges those Members which have not so far recruited fishing vessels for this purpose to endeavour to do so.

9.2.5 Particular attention was drawn by the commission to the need for close and continuous liaison with fishing companies. Whilst the commission felt that this was generally the responsibility of the port meteorological liaison services, it was recognized that often these services had little opportunity for contact with fishing companies. The commission considered that such difficulties could be overcome by the appointment of local agents for duties in fishing harbours and by direct approach to fishing organizations concerned.

9.2.6 The commission also noted the document submitted by the Federal Republic of Germany concerning the difficulties experienced aboard fishery protection vessels where subregional RTT broadcasts are intercepted. It was pointed out that the RA VI Working Group on Meteorological Transmissions had discussed the problem of garbling due to the lack of a figure shift signal (Signal No. 30) following the alignment function and proposed it be taken up with CSM. The commission therefore requested the president of CMM to take the question up with the president of the Commission for Synoptic Meteorology.

9.3 Facsimile broadcasts of weather charts for shipping (Agenda item 9.3)

The commission discussed the organization of the facsimile transmission of meteorological charts for maritime purposes. It recognized that there is an increasing interest on the part of shipping to receive meteorological information by facsimile and Recommendation 16 (CMM-IV) was adopted. The commission invited the Secretary-General to prepare a map indicating the facsimile transmitting stations and areas for which charts suitable for shipping are issued. This material should be made available to all members of the Commission for Maritime Meteorology.

9.3.1 Establishment of special practices for transmission of meteorological charts intended for reception by ships (Agenda item 9.3.1)

The commission noted that the International Radio Consultative Committee (CCIR) included in its study programme Question 274 (XIII) which reads as follows :

> "What steps should be taken to establish a uniform practice for facsimile transmission of meteorological charts intended for reception by ships ?"

Since this question needs to be studied jointly with WMO, the commission made the following comments :

(a) The standards for international facsimile transmission characteristics (facsimile equipment and radio transmission) contained in WMO Publication No. 9.TP.4, Volume C, Chapter I, Part V, are considered adequate;

(b) Technical Regulations 7.2.1.1 and 7.2.1.2 already define the projections and scales which should be used for weather charts.

As to the presentation of facsimile weather charts intended for reception by ships, the commission was of the opinion that, in general, the same symbols should be used as for meteorological charts exchanged between Meteorological Services. It felt, however, that a few additional entries in the weather charts used by ships would facilitate their use by mariners. Specific suggestions of the commission on this subject were incorporated in Recommendation 16 (CMM-IV).

9.3.2 Establishment of criteria which facsimile transmissions should fulfil for publication in WMO Publication No. 9.TP.4 - Volume D (Agenda item 9.3.2)

The commission noted the decision of the thirteenth session of the Executive Committee to include in Volume D information on meteorological facsimile broadcasts, when they cover sea areas even though partly. The commission felt that the above procedures for publishing facsimile schedules in Volume D were satisfactory and should be continued.

9.4 MAFOR Code (Agenda item 9.4)

9.4.1 The commission reviewed the FM 61.C - MAFOR code form with a view to advising CSM on any deficiencies. It concluded that this code is, in general, suitable for transmission of weather forecasts for shipping.

9.4.2 However, the commission felt that :

(a) In the telecommunication heading of MAFOR bulletins the international date-time group (YYGGgg) should be included;

(b) The use of indicators for maritime areas should be co-ordinated on an international basis.

The commission adopted Recommendation 17 (CMM-IV).

9.4.3 Additionally, the commission noted that ships' officers had reported one important difficulty in using this code. This difficulty occurred when the group $1GDF_mW_1$, to indicate "occasionally" conditions (G = 9), was added at the end of the message. For example, when a 24-hour forecast was encoded but required two or more $1GDF_mW_1$ groups to cover the entire forecast period, ships' officers were unable to determine from the last group of the message, indicating "occasionally", the period of the forecast in which such conditions were expected to occur. The commission decided to request the president of CSM to arrange for clarification of the last sentence of note 3 for code FM 61.C (MAFOR) shown in Volume B, page I-A-1-69.

9.5 Storm warnings (Agenda item 9.5)

9.5.1 Special arrangements concerning storm warnings issued in regions where tropical cyclones may be encountered (Agenda item 9.5.1)

The commission noted that there exist certain discrepancies between paragraph 11.1.2.1 in Volume D, Part D of WMO Publication No. 9.TP.4 and paragraph 10.2.2.1 of the Technical Regulations, and also an inconsistency between the term "Tropical disturbance of

unknown origin" and "Tropical disturbance of unknown intensity". It adopted Recommendation 18 (CMM-IV) which eliminates these discrepancies.

The commission noted that the International Convention for Safety of Life at Sea (London, 1960) will come into force on 26 May 1965. The provisions contained in Chapter V of this convention have an important impact on the observing and reporting programmes of ships encountering specified severe weather conditions (i.e. tropical storm). The commission agreed to request the Secretary-General, in consultation with the presidents of CMM and IMCO, to bring those parts of Chapter V of this convention related to meteorology to the attention of Members.

9.5.2 Visual storm warning signals (Agenda item 9.5.2)

The commission re-examined the annex to Recommendation 19 (CMM-III) which is also published on page D-D-1-65 of Volume D of WMO Publication No. 9.TP.4. It noted that the remarks at present appearing against the ball and cone day signals were ambiguous and therefore subject to misinterpretation. It decided that a simple revision of these remarks would make the intention of the third session of CMM clear and accordingly adopted Recommendation 19 (CMM-IV) to this effect.

9.6 Code form FM 46.C, Analysis in abbreviated form (IAC FLEET) (Agenda item 9.6)

9.6.1 The commission noted the modifications made to FM.46.C by the third session of CSM in response to the requests of the third session of CMM. It also considered a proposal that the attention of CSM be drawn to the fact that the present code does not entirely meet the requirements of shipping. The shortcomings in the present code are given in Annex IV.

9.6.2 The commission accordingly decided to request the president of CSM to arrange for the modification of the code to meet the following requirements :

(a) That past and/or prognostic data relating to pressure systems and fronts be included in the same message with current analysed data; the past and prognostic positions to be given in the form $QL_aL_aL_oL_o$ as taken from the past or prognostic analysed charts.

(b) That all past and prognostic data for P_tP_cPP and $md_sd_sf_sf_s$ for pressure systems and $F_tF_1F_c$ and $md_sd_3f_sf_s$ for fronts be related to the time g_pg_p hours prior to and g_pg_p hours following current chart analysis G_cG_c, respectively.

(c) That provision be made to include in Section 88800 - waves, past and prognostic data relating to isopleths; the position data also to be given in the form $QL_aL_aL_oL_o$ where $QL_aL_aL_oL_o$ refers to g_pg_p hours prior to and g_pg_p hours following G_cG_c, respectively.

9.7 Standardization of details and wording of forecast in Part III of Weather Bulletins for Merchant Shipping (Agenda item 9.7)

9.7.1 The commission considered this item on the basis of two proposals made by India. The proposal to use the MAFOR code for issuing forecasts for shipping is dealt with under agenda item 7.1. As regards the desirability of a standardized terminology for plain language forecasts in English under Part III of the weather bulletins issued for shipping, it was felt that there were many difficulties to be overcome before a standard terminology could be adopted and they would require careful study. It was also suggested that it might be adequate if an outline of the elements to be included in the bulletins and their specifications were evolved and that they might at a later stage be included in Chapter 10 of the Technical Regulations.

9.7.2 The commission was therefore of the opinion that no final decision could be taken on this question at its fourth session. It accordingly decided to bring to the attention of members of CMM a specimen wording of a plain language bulletin in English (see Annex V) and to refer the broader question of standardization to the Working Group on the Collection of Ships' Weather Reports and the Provision of Shipping Forecasts (see agenda item 7.1) for study.

10. CLIMATOLOGICAL INFORMATION FOR SHIPPING AND FISHING (Agenda item 10)

10.1 Climatological summaries (Agenda item 10.1)

The CMM Working Group on Marine Climatology had been entrusted with the task of furnishing technical advice with regard to the preparation and publication of climatological summaries.

Resolution 35 (Cg-IV) specifies the procedures for preparing marine climatological summaries and the data to be included in these summaries. The CMM Working Group on Marine Climatology was invited to consider the question of the preparation and publication of climatological summaries with a view to giving further technical advice. The Commission considered the two following proposals put forward on this subject by the working group.

Layout of the monthly percentage frequency tables for wave observations

The CMM Working Group on Marine Climatology had recommended that Figure 1 included in Resolution 35 (Cg-IV), Annex, Part C, A.10, in which the emphasis is on the relation between $d_W d_W$ and H_W for given values of P_W, be replaced by a new table, the layout of which provides a representation in which the emphasis is on the relation between H_W and P_W for given ranges of $d_W d_W$.

This proposal was discussed at length by the commission. Although it was generally agreed that the new layout would provide a better representation, it was realized that introduction of this change would require an amendment to Resolution 35 (Cg-IV). However, it was noted that some of the Members responsible for the preparation of the marine climatological summaries had indicated that they supported the change. Taking into account that it would be better to introduce the change in the layout at an early stage in order to avoid disruption of the work on the summaries, it was finally decided to request the president of CMM to make the necessary arrangements to obtain, through the Secretary-General, the views of the responsible Members on this subject and if agreement is reached, to invite the President of the Organization to take the necessary steps to introduce the change as soon as possible.

Replacement of monthly percentage frequency tables for wave observations by seasonal tables

The second proposal from the working group was to replace monthly tables which would be based on an inadequate number of observations by seasonal tables, the seasons being as follows :

December - February
March - May
June - August
September - November

except in monsoon areas where they will be :

Winter monsoon months
Summer monsoon months
Transitional months.

It was mentioned that the preparation of monthly statistics could well prove difficult at least for some areas due to an insufficient number of observations, and that the idea of replacing monthly tables by seasonal tables was therefore justified. On the other hand, it was noted that there was no ideal set of seasons all around the world due to important variations of latitude and longitude. It was felt that this specific question should be studied further and it was decided to refer it to the new Working Group on Marine Climatology (see Resolution 1 (CMM-IV)) as a matter of urgency.

Publication of annual marine climatological summaries

The commission was informed that the sixteenth session of the Executive Committee had supported a proposal that each responsible Member indicated on the map of Part A of the annex to Resolution 35 (Cg-IV) should publish, at its own expense, the summaries relating to the area of responsibility allocated to it. It was noted that up to now seven of the nine Members had notified the Secretariat that they were prepared to undertake this work.

The commission took note of the view expressed by the IUGG representative that unless the marine climatological summaries were all published, the position would be unacceptable. If all parts of all summaries could not be published, it was noted that IUGG would then be satisfied by publication of a substantially reduced volume of marine climatic data on a global scale supplemented, wherever possible, by publication of more detailed information on a national or regional scale.

Publication of marine climatological summaries for former periods

The commission noted the great importance attached by IUGG to the retrospective collection and publication of marine climatic data referred to in Resolution 35 (Cg-IV), Annex, Part B, Sections 4 and 5. The commission agreed that the new Working Group on Marine Climatology (see Resolution 1 (CMM-IV)) should define what summaries should be prepared for the years before 1961.

Use of surface data from ocean islands for the preparation of marine climatological summaries

In studying suitable measures to facilitate the preparation of marine climatological summaries, the commission studied the usefulness for this purpose of surface observation data from meteorological stations situated on oceanic islands.

Some participants expressed their concern that most elements observed at meteorological stations on small islands were unrepresentative of the surrounding oceans and hence inclusion might lead to false interpretations.

Nevertheless, where marine observations are insufficient to provide meaningful statistical summaries, the oceanic island data might be of some assistance, particularly in the study of climatic anomalies.

The commission decided that it was advisable to consult the Commission for Climatology on this matter and to postpone any action until this commission has been able to give its opinion. This decision is the subject of Recommendation 21 (CMM-IV).

Arrangements for the collection, punching and distribution of data

It was suggested that these arrangements, which are specified in Resolution 35 (Cg-IV) Annex, Part D, be completed by a new provision : "Any country which issues international maritime punch-cards should submit observations only from those ships which have been recruited by the country concerned." It was realized that, according to the present provisions of this Part D, Members were requested to send only the observations from their ship stations, i.e. those stations on board ships they have recruited. In these conditions, it was agreed that the proposed addition was not necessary. It was decided to invite the attention of the Secretary-General to the fact that in Part D, paragraph 2, the first line

should be corrected to read "Members who operate selected or supplementary ship stations but.....". No correction is necessary to the corresponding French text. However, in order to make clear that Members who receive copies of log-books from ships they have not recruited should not introduce these observations in the exchange system, to avoid duplication it was agreed that the attention of Members should be called to this point. Recommendation 20 (CMM-IV) was adopted to this effect.

10.2 Marine section of the World Climatic Atlas (Agenda item 10.2)

Under this agenda item the commission examined the part of the report of the CMM Working Group on Marine Climatology dealing with the results of the preparatory studies for the marine section of the World Climatic Atlas, entrusted to the group as a result of Resolution 1 (CMM-III).

Regarding the selection of elements and class intervals for which representations of simultaneous occurrences should be included, the commission endorsed the view of the working group that it would be premature at this stage to make a detailed and final selection of combinations of meteorological elements, but that at least the following should be included :

- Winds force 8 or more associated with air temperature less than - 2°C (conditions favourable to superstructure icing);
- Wind speed and direction in association with visibility less than two miles (formation of advection fog).

It was agreed that the problem should remain under review.

The commission also agreed to the opinion expressed by the working group that it would be unwise at this stage to make any detailed recommendations about the selection of elements and representative areas for the study of climatic trends. It was considered that some Members might carry out studies on this item for specific areas and that the matter should continue to be studied.

With regard to the representation of the variability of meteorological elements, the commission noted the view expressed by the working group that there is a need for further investigation by Members into :

(a) The possibility of representing the frequency distributions of scalar elements by a combination of two normal distributions, or by a log-normal distribution, or by standard deviation and a measure of skewness;

(b) The problem of computing compound wind distribution.

It was noted that several Members were working on this subject. It was agreed that the matter should be reviewed again at the fifth session of CMM. Since all the above-mentioned subjects still required continuing attention, it was felt necessary to re-establish a CMM Working Group on Marine Climatology with substantially the same terms of reference. Resolution 1 (CMM-IV) was adopted to this effect.

The views of the CMM working group on the Marine Section of the World Climatic Atlas have been communicated to the CCl Working Group on Climatic Atlases. It was noted that the comments of the chairman of the CCl working group were in general agreement with those of the CMM working group. It was decided to request the Secretary-General to communicate to the new CMM Working Group on Marine Climatology the comments of the chairman of the CCl working group reproduced in CMM-IV/Doc. 29, ADD.1.

10.3 International punch-card for recording precipitation observations during the International Indian Ocean Expedition (Agenda item 10.3)

The commission noted that a punching code for recording precipitation observations during the International Indian Ocean Expedition had been prepared by the chairman of the CMM Working Group on Marine Climatology and approved by the president of CMM and by the scientific director for meteorology of the expedition. It was noted that no difficulties had been experienced by Members in punching the cards on account of this additional punching le.

11. SPECIALIZED TRAINING OF METEOROLOGICAL PERSONNEL IN THE FIELD OF MARITIME METEOROLOGY AND TRAINING OF MARINE OBSERVERS (Agenda item 11)

11.1 Handbook on "The preparation and use of weather maps by mariners" (Agenda item 11.1)

The commission examined the draft of the WMO Technical Note on "The preparation and use of weather maps by mariners" prepared under the chairmanship of Dr. M. Rodewald (Federal Republic of Germany) by the CMM working group established for this purpose by Resolution 3 (CMM-III). It expressed its appreciation to the working group for the thorough and careful manner in which the working group had carried out its task.

It was pointed out that sections 4,- Specific forecasting rules, and 6,- Details of how to make use of weather maps, of Part II were more suitable for meteorologists than for mariners, and therefore might be omitted. However, it was agreed that these parts as they stand could be of interest and use to many present-day mariners who have received sufficient meteorological training, and therefore these parts should remain.

For making reliable analyses, the great importance of weather reports from ships plying sparse areas was mentioned, and to stress this point, it was agreed to introduce in the draft a short relevant paragraph together with the WMO chart of sparse areas.

It was suggested that an example for the plotting of wave charts from a coded wave analysis message should be included. However, since only one Member is presently issuing such messages in an experimental way, after some discussion, it was considered that there was no real requirement to introduce such an example in the draft. Moreover, wave charts which can be used without any decoding and plotting are already included by several Members in facsimile broadcasts.

With regard to Appendix II to the draft, which contains code forms and code tables for marine purposes and conversion tables, it was appreciated that this appendix would require amending from time to time to be kept up to date with respect to codes. However,there is no provision for an amendment service for papers published in the series of WMO Technical Notes, and the full code forms and code tables are published in Volume B of WMO Publication No. 9 and reproduced in national publications made available to shipping by the national authorities concerned. Therefore, it was considered preferable not to introduce the codes in the handbook but to make reference to the appropriate WMO publications. As regards conversion tables, which are already provided to ships for other purposes, it was also agreed that their inclusion was not necessary.

The amendments to the draft introduced by the commission are listed in Annex VI. Taking into account the decision of the Executive Committee that the more important Technical Notes should be published in the four official languages of the Organization, subject to the approval by the Executive Committee in each case, and that the value of the present Technical Note would be enhanced for ships' officers if it were made available in these four languages, the commission agreed to recommend that the Note be published in the four official languages (Recommendation 22 (CMM-IV) was adopted to this effect).

11.2 Outline of a booklet on instructions and advice to fishermen (Agenda item 11.2)

The commission noted that the Working Group on Weather Advice for Fishing Operations had, in accordance with its terms of reference, produced an outline which could be used by national services as a basis for the writing of a booklet entitled "Fishermen and the weather". This outline is reproduced in Annex VII. The commission was made aware that the FAO Advisory Committee on Marine Resources Research had recommended that model booklets "Fishermen and the weather" and "Oceanography for fishermen" be produced by FAO in collaboration with WMO and UNESCO as expeditiously as possible in order to be made available to national agencies as models for booklets to be distributed to fishermen. It was recognized that this project raised a number of problems from the formal and practical points of view. Regarding the formal aspects, it was pointed out that FAO had already prepared a draft model booklet which, because of the difficulties experienced by FAO, partially modifies the outline developed by the CMM working group. It was therefore considered that close collaboration with FAO is essential, but that WMO is primarily responsible for the meteorological booklet. As regards practical aspects, it was recognized that a single model booklet would not be acceptable due to the large variations in climatic conditions all over the world, the differences in educational level among fishermen, the varying nature of fishing activities (coastal waters, versus long-haul operations). It was therefore agreed that several models should be prepared to cater to the different local requirements. FAO should make known to those in charge of the drafting, the educational standards of the fishermen in the various areas for which models would have to be prepared. In all cases, the text should be worded as simply as possible. It was finally agreed to recommend the Executive Committee to authorize the establishment of a joint WMO/FAO working group. Recommendation 23 (CMM-IV) was adopted to this effect.

11.3 Oceanographic training of meteorological personnel (Agenda item 11.3)

As the consequence of a request of the thirteenth session of the Executive Committee, the president of CMM consulted members of the commission by correspondence on the desirability of drawing up a training syllabus for the special requirements in the field of the commission. On the basis of the answers received, the president decided to establish a working group with the following terms of reference :

(a) To prepare a syllabus for oceanographic training of meteorological personnel engaged in forecasting activities for sea areas;

(b) To prepare a syllabus for the observation of oceanographic elements for training of meteorological personnel engaged in observational activities on ocean weather stations.

However, the working group was not able to arrive at any firm conclusions because its members lacked sufficient information as to the exact meaning of these terms.

Therefore at the fourth session of the commission a questionnaire was circulated to all members present. In short, a majority of the members who replied to the questionnaire agreed that CMM should prepare a Guide, or Guides, for the specialized training of meteorological observers who make observations of waves and sea surface temperature.

Subsequent discussions on this subject questioned just how far the Guide, or Guides, should go in providing training material for forecasters and observers, specifically :

(a) Forecasters making forecasts for sea areas need knowledge of oceanographic factors, such as subsurface temperatures, mixing layers and areas of upwelling, because these factors can and do affect atmospheric processes over the oceans;

(b) If meteorological observers are expected to make subsurface temperature observations, then specialized training is required for them;

(c) For fishermen, observations and forecasts should include subsurface temperatures down to the thermocline.

The commission concluded that relevant material, including the actual questionnaires received, be passed to the president of CMM and that the president of CMM be asked to take whatever action he considers necessary, taking into account :

(a) The decisions recorded in paragraph 5.3.4 of the general summary of Fourth Congress;

(b) The report of the president to CMM-IV; and

(c) The desirability of seeking the advice and assistance of the Intergovernmental Oceanographic Commission.

11.4 Technical report on port meteorological liaison officer activities (Agenda item 11.4)

At its third session CMM decided that each Member should send a report on the activities of port meteorological officers to the president of CMM. On the basis of these replies, a Technical Note was prepared by the Netherlands upon the request of the president of CMM and submitted to the session for consideration. After study of the Note, taking into account comments provided by Members, the commission expressed its appreciation and recommended that it should be published as a suitable WMO publication. Recommendation 24 (CMM-IV) was adopted.

11.5 Guide for use by marine observers on board mobile ship stations (Agenda item 11.5)

The commission examined the draft "Manual for use by marine observers on mobile ship stations" which had been prepared by the Working Group on the Preparation and Use of Weather Maps by Mariners at the request of the president of CMM. It was agreed that this manual had to be considered independently of the draft Technical Note on the "Preparation and use of weather maps by mariners" since it covered a different subject. The commission decided that much of the information contained in this draft manual is covered in the Guide to Meteorological Instrument and Observing Practices, Chapter 10. As, however, the contents of Chapter 10 are much too elaborate for the purpose of instructing observers on auxiliary ships, the question arises whether each Member should make a compilation of the necessary information for this purpose, or whether uniform instructions should be issued by WMO. The commission felt that there was a need for uniformity in this respect and that it can only be met by issuing a "Manual for use by marine observers on board auxiliary ships". The president of CMM is requested to arrange with the Netherlands, as a matter of urgency, for the preparation of such a manual, taking into account the information contained in the draft manual mentioned above, including the comments and amendments given in CMM-IV/Doc. 47, Annexes XI and XII.

11.6 Complete re-examination of the selection of cloud pictures most appropriate to a cloud album intended for exclusive use by observers at sea (Agenda item 11.6)

(a) Marine Cloud Album

The commission reviewed the selection of cloud pictures composing the Marine Cloud Album and felt, on the basis of experience gained, that for the time being no change was required. However, it requested the Secretary-General to conduct an inquiry into this matter so that Members who feel that the present selection is not suitable should state which specific pictures are concerned and submit more satisfactory ones for consideration, specially photographs taken at sea. On the basis of the result of the inquiry and of the photographs so collected, the president of CMM will be in a position to determine whether a complete re-examination is required. If necessary, a small working group could be established by the president to prepare a report for consideration at the fifth session of the commission.

(b) Cloud sheet for use on board ships

The commission noted that the cloud sheet has already been distributed to observers on board many ships and has in general been well received. It reviewed the layout of the sheet and recommended that, if another printing is made, the cloud pictures be arranged horizontally by groups with the high clouds at the top, middle clouds in the centre and low clouds at the bottom of the chart; suitable lines or spacing should be made to separate each group. The dominant cloud form symbol and number should be emphasized more by using slightly larger type, with other clouds present being identified in smaller type.

11.7 Guide to Climatological Practices, Chapter 9, Marine Climatology, and Chapter 13, Application of Climatological Data (Agenda item 11.7)

The commission noted that the text for Chapter 9 (Marine climatology) of the WMO Guide to Climatological Practices (WMO No. 100.TP.44) had been prepared by the chairman of the CMM Working Group on Marine Climatology and approved by the president of CMM on behalf of the commission. The president of CCl subsequently agreed to the inclusion of this text in the Guide to Climatological Practices, and it was accordingly published as Chapter 9 of the Guide in September 1961.

With respect to Chapter 13 of the same Guide dealing with various aspects of the application of climatological data, the commission noted that the CCl Working Group on the Guide and Technical Regulations prepared a preliminary draft of the section on marine aspects and referred it to CMM for review. The chairman of the CMM Working Group on Marine Climatology prepared an amended version of this draft and submitted it to the president of CMM who approved it on behalf of his commission. The text of the whole Chapter 13, including the contribution from CMM, is now under study by the CCl Working Group on the Guide and Technical Regulations and it is expected that this chapter will be published in the first half of 1965.

The commission examined a text proposed for inclusion in paragraphs 9.5.1 and 9.5.2 of Chapter 9 of the Guide to Climatological Practices, which had been prepared by the Working Group on Marine Climatology at the request of the president of CMM. It was agreed that this text, which is derived from Resolution 35 (Cg-IV) and specifies the procedures for preparing marine climatological summaries, should be included in the Guide to Climatological Practices. It was decided to ask the president of CMM to transmit the proposed text (see Annex VIII) to the president of CCl with a request that he authorize its publication in the Guide to Climatological Practices.

The commission wished to record its appreciation of the work performed by the chairman of the Working Group on Marine Climatology in connexion with the CCl Guide on Climatological Practices.

11.8 Manual : "The value and use of the International Maritime Meteorological Punch-Card" (Agenda item 11.8)

The commission examined the final draft of the Manual submitted to the session by the CMM Working Group on Marine Climatology. In preparing this final draft, the working group had taken into account the comments formulated by members of the commission on the previous draft. The commission agreed to recommend that the text prepared by the working group be published as a WMO manual for the benefit of Members who are not yet familiar with punch-card procedures.

Recommendation 25 (CMM-IV) was adopted to this effect.

11.9 Guide to Meteorological Instrument and Observing Practices, Chapter 10, Marine Observations (Agenda item 11.9)

11.9.1 Paragraph 10. 9 - Ocean waves (Agenda item 11.9.1)

The commission noted that the CMM Working Group on Technical Problems had, in accordance with its terms of reference, prepared a new text for paragraph 10.9.1.1 of the Guide to Meteorological Instrument and Observing Practices. This text has been circulated among the members of the commission. In view of the strong support which this new text had received, the president of CMM approved it with a few minor amendments on account of comments received. This new text has been introduced in the Guide by an amendment dated January 1964.

The attention of the commission was invited to the fact that this new text includes definitions of "sea" and "swell" different from those given for these two terms in paragraph 10.9.2. It was agreed that the definitions in paragraph 10.9.2 should be replaced by those of the new paragraph 10.9.1.1 and that paragraph 10.9.2 be transferred to the beginning of section 10.9. The commission decided to invite its president to take care of this matter.

11.9.2 Paragraph 10.10 - Ice (Agenda item 11.9.2)

The commission was informed that,due to the fact that no ice code is used on a world-wide basis,it was still not possible to prepare a suitable paragraph for inclusion in the Guide. No further action was recommended, but it was decided to leave it to the president of CMM to reconsider this question, as required, when progress will have been made in the tasks referred to the Working Group on Sea Ice.

11.9.3 General (Agenda item 11.9.3)

In addition to its conclusion on ocean waves (agenda item 11.9.1) the commission also noted that the Working Group on Technical Problems had prepared a revised text on paragraph 10.2.1 for inclusion in the Guide (CMM-IV/Doc. 4, p. 17). The commission accepted the proposal and requested the president of CMM to examine, in consultation with the chairman of the Working Group on Technical Problems, whether this text can now be submitted to the president of CIMO or should first be reconsidered by the working group. It was also decided that if certain parts of Chapter 10 still require to be revised,the working group should be requested to undertake this task.

11.10 Revision of Technical Notes No. 2 (Parts I and II) and No. 47 (Agenda item 11.10)

11.10.1 The commission considered the desirability of revising Technical Notes No. 2 - Methods of observation at sea (Part I - Sea surface temperature, Part II - Air temperature and humidity, atmospheric pressure, cloud height, wind,rainfall and visibility) and No. 47 - Precipitation measurements at sea. It studied in more detail the case of sea surface temperature taking into account the discussions under agenda item 5.1. Although it realized that extensive research had been carried out since the issue of Technical Note No. 2, the commission felt that there was no real need at this stage to issue a revised Note, firstly, because literature is generally available on such studies and secondly, because there is too little to report on the development of cheap reliable instruments and methods for routine use on board selected ships.

11.10.2 Revision of Technical Note No. 47 was not considered necessary since this note is based on information dating only from the third session of CMM. It was, however, agreed that this question should be reconsidered by the re-established Working Group on Technical Problems.

11.11 Contents of WMO Publication No. 9.TP.4, Volume D (Agenda item 11.11)

11.11.1 Meteorological and non-meteorological codes and observation practices

The commission examined the layout of Volume D as proposed by Recommendation 31 (CMM-II). It felt that the proposed Part E - Meteorological and non-meteorological codes and observation practices - which was not yet published would serve no useful purpose because:

(a) No Member was issuing Volume D to its ships; and

(b) Codes are published in Publication No. 9.TP.4, Volume B.

The commission agreed that Part E should not be published and all reference to it appearing in the present Volume D should be deleted. The Secretary-General is requested to make all necessary amendments.

11.11.2 Equivalents given in Part G of Volume D

The commission noted that for the International Meteorological Tables an equivalent of 1 nautical mile = 1,852 m was used. It decided that in WMO Publication No. 9.TP.4, Volume D, an equivalent of 1 nautical mile = 1,852 m should be used. The Secretary-General is requested to make the appropriate amendments to Part G of Volume D.

12. SEA ICE (Agenda item 12)

12.1 Ice symbols (Agenda item 12.1)

The commission considered analyses of the symbols used by the various countries as presented by the chairman of the Working Group on Sea Ice, and a proposed new system of symbols submitted by Canada, which is expected to be used during the summer of 1965. This system rigidly associates concentration with developments and floe size. One member mentioned that a similar system was in use in his own country. The commission felt that this was an ideal system, but that it was difficult to apply for most countries which do not have sufficient observing facilities. In addition, the Unified Ice Code does not record this association.

It was unfortunately found impossible at the time of the session to adopt an international set of symbols because countries have still not had sufficient time to consider what is possible, although they are willing to make the necessary changes. It was, however, felt that all symbols must follow rigidly the classes indicated by the present Ice Nomenclature, so that all maps are comparable.

The specification of the symbols laid down by the previous working group are considered still relevant, i.e. a set of symbols to be used in the international exchange of ice data by chart and facsimile. These symbols should be compatible with the Nomenclature and the codes, and should be flexible enough to permit the reporting of ice conditions in varying degrees of detail, depending on requirements.

The task of designing a set of ice symbols for international exchange of ice data by chart and facsimile was referred as a matter of urgency to the re-established Working Group on Sea Ice. It was recommended that all the relevant documents available during the session be considered by the new group. These documents are CMM-IV/Doc. 68 and 63 and the note on "Background and utilization of proposed WMO unified ice code" (including the station plotting model) reproduced as Annex IX.

12.2 Illustrated International Ice Nomenclature (Agenda item 12.2)

The commission noted that a preliminary set of photographs for the Illustrated Ice Nomenclature which has been made available since June 1957 at Photohaus, Friedrich Kunze,

Hamburg, has been completed by the addition of 44 new photographs submitted by various Members. The commission accepted this Illustrated Ice Nomenclature and expressed its appreciation to the chairman of the working group for the work he has done in this respect. It was noticed that there remain a few terms in the Ice Nomenclature which are not illustrated by two photographs (i.e. from both sea and air). The missing photographs are :

(a) Photographs taken from ships or shore

1.15	Bay ice
1.214	Polar fast ice
2.21	Glacier tongue

(b) Photographs taken from the air

1.141	Young polar ice
1.142	Arctic pack
1.15	Bay ice
1.22	Ice foot
1.324	Growler
1.3312	Medium ice field
1.3313	Small ice field
1.531	Shore polynya
2.21	Glacier tongue

In this relation, the commission stated that this publication will need some changes as the Ice Nomenclature evolves and as additional pictures become available.

However, the commission considered that the Illustrated Ice Nomenclature as it stands now is the best likely to be available for several years. It therefore recommended that the publication of this Nomenclature as approved by Resolution 18 (EC-XIII) now be undertaken by WMO in its present loose-leaf form so that modifications can easily be made from time to time as necessary.

It was recommended that the production of the Illustrated Ice Nomenclature should continue to be supervised by the re-established Working Group on Sea Ice and in particular by Mr. Fabricius.

Finally it was stated that this Illustrated Ice Nomenclature needs further consideration by countries using it,with a view to obtaining missing or better pictures.

12.3 Abridged International Ice Nomenclature (Agenda item 12.3)

The commission considered modification in the International Ice Nomenclature suggested by the Canadian Committee on Oceanography, the Scott Polar Research Institute, and the Instituto Antartico Argentino. It concluded that no changes should be made in the present limits e.g. the ranges of thicknesses for young,winter and polar ice, but subdivisions of present classes are acceptable. A body of data has already been started with the present limits. As an example of an acceptable change, the present "Thick winter ice 30 - 200 cm" probably should be subdivided. The commission strongly agreed that the present Nomenclature should be extended but its fundamental divisions should not be altered.

When including this question in the terms of reference of the working group, the commission recommended that the proposed amendments be examined by the members of this group, if necessary in consultation with other experts in their countries, and that their conclusions be forwarded to the chairman of the working group. The commission expressed the hope that the group will find it possible to come to final conclusions on each specific proposal by the end of 1965.

12.4 Code for reporting sea ice (Agenda item 12.4)

The commission examined a proposal submitted by the United States of America for an abbreviated form (ICE D) of the WMO Unified Ice Code (see Annex X). It was found that this code was not sufficiently simple for observers without training and experience and it was not unanimously accepted.

The commission was informed that the only country that has tested the WMO Unified Ice Code systematically is the United States of America. The results of these tests are given in Annex IX. From scrutiny of this code and of the results of the experiments referred to above, it was concluded that the present WMO Unified Ice Code (ICE A, ICE B, ICE C) can only be used by specially trained observers but it has the great merit of providing information directly for punch-cards. If the Ice Nomenclature is changed, corresponding changes in the ice codes will be inevitable.

It was finally decided to request the Secretary-General to draw the attention of Members to the existence of this abbreviated ICE D code in addition to the WMO Unified Ice Code so that those which have the opportunity to do so may try them out. Results of such tests or comments on the U.S. experience should be submitted to the chairman of the Working Group on Sea Ice. The working group will have to reconsider whether the results of the tests justify a new submission of ice codes to the Commission for Synoptic Meteorology. It was confirmed that the use of these codes would not preclude the use of plain language or any other local code.

12.5 Re-establishment of the Working Group on Sea Ice

Since all the points discussed under agenda item 12 still required continuing attention, it was felt necessary to re-establish the Working Group on Sea Ice with similar terms of reference. In addition, in view of the urgency attached to the above questions, particularly the development of a set of ice symbols and the amendments to the Abridged Ice Nomenclature and of the magnitude of the task allocated to this group, the commission decided that individual members shall act as rapporteurs within the working group for specific subjects. Resolution 2 (CMM-IV) was adopted.

The commission decided that, after adequate preparation by correspondence through the rapporteurs, a session of the working group should be organized early in 1966 to draw up final conclusions in particular as regards ice symbols.

The commission stressed the importance, for the effective working of the group, of consulting, as appropriate, specialized institutes like the polar institutes.

13. OCEANOGRAPHY (Agenda item 13)

13.1 Application of meteorology to oceanography (Agenda item 13.1)

13.1.1 The commission reviewed international activities in oceanography since its third session. It noted that most of the questions of interest to both meteorology and oceanography were specifically covered in various items of the agenda of the session. It considered, however, that the study of ocean-atmosphere interaction deserved special attention.

13.1.2 The commission considered that the study of ocean-atmosphere interaction from the meteorological point of view should be carried out for three main reasons :

(a) The scientific interest of this study lay essentially in the elucidation of the combined influence of the various meteorological factors involved in this interaction;

(b) The technical interest lay in the determination of improved measurement procedures and methods of meteorology which could be applied directly or adapted to the requirements of this study;

(c) The practical interest of the applications of this study lay in the possibility of improving meteorological assistance to human activities related to the oceans, such as fishing, maritime commerce, extended forecasting and other activities.

13.1.3 The commission decided that a working group should be established within the commission to collate available studies, co-ordinate action already initiated and promote new action within the framework of the study of ocean-atmosphere interaction. The establishment of this working group is the subject of Resolution 5 (CMM-IV).

13.1.4 The commission considered that the terms of reference of the working group should be framed broadly enough to enable this group to adapt the details of these terms of reference to include such additional detailed points which might be required, for instance, if it were transformed into a joint group by combining with a corresponding group of another organization.

13.1.5 The commission noted the activities of the Intergovernmental Oceanographic Commission and other bodies in the oceanographic aspects of the ocean-atmosphere interaction and particularly IOC Resolution III 17. The commission also noted with satisfaction the action undertaken by the Executive Committee and the Secretary-General in application of Resolutions 17 and 26 of Fourth Congress for close WMO/IOC co-operation.

13.1.6 The commission noted finally that CAe had set up a working group on the boundary layer with terms of reference which complements those of the CMM group on ocean-atmosphere interaction.

13.1.7 In consequence, the commission decided to request the Executive Committee and the Secretary-General to take, within the framework of WMO/IOC collaboration, specific measures to ensure the closest possible co-operation between the CMM Working Group on Ocean-Atmosphere Interaction and appropriate IOC bodies or experts and with other scientific groups in the field of oceanography. This decision is contained in Recommendation 26 (CMM-IV).

13.2 Safety regulations of oceanographic and meteorological buoys (Agenda item 13.2)

13.2.1 The commission noted Resolution A.50 (III) on the marking of oceanographic stations, which was adopted by a session of the IMCO Assembly. It felt that this resolution is also applicable to meteorological buoys. The commission therefore requested the Secretary-General to bring this resolution to the attention of Members concerned.

13.2.2 The IOC representative drew the attention of the commission to paragraph 3(h) of the Annex to Resolution A.50 (III), which allows IOC, at its discretion, to use numbers or other inscriptions on the stations for identification and other purposes. He expressed the view that a co-ordination of the identification of meteorological and oceanographic buoys might be necessary. The commission requested the Secretary-General to take the necessary action with IOC and Members concerned, if and when necessary.

14. AMENDMENTS TO THE TECHNICAL REGULATIONS (Agenda item 14)

14.1 Inclusion of definitions for manned stations on fixed platforms, automatic stations on unmanned platforms and anchored buoys in Technical Regulation 2.1.2.1 (Agenda item 14.1)

Fourth Congress requested the Commission for Maritime Meteorology and the Commission for Synoptic Meteorology to consider the possible inclusion in Technical

Regulation 2.1.2.1 of definitions for manned stations on fixed platforms and automatic stations on unmanned platforms and anchored buoys. On the basis of the suggestions of the CMM Working Group for the Study of a World-Wide Network of Surface and Upper-Air Sea Stations, the commission agreed to amend Technical Regulation 2.1.2.1 and to propose the insertion of the corresponding definitions in Chapter 1 to the Technical Regulations. The commission adopted Recommendation 27 (CMM-IV).

14.2 International Maritime Meteorological Punch-Card (Agenda item 14.2)

The commission considered the amendments to the layout of the International Maritime Meteorological Punch-Card proposed by the Working Group on Marine Climatology, and adopted Recommendation 28 (CMM-IV). When doing so,the commission kept in mind that any amendment should be restricted to the use of additional punchings which have not yet been allocated, and that the specifications of those already allocated should not be altered.

The commission also requested that the list of numbers indicating in columns 61-62 on the International Maritime Meteorological Punch-Card the "country which has recruited the ship" shall be included in Chapter 9 - Marine climatology - of the Guide to Climatological Practices. Finally, in order to avoid confusion with the expression "country of origin", the commission requested that a footnote be added to the list of indicators referred to above, stating that this expression had previously been used for columns 61-62.

14.3 Information to be supplied by Members with respect to coastal stations designated for the reception of reports from ships (Technical Regulation 6.2.2.1) (Agenda item 14.3)

14.3.1 The commission reviewed the present layout and content of Part B - Coastal stations accepting ships' reports - of Volume D of WMO Publication No. 9.TP.4. It noted that the ITU publication "List of Coast Stations", for which a 6-monthly amendment service is provided, contains details on all coastal radio stations. After a lengthy discussion, the commission concluded that it is necessary to publish in WMO Publication No. 9.TP.4, Volume D, full information on coastal radio stations accepting ships' reports. Details as regards the type of information to be included and its presentation are found in Recommendation 11 (CMM-IV).

14.3.2 The commission noted that the Part B of Volume D, containing a list of coastal radio stations accepting ships' weather reports, is at present not kept up to date because Members responsible for the operation of these stations are not supplying the necessary information to the Secretariat. The commission felt that similar arrangements as for supplying amendments for meteorological broadcasts are required. The commission adopted Recommendation 29 (CMM-IV).

14.4 Changing the recommended practice in Technical Regulation 6.2.2.9 into a standard practice (Agenda item 14.4)

14.4.1 The commission noted that telecommunication authorities in some Member countries objected to using "OBS" as the first word in the address of ships' weather messages because :

(a) It was identical to the paid service indication "OBS" which must precede the address of all meteorological messages as required by the Additional Radio Regulations (Geneva, 1959), Article 4, and Telegraph Regulations (1952); and

(b) National instructions require a minimum of 5 letters in the first word of the address.

However, the commission agreed that it was desirable that the first word of the message address be standardized and should be METEO. Recommendation 10 (CMM-IV) was adopted accordingly.

14.4.2 The commission also considered the question of changing the word "should" to read "shall" in Technical Regulation 6.2.2.9. However, the ITU representative stated that there was no rule in the Radio Regulations (Geneva, 1959) requiring ships to include the abbreviation "OBS" in the call from observing ships to the coastal stations to secure appropriate priority of answer by the coastal stations as required by Technical Regulation 6.2.2.9. Some Members indicated that while some ships were following this procedure in Technical Regulation 6.2.2.9, others were not complying with this request since it was not required by the Radio Regulations (1959).

14.4.3 The ITU representative pointed out that the Radio Regulations (Geneva 1959), Additional Regulations, Article 4, Section 2, Part C - Meteorological Radiotelegrams, paragraph 15 (2), reads : "Meteorological radiotelegrams must bear the paid service indication OBS before the address. This paid service indication is the only one admitted." The commission then agreed to recommend that a new paragraph be added in the Technical Regulations to follow Technical Regulation 6.2.2.9 and adopted Recommendation 30 (CMM-IV).

14.4.4 The commission noted the report of the Inter-Agency Working Group on the Co-ordination of the Safety of Life at Sea and in the Air, in which the problem of the utilization of "OBS" followed by the name of the coastal radio station instead of the name of the Meteorological Service was considered. However, no conclusion was reached.

14.5 General

14.5.1 Under this item the commission considered a proposal from the president of CMM to incorporate the main principles of Resolution 35 (Cg-IV), International arrangements for marine climatological summaries and for data collection for the marine section of the World Climatic Atlas, in the appropriate chapter of WMO Technical Regulations. At the request of the president of CMM, the Working Group on Marine Climatology had prepared for this purpose draft amendments to section 8.3 of the Technical Regulations. The commission introduced some modifications to these amendments and decided to recommend that they be included in the Technical Regulations. Recommendation 31 (CMM-IV) refers.

14.5.2 It was noted that when the arrangements for publication of these summaries have been completed, it will be necessary to add one or more paragraphs to section 8.5 of the Technical Regulations, dealing with the publication of marine climatological summaries.

14.5.3 The commission noted that some adjustments were necessary to certain Technical Regulations in order to bring them up to date with present observing and reporting practices. It felt that the responsibilities of auxiliary ships should be made more specific by the Technical Regulations. The commission agreed that some measure of continuity in the allocation of zones of responsibility for the collection of ships' weather reports and in the operation of coastal radio stations was required. Furthermore, a change in the warning procedures was felt necessary. The commission adopted Recommendation 32 (CMM-IV).

15. ROUTING OF SHIPS BY MEANS OF EXTENDED WEATHER AND WAVE FORECASTING (Agenda item 15)

The commission heard a description of the work being carried out in the Netherlands and in the United States on the routing of ships by the provision of special weather advice on an individual basis. It was noted that similar work was being carried out in the U.S.S.R. and that studies on this subject are continuing. Great interest was shown in the methods used and the concensus was that the results already achieved showed considerable promise for the future. It was felt that the technique used and the associated problems should be studied internationally and the WMO, through its Commission for Maritime Meteorology, was the correct body to ensure co-ordination of these efforts.

The commission recorded its appreciation of the information on this subject presented to the session and decided to request the Secretary-General to arrange for the distribution of reports on the work carried out in the Netherlands, U.S.S.R. and the United States to Members of the Commission for Maritime Meteorology.

16. SCIENTIFIC LECTURES AND DISCUSSIONS IN THE FIELD OF THE COMMISSION (Agenda item 16)

An interesting and informative group of illustrated lectures was arranged during an afternoon meeting on 2 December 1964. The subjects of the lectures and the names of the speakers are listed below.

Application of satellite and aircraft observations to problems of maritime meteorology : P.H. Kutschenreuter.

Voyages into "sparse areas" of the southern oceans : A.B. Crawford.

The story behind MAMOS - Marine Automatic Meteorological Observing Station : W.W. Shinners and Captain R.E. Mottern.

Each lecture was accompanied by slides and provided most useful complementary information regarding several items on the agenda.

17. ESTABLISHMENT OF WORKING GROUPS (Agenda item 17)

The commission established or re-established five working groups on the following items to carry out the programme of the commission between the fourth and fifth sessions :

Marine Climatology

Sea Ice

Technical Problems

Collection of Ships' Weather Reports and the Provision of Shipping Forecasts

Ocean-Atmosphere Interaction.

As far as possible, the chairmen and members of the working groups were designated by the commission. The terms of reference and the composition of the working groups are given in Resolutions 1 to 5 (CMM-IV).

The commission also recommended that WMO accept participation in a joint FAO/WMO working group on the preparation of booklets on "Fishermen and the weather". The terms of reference and the composition of the working group, as far as WMO is concerned, are given in Recommendation 23 (CMM-IV).

18. REVIEW OF PREVIOUS RESOLUTIONS AND RECOMMENDATIONS OF THE COMMISSION (Agenda item 18

In accordance with current practice, the commission examined those resolutions and recommendations of CMM which are still in force. As regards Recommendation 18 (CMM-III), Ice Accretion on Ships, it was agreed that it need no longer be kept in force but that the Secretary-General be requested to introduce in WMO Publication No. 9, Volume D, Part D, the substance of paragraph 2 under RECOMMENDS of this recommendation. Resolution 6 (CMM-IV) was adopted.

19. REVIEW OF EXECUTIVE COMMITTEE RESOLUTIONS RELATED TO THE COMMISSION (Agenda item 19)

The commission examined the Executive Committee resolutions in the field of maritime meteorology and agreed in Recommendation 33 (CMM-IV) that only Resolution 19 (EC-III), Use of Ocean Weather Ships for Research Purposes, needs to be kept in force.

20. ELECTION OF OFFICERS (Agenda item 20)

Mr. K.T. McLeod (Canada) was elected president and Mr. G. Verploegh (Netherlands) vice-president of the commission.

21. DATE AND PLACE OF THE FIFTH SESSION (Agenda item 21)

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

22. CLOSURE OF SESSION

A provisional version of the abridged report of the session was distributed on the last day.

Before closing the session Mr. H. Thomsen expressed satisfaction at the results achieved and thanked all who had contributed to the success of the session, particularly the chairmen of the working committees and all staff members of the WMO Secretariat whose assistance had been so valuable throughout the duration of the session. He thanked the Secretary-General of WMO for the excellent facilities which had been provided. He further wished the new president and vice-president good luck in their work for the commission during the coming period.

On behalf of all the delegates, Commander C.E.N. Frankcom congratulated Mr. Thomsen on his competent way of conducting the session and also the staff of the Secretariat on their efficiency and enthusiasm in carrying out their tasks.

Dr. K. Langlo, representative of the Secretary-General, also paid tribute to the work of Mr. H. Thomsen as president of the session. He expressed his appreciation of the work of the interpreters and other staff specially engaged for the session and thanked the commission for its generous hospitality at the close of the session.

The session closed at 4.50 p.m. on 8 December 1964.

RESOLUTIONS ADOPTED BY THE SESSION

Res. 1 (CMM-IV) - WORKING GROUP ON MARINE CLIMATOLOGY

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING :

(1) Resolution 1 (CMM-III),

(2) A statement presented by the International Union of Geodesy and Geophysics;

CONSIDERING that a number of marine climatological problems have to be studied between the sessions of the commission;

DECIDES :

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

(a) To pursue preparative studies for the marine section of the World Climatic Atlas, such as :

(i) Selection of elements and class intervals for which representations of simultaneous occurrences should be included,

(ii) Selection of elements and representative areas for the study of climatic trends,

(iii) Representation of the variability of meteorological elements, considering inter alia :

- the possibility of representing the frequency distributions of scalar elements by a combination of two normal distributions, or by a log-normal distribution, or by standard deviation and a measure of skewness,
- the problem of computing compound wind distribution,

(b) To pursue studies regarding the preparation and publication of climatological summaries, particularly with respect to :

(i) The selection of months for seasonal percentage frequency tables described in Resolution 35 (Cg-IV),Annex, Part C, paragraph A. 10,

(ii) The summaries which should be prepared and the selection of elements for the summaries described in Resolution 35 (Cg-IV), Annex, Part B, paragraph 5,

(2) To invite, subject to the concurrence of the permanent representatives concerned, the following experts to serve on the working group :

W.H. Haggard (U.S.A.) (chairman)
N. Bradbury (United Kingdom)
H.J. Bullig (Federal Republic of Germany)
V.V. Filippov (U.S.S.R.)

J.J. le Roux (South Africa)
G. Roncali (Italy)
G. Verploegh (Netherlands).

NOTE : This resolution replaces Resolution 1 (CMM-III) which need no longer be kept in force.

Res. 2 (CMM-IV) - WORKING GROUP ON SEA ICE

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING Resolution 2 (CMM-III);

CONSIDERING :

(1) The urgent requirement for a set of ice symbols to be used in the international exchange of ice data by chart and facsimile,

(2) The desirability of publication by WMO of the Illustrated International Ice Nomenclature,

(3) The necessity for keeping the WMO Abridged Sea Ice Nomenclature current, in the light of expanding sea ice technology;

DECIDES :

(1) To establish a Working Group on Sea Ice with the following terms of reference:

(a) Designing a set of ice symbols to be used in the international exchange of ice data by chart and facsimile. These symbols should be compatible with the Nomenclature and the codes, and should contain enough flexibility to permit reporting of ice conditions in varying degrees of detail, depending on requirements,

(b) Final editing of the Illustrated International Ice Nomenclature for publication,

(c) Studying the proposals made by Members for amendments to the Abridged Ice Nomenclature, and preparing recommendations on these,

(d) Arranging for further study and testing of the Unified Ice Codes with a view to their possible adoption by the Commission for Synoptic Meteorology;

(2) To invite, subject to the concurrence of the permanent representatives concerned, the following experts to serve on the working group :

G.A. Tunnell (United Kingdom) (chairman)
J.S. Fabricius (Denmark)
G. Heap (United Kingdom)
W.E. Markham (Canada)
E. Palosuo (Finland)
J.J. Schule (U.S.A.)
A. Treshnikov (U.S.S.R.)

one expert to be designated by each of the following Members :

Argentina
Federal Republic of Germany

(3) To request individual members to act as rapporteurs within the working group in accordance with the following :

Ice symbols : G.A. Tunnell
Illustrated International Ice Nomenclature : J.S. Fabricius
Abridged Ice Nomenclature : G. Heap
Ice codes : J.J. Schule.

Res. 3 (CMM-IV) - WORKING GROUP ON TECHNICAL PROBLEMS

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING Resolution 4 (CMM-III);

CONSIDERING that a number of technical problems will need to be kept under continuous review between the sessions of the commission;

DECIDES :

(1) To establish a Working Group on Technical Problems, with the following terms of reference :

(a) To keep under review the investigations concerning the improvements in methods of observation and measurement at sea, to co-ordinate the results and the exchange of information particularly with regard to the following problems :

(i) Measurement of sea surface temperature with particular reference to :

- comparative measurement of temperature obtained from the condenser intake thermometer using, among others, recording devices,
- the development of simple, cheap and reliable instruments for measuring sea surface temperature,

(ii) Precipitation measurements at sea with particular reference to the need for increasing the amount of precipitation data furnished by mobile ship stations,

(iii) Wind structure at sea,

(iv) Observation and measurement of waves and reporting of state of sea,

(b) To report to the president of the commission any important developments occurring in the above fields to enable him to inform members of the commission accordingly,

(c) To consider, upon request of the president, any amendments which should be made to Chapter 10 of the Guide to Meteorological Instrument and Observing Practices and any other questions referred to the working group by the president of the Commission for Maritime Meteorology,

(2) To invite, subject to the concurrence of the permanent representatives concerned, the following experts to serve on the working group :

F. Spinnangr (Norway) (chairman)
W.T.R. Allen (Canada)
M. Dury (Belgium)
J. Romer (France)
H. Walden (Federal Republic of Germany)
A. Zribi (Tunisia)

An expert nominated by Poland
An expert nominated by the United Kingdom
An expert nominated by U.S.A.
An expert nominated by U.S.S.R.

Res. 4 (CMM-IV) - WORKING GROUP ON THE COLLECTION OF SHIPS' WEATHER REPORTS AND THE PROVISION OF SHIPPING FORECASTS

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING the new plan for the collection of ships' weather reports developed by the fourth session of the Commission for Maritime Meteorology and the important role which the CMM Working Group on the Collection of Ships' Weather Reports and the Provision of Shipping Forecasts has played;

CONSIDERING :

(1) That there is a need to keep under review developments relating to the collection and dissemination of ships' weather reports and the provision of meteorological information for shipping,

(2) That new problems may arise when implementing decisions as regards the collection and dissemination of ships' reports;

DECIDES :

(1) To re-establish the Working Group on the Collection of Ships' Weather Reports and the Provision of Shipping Forecasts composed of the following experts nominated in the course of the fourth session of the commission :

C.E.N. Frankcom (United Kingdom) (chairman)
Bonnard (Senegal)
L.M. de la Canal (Argentina)
A.B. Crawford (South Africa)
R.L. Kintanar (Philippines)
H.E. van Rheenen (Netherlands)
K.U. Siddiqi (Pakistan)
A.E. Sik (U.S.A.)
I. Tarbeev (U.S.S.R.)
T. Tournier (France)

and of experts who may be nominated later by Members,

(2) That the terms of reference of the group shall be as follows :

(a) To keep under constant review developments relating to the collection and dissemination of ships' weather reports,

(b) To formulate recommendations, as necessary, as regards WMO plans for the collection and dissemination of ships' weather reports,

(c) To keep under constant review developments relating to the provision of information for shipping,

(d) To formulate recommendations, as necessary, as regards WMO plans for the provision of information for shipping,

(e) To carry out any other task of an operational aspect in marine meteorology which the president of the Commission for Maritime Meteorology may allot to it.

Res. 5 (CMM-IV) - WORKING GROUP ON OCEAN-ATMOSPHERE INTERACTION

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING paragraphs (a) and (d) of its terms of reference;

CONSIDERING :

(1) That the applications of meteorology to oceanography and to allied fields will benefit considerably from a comprehensive study of ocean-atmosphere interaction,

(2) That, from the meteorological point of view, such a study is of scientific and technical interest and would have practical application;

DECIDES :

(1) To establish a Working Group on Ocean-Atmosphere Interaction with the following terms of reference :

(a) To collate available results and to co-ordinate and promote studies with a view to determining the factors involved in ocean-atmosphere interaction,

(b) To study, stimulate and co-ordinate programmes within the general framework of the study of ocean-atmosphere interaction. In carrying this out,the working group should take into account the long experience gained in meteorological practices and procedures,

(c) To study the results obtained in the study of ocean-atmosphere interaction with a view to the improvement of meteorological services to human activities dependent on the ocean,

(d) To propose procedures and texts of international agreements for the purposes indicated in (b) and (c) above,

(e) To make proposals to the president of the Commission for Maritime Meteorology on any matters which would assist the group in carrying out its work,

(f) To present to the president of the commission a progress report on its activities once a year and a final report six months before the fifth session of the commission,

(2) To invite, subject to the concurrence of the permanent representatives concerned, the following experts to serve on the group :

W.W. Shinners (U.S.A.) (chairman)
G.P. Britton (United Kingdom)
M. Giorgi (Italy)
H.U. Roll (Federal Republic of Germany)
G. Verploegh (Netherlands)
An expert nominated by France
An expert nominated by U.S.S.R.

Res. 6 (CMM-IV) - REVISION OF THE RESOLUTIONS AND RECOMMENDATIONS OF THE COMMISSION FOR MARITIME METEOROLOGY

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING the action taken on the recommendations adopted prior to its fourth session;

CONSIDERING that all the resolutions adopted prior to its fourth session are now obsolete;

DECIDES :

(1) To keep in force Recommendations 27 and 28 (CMM-III) and to publish their texts in the report of the fourth session of the commission,*

(2) Not to keep in force Resolutions 1 to 9 (CMM-III),

(3) To note with satisfaction the action taken by the competent bodies on its Recommendations 1 to 7, 9 to 26, 29 to 32 (CMM-III), which are now redundant.

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* See page 146.

RECOMMENDATIONS ADOPTED BY THE SESSION

Rec. 1 (CMM-IV) - MEASUREMENTS OF SEA SURFACE TEMPERATURE

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING Recommendation 8 (CMM-III);

CONSIDERING :

(1) That it has not been possible, up to now, to develop a uniform method of obtaining sea surface temperatures to the required accuracy which can be used economically and easily on merchant ships,

(2) That certain doubts have been expressed with respect to the absolute reliability, under certain conditions, of measurements obtained from condenser intake thermometers;

RECOMMENDS :

(1) That Members carrying out further studies on measurement of sea surface temperature :

(a) Devote particular attention :

(i) To making comparative measurements of temperature obtained from condenser intake thermometers using, amongst others, recording devices,

(ii) To developing a simple, cheap and reliable instrument for measuring sea surface temperature which could easily be used aboard voluntary observing ships,

(b) Keep the Secretary-General informed of the results obtained in these matters,

(2) That the Secretary-General be requested to send a circular letter to Members, drafted in consultation with the president of the Commission for Maritime Meteorology, inviting Members to make a special effort to improve the measurements of sea surface temperature at mobile ship stations.

NOTE : This recommendation replaces Recommendation 8 (CMM-III) which need no longer be kept in force.

Rec. 2 (CMM-IV) - PRECIPITATION MEASUREMENTS AT SEA

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING Recommendation 7 (CMM-III);

CONSIDERING :

(1) That further investigations are required to obtain more reliable precipitation data from oceans,

(2) That precipitation measurements already carried out on board ocean weather stations, although not as accurate as desirable, would provide very useful data from areas where no such information is received at present;

RECOMMENDS :

(1) That Members be requested :

(a) To pay particular attention in further studies of this question to the need to develop instruments and procedures which may, at a later stage, facilitate the inclusion of precipitation measurements in the routine reporting programme of a number of mobile ship stations,

(b) To keep the Secretary-General informed of the results obtained in this field,

(2) That Members operating ocean weather stations on which precipitation measurements are made be invited to take appropriate measures so that the relevant data be included twice a day, preferably in the morning and in the evening, in the routine weather reports of ocean weather stations, using the appropriate $7RRt_Rt_R$ group of the SHIP code form.

NOTE : This recommendation supersedes Recommendation 7 (CMM-III) which need no longer be kept in force.

Rec. 3 (CMM-IV) - INVESTIGATIONS ON WIND STRUCTURE AT SEA

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING the report submitted by the CMM Working Group on Technical Problems on the studies now carried out on wind structure at sea;

CONSIDERING that the determination of wind structure at sea is of practical importance, in particular for ship design and ship safety, study of wind effects on coastal works, wave forecasting, and for the determination of correction factors for the reduction of wind measurements to a standard height;

RECOMMENDS :

(1) That Members be invited :

(a) To carry out further studies on wind structures at sea, paying special attention to the aspects of particular interest to the Commission for Maritime Meteorology,

(b) To submit the results of their studies to the Secretary-General,

(2) That a document summarizing the information received from Members be submitted in an appropriate form to the fifth session of the commission.

NOTE : This recommendation supersedes Recommendation 9 (CMM-III) which need no longer be kept in force.

Rec. 4 (CMM-IV) - MEASUREMENT OF WIND AT SEA

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING :

(1) Resolution 4 (CMM-III),

(2) The relevant part of the report of the CMM Working Group on Technical Problems;

CONSIDERING :

(1) That, for meteorological purposes, wind estimates at sea are not in all circumstances reliable enough, particularly in higher ranges of wind speeds and sometimes also at night,

(2) That there is a need for more precise wind data in these higher wind speeds;

RECOMMENDS : that Members

(1) Be urged to continue efforts to develop and install suitable fixed wind measuring equipment in ships and to educate seamen in its use,

(2) Be invited to keep the Secretary-General informed of developments.

Rec. 5 (CMM-IV) - EQUIVALENT SPEEDS FOR THE BEAUFORT NUMBERS

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING :

(1) Recommendation 12 (CMM-III),

(2) Resolution 18 (EC-XIII),

(3) General summary of the third session of the Commission for Synoptic Meteorology;

CONSIDERING the need for introducing a new scale for equivalent speeds for the Beaufort numbers;

RECOMMENDS that the new table for equivalent speeds for the Beaufort numbers given in the annex* to this recommendation be adopted by the World Meteorological Organization.

NOTE : This recommendation supersedes Recommendation 12 (CMM-III) which is no longer in force.

* See Annex XI.

Rec. 6 (CMM-IV) - REPORTING OF ICE ACCRETION ON SHIPS

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING Recommendation 27 (CSM-III);

CONSIDERING that there is a requirement for reporting quantitative values of the rate of ice accretion and total ice accretion on vessels and that additional information on causes of ice accretion would be of value;

RECOMMENDS that Members operating ocean weather stations, research vessels and other ships in higher latitudes be invited :

(1) To conduct tests as a matter of urgency to determine a practical procedure for simple quantitative estimation of rates of ice accretion and total ice accretion, which, when developed, can readily be carried out aboard such vessels as fishing trawlers, and to report findings to the president of the Commission for Maritime Meteorology prior to the fourth session of the Commission for Synoptic Meteorology, if possible,

(2) To study the causes of icing, to determine whether additional causes to those listed in the World Meteorological Organization Code Table 1751-I_S, such as (a) spray and snow, (b) fog and rain, and (c) snow and fog, should be added to the table,

(3) To forward the results of these studies to the Secretary-General as soon as possible.

Rec. 7 (CMM-IV) - LOCUST REPORTS FROM SHIPS

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING :

(1) Resolution 12 (EC-XI),

(2) Recommendation 16 (CMM-III),

(3) Resolution 18 (EC-XIII),

(4) The request from the Anti-Locust Research Centre that locust reports from ships be supplemented, wherever possible, by sending to it specimens of the locusts observed in order to establish which species of locust is concerned;

CONSIDERING :

(1) The importance of appropriate warnings to all countries threatened by locust invasion,

(2) The value of locust reports from ships when such warnings are being issued by the Anti-Locust Research Centre and for the related control operations,

(3) That the cost of such messages will be defrayed by the Desert Locust Information Service in London;

RECOMMENDS :

(1) That Members concerned be invited to instruct reporting ships, regardless of their nationality, operating in the seas around Africa, Arabia, Pakistan and India, to send by radio, and in plain language, reports on any locusts seen to "Telex 24364 = Anti-Locust London" - through Portishead Radio Station (United Kingdom),

(2) That each locust report should contain the following elements :

(a) Date and time (specifying GMT or zone time) when locusts first seen,

(b) Latitude and longitude, if possible to nearest minute, where locusts first seen,

(c) Time and position at which locusts last seen,

(d) Whether isolated locusts (seen in flight singly), locust group(s) (flying locusts seen intermittently in numbers), swarm (flying locusts seen continuously in numbers, over a period of at least a minute), dense swarm (obscuring part of horizon or other background), locusts appearing on board or floating dead locusts (isolated, groups or swarms),

(e) Colour of locusts (yellow, pink, grey),

(f) Wind direction and speed,

Details of such reports should be entered in the ship's meteorological log, even when it has not been possible to send a radio report,

(3) That, in addition to sending locust reports, ships be instructed to collect, wherever practicable, specimens of the locusts observed and to post them as soon as possible to the Desert Locust Information Service, Anti-Locust Research Centre, College House, Wright Lane, London, W.8;

REQUESTS the Secretary-General to incorporate the substance of this recommendation in WMO Publication No. 9.TP.4, Volume D.

Rec. 8 (CMM-IV) - GUIDANCE ON REPORTING PRECIPITATION AT SEA

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING the table proposed by the United Kingdom for assisting weather observers at sea in coding present weather "ww", reproduced in the annex* to the present recommendation;

CONSIDERING that guidance material for assisting observers at sea in coding present weather "ww" would be useful especially to ensure uniformity in coding by day and night;

RECOMMENDS :

(1) That Members be invited to carry out trials with the suggested or similar tables,

(2) That the results of these trials be examined by the CMM Working Group on Technical Problems with a view to preparing a table containing guidance for using code figures of present weather "ww" which are relevant to precipitation,

* See Annex XII.

(3) That the recommended table be submitted to the fifth session of the Commission for Maritime Meteorology.

9 (CMM-IV) - CODED METEOROLOGICAL MESSAGES FOR INTERNATIONAL EXCHANGES

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING :

(1) Resolution 30 (Cg-IV),

(2) Resolution 31 (Cg-IV),

(3) The present differing practices in reporting wind speeds,

(4) That the International Civil Aviation Organization and the Inter-Governmental Maritime Consultative Organization have the question under consideration;

CONSIDERING :

(1) The requirements for uniformity in automatic data processing,

(2) The desirability of avoiding the possibility of ambiguity;

RECOMMENDS that, as a matter of urgency, a code table for reporting wind speeds (corresponding to the symbolic letters "ff" in present WMO codes) be devised, taking into account the undesirability of disruption of existing climatological records and also of the long-established practices for estimating and reporting wind speeds at sea.

Rec. 10 (CMM-IV) - USE OF "METEO" AS THE FIRST WORD OF THE ADDRESS IN SHIPS' WEATHER MESSAGES

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING that some Members are unable to use the abbreviation "OBS" as the first word of the address in ships' weather messages;

CONSIDERING :

(1) The desirability of standardizing the first word of the address in ships' weather messages,

(2) That some Members must employ a minimum of five letters in the first word of the address of telegrams;

RECOMMENDS that Members endeavour to employ "METEO" as the first word in the address of ships' weather messages.

Rec. 11 (CMM-IV) - COLLECTION AND DISSEMINATION OF SHIPS' REPORTS

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING :

(1) Paragraphs 5.14.1 and 5.14.2 of the general summary of Third Congress,

(2) Recommendation 6 (CMM-III),

(3) Paragraph 10.4 of the general summary of the third session of the Commission for Synoptic Meteorology,

(4) Recommendation 44 (CSM-III),

(5) Technical Regulations 6.1.1.1, 6.2.2.7, 6.3.3.1 and 6.3.4.1,

(6) That the present arrangements for the collection of ships' reports outlined in WMO Publication No. 9.TP.4, Volume D, have proved insufficiently effective,

(7) The report of the CMM Working Group on the Collection of Ships' Weather Reports and Provision of Shipping Forecasts;

CONSIDERING :

(1) That ships' weather reports form the basis for issuing forecasts and warnings for shipping and, to a large degree, for other meteorological activities,

(2) That,an efficient transmission of ships' reports from ships to coastal radio stations is fundamental,

(a) That this depends very much upon the goodwill and enthusiasm of the radio officers aboard mobile ship stations, and also on the efficiency of the coastal radio stations designated by Members for the collection of ships' reports,

(b) That subject to the general principle that ships' reports should be transmitted to the nearest radio station designated for the collection of reports, a degree of freedom should be provided to the radio officers aboard ships in case of difficulty in contacting promptly the nearest station,

(c) That the instructions to the radio officers need to be as simple as possible,

(3) That the ship's report should enter the telecommunications system for the exchange of basic meteorological data in the same way as the synoptic reports from land stations, i.e. through the territorial, subregional and regional broadcast centres,

(4) That each Member should arrange for its territorial centre to collect expeditiously all the ships' reports received at the designated coastal radio station(s) existing in its territory and for prompt retransmission of the reports to the appropriate subregional centre(s);

RECOMMENDS :

(1) That the world-wide plan for the collection and dissemination of ships' weather reports be in accordance with the annex* to this recommendation,

* See Annex XIII.

(2) That Members be encouraged to designate MF and HF coastal radio stations for receiving ships' reports from high seas shipping in areas where there is a shortage of such stations,

(3) That regional associations take urgent action to establish the zones outlined in part II of the annex* to this recommendation for which each subregional centre (or other centres with similar functions) is responsible for the international retransmission of ships' reports and to confirm that the coastal radio stations referred to in paragraph (2) under "REQUESTS" below meet the minimum regional needs;

REQUESTS the Secretary-General :

(1) To issue a new Map A entitled : "Broad outline of zones for the collection and dissemination of ships' reports", replacing the present Map A of WMO Publication No. 9.TP.4, Volume D, Part D, page D-D-1-35. The new map will delineate the above-mentioned zones as established by the regional associations concerned in the light of RECOMMENDS (3) above,

(2) To issue in WMO Publication No. 9.TP.4, Volume D, new lists of coastal radio stations receiving, free of charge to the ship, radio weather messages from high seas shipping and from shipping close to the coasts, in accordance with the arrangements outlined in paragraph 5 of the annex* to this recommendation. These lists should not be arranged according to countries but should give for each zone an alphabetic list of coastal stations designated in the zone, with full particulars : location, nationality, call sign, working frequencies, type of modulation, hours of operation of the station, and the address with which weather messages should be headed when transmitted to a radio station. All HF coastal radio stations should be underlined,

(3) To reprint the following information in a convenient form so that it can be made available to Members at a nominal price for distribution to ships' officers : Amended WMO Publication No. 9.TP.4, Volume D, Part B, together with a suitable introduction and appropriate additional information, based on the annex* to this recommendation, including a map showing the positions of coastal stations designated to collect ships' reports. HF stations designated for the reception of reports from high seas shipping are to be underlined. Zones to be indicated by the roman figure of the region, followed by a capital letter indicating the zone (i.e. Zone I/A,..). The names of the subregional centres would not be shown on this map. A note on the map should indicate that complete information about the coastal stations shown on the map is given in the list referred to in paragraph (2) above and this list will be included in the reprint.

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* See Annex XIII.

Rec. 12 (CMM-IV) - ADDITIONAL PROCEDURES FOR THE TRANSMISSION OF WEATHER MESSAGES BY "SINGLE-OPERATOR" SHIPS

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING :

(1) That the majority of weather messages are furnished by "single-operator" ships,

(2) The difficulties sometimes experienced in the transmission of weather messages by "single-operator" ships,

(3) That some ships do not follow the international plan for watch hours as given in the Radio Regulations, Appendix 12,

(4) The earnest efforts made by radio officers in ships to transmit as many messages as possible,

(5) Technical Regulation 3.3.1.5;

CONSIDERING :

(1) The requirement to receive as many weather messages as possible from "single-operator" ships,

(2) The need for additional procedures for making observations and transmitting weather messages from "single-operator" ships;

RECOMMENDS :

(1) That in the absence of normal transmissions of observations at main standard times, the procedures for taking observations and transmitting weather messages by "single-operator" ships given in the annex* to this recommendation be implemented on a world-wide basis,

(2) That Members concerned inform all of their reporting ships of the procedures contained in the annex;*

REQUESTS the Secretary-General to include the substance of the annex to this recommendation in WMO Publication No. 9.TP.4, Volume D.

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* See Annex XIV.

Rec. 13 (CMM-IV) - REPORTS FROM SELECTED, SUPPLEMENTARY AND AUXILIARY SHIPS

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING the report of the CMM Working Group on the Collection of Ships' Weather Reports and the Provision of Shipping Forecasts;

CONSIDERING :

(1) That there exists generally a lack of ships' reports in certain areas, particularly in the southern hemisphere,

(2) That there is a need to recruit more selected and supplementary ships,

(3) That a considerable number of ships plying routes in areas where reports are sparse have not been recruited as auxiliary ships,

(4) That recruiting of auxiliary ships does not require funds for providing meteorological instruments aboard and also provides a low-cost method for improving the distribution of reports received from sparse areas of the oceans;

RECOMMENDS :

(1) That Members endeavour to recruit as many additional selected and supplementary reporting ships as possible, subject to funds being available,

(2) That in addition Members continue their efforts to recruit additional auxiliary ships to furnish reports from sparse areas,

(3) That Members provide the Secretary-General every six months with a list of new auxiliary ships recruited (100 copies), for distribution to Members for issue to their port meteorological officers,

(4) That the map shown in the annex* to this recommendation replace the map in WMO Publication No. 9.TP.4, Volume D, page D-D-1-7;

REQUESTS the Secretary-General :

(1) To make available to Members on request additional copies of the map for use in recruiting more auxiliary ships,

(2) To approach the Inter-Governmental Maritime Consultative Organization and other maritime organizations in order to obtain their co-operation in giving adequate publicity to the contribution that ships can make to their own safety and economic operation by reporting weather observations,

(3) To bring the text of Regulation 4, Chapter V of the International Convention for Safety of Life at Sea (1960), to the attention of Members of the World Meteorological Organization.

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* See Annex XV.

Rec. 14 (CMM-IV) - PROGRAMME OF RADIOSONDE OBSERVATIONS ABOARD MOBILE SHIPS

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING :

(1) The report of the Working Group on the Study of a World-Wide Network of Surface and Upper-Air Sea Stations and, in particular, its proposals for a programme of radiosonde observations aboard mobile ships,

(2) Resolution 22 (Cg-IV),

(3) Resolution 11 (EC-XVI);

CONSIDERING :

(1) That the oceans cover about three-quarters of the earth's surface and that no upper-air observations are made over much of this area,

(2) That the absence of upper-air data from the oceans frequently prevents Meteorological Services from providing timely advice for the protection of human life and property both at sea and on land,

(3) That data from the oceans are indispensable for research into large-scale meteorological phenomena,

(4) That the adoption of the working group's proposal for a world-wide programme of radiosonde observations aboard mobile ships would constitute a major step forward in present efforts to introduce the concept of the World Weather Watch;

RECOMMENDS :

(1) That Members be urged to establish one or more mobile ship radiosonde programmes aboard ships travelling through sparse data areas, or to assist other Members to establish co-operative programmes,

(2) That such programmes be started as soon as practicable,

(3) That efforts be made to obtain winds aloft by visual or electronic means,

(4) That Members planning such programmes should keep the Secretary-General informed;

INVITES the attention of Members participating in the scheme :

(1) To the map annexed* to this recommendation which provides guidance material in the selection of routes traversing sparse data areas,

(2) To the particular value of augmenting the number of ships carrying out such programmes in sparse areas wholly or partly south of the equator.

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* See Annex XVI.

Rec. 15 (CMM-IV) - REVISED PLAN FOR THE PROVISION OF SHIPPING FORECASTS

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING :

(1) Technical Regulations paragraph 10.2.1.1,

(2) Map B - Areas of responsibility for shipping forecasts - contained in WMO Publication No. 9.TP.4, Volume D,

(3) Recommendations of regional associations, approved by the Executive Committee, relating to the changes in the areas allocated to Members since the last printing of Map B;

CONSIDERING :

(1) That in order that Map B, contained in Volume D, be of maximum use, it must be brought up to date,

(2) That reprinting of Map B is essential so that all recommendations of regional associations and of the Commission for Maritime Meteorology, approved by the Executive Committee in Map B, may be included,

(3) That certain ocean areas are still not provided with shipping forecasts;

RECOMMENDS :

(1) That Map B, as amended by the session (see the annex* to this recommendation), should replace the Map B at present published in Volume D of WMO Publication No. 9.TP.4,

(2) That Members and regional associations endeavour to arrange to provide shipping forecasts for ocean areas for which services have not yet been implemented, as indicated in the annex* to this recommendation,

(3) That, whenever a Member responsible for issuing shipping forecasts for a given ocean area is no longer able to provide this service, the Member should inform the president of the regional association concerned and the Secretary-General at least six months in advance,

(4) That in cases as stated in paragraph 3 above (under "RECOMMENDS"),the regional association concerned, in consultation with the president of the commission, take prompt action to arrange for the provision of shipping forecasts for the area(s) concerned;

REQUESTS the Secretary-General to include in WMO Publication No. 9.TP.4, Volume D, a world map showing the areas covered by Bulletins A, C, and D for high seas and also by selected "coastal" bulletins, and to keep this map up to date.

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* Annex XVII.

Rec. 16 (CMM-IV) - FACSIMILE BROADCAST OF METEOROLOGICAL INFORMATION FOR MARITIME PURPOSES

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING :

(1) Recommendation 17 (CMM-III),

(2) The International Convention for Safety of Life at Sea (London, 1960), Chapter V, Regulation 4b (ii),

(3) The increasing number of ships equipped for the reception of meteorological information by facsimile;

CONSIDERING :

(1) That the facsimile broadcast of meteorological information offers a valuable service to shipping and for fishing vessels,

(2) That the existing and planned meteorological facsimile broadcasts can be of use to meet the requirements for shipping and for fishing vessels,

(3) That such broadcasts could satisfy more efficiently maritime requirements if appropriate adjustments of programmes (e.g. contents of broadcasts including presentation of charts) and areas in which the broadcasts are intended to be received were made;

RECOMMENDS :

(1) That Members operating facsimile broadcasts should consider the possibility of making appropriate adjustments to :

(a) The programmes of their facsimile broadcasts,

(b) The presentation of charts transmitted,

(c) The areas for which the broadcast is intended, taking into account the annex* to this recommendation,

(2) That Members should assist shipping companies in becoming familiar with WMO specifications for standardized facsimile equipment;

ENCOURAGES other Members to establish facsimile broadcasts for the benefit of shipping and fishing vessels;

REQUESTS the Secretary-General to include the details of facsimile broadcasts of interest to shipping in WMO Publication No. 9. TP.4, Volume D, even though the charts only partially cover a sea area.

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* See Annex XVIII.

Rec. 17 (CMM-IV) - FORECAST FOR SHIPPING, FM 61.C - MAFOR

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING :

(1) Recommendation 25 (CSM-III),

(2) Recommendation 30 (CSM-III);

CONSIDERING :

(1) That information on the time of issue of a forecast is important for users,

(2) That, in the case of non-routine messages, the time of transmission can significantly differ from the time of issue,

(3) That no indicators for maritime areas have been allocated and published in WMO Publication No. 9.TP.4, Volume D;

RECOMMENDS :

(1) That the international date-time group YYGGgg should be included in the telecommunication heading of MAFOR bulletins,

(2) That regional associations and the Executive Committee Working Group on Antarctic Meteorology be invited to arrange for the allocation of suitable figures as indicators for maritime areas (AAA) as used in FM 61. C - MAFOR code, taking into account the following scheme for the allocation of figures :

Region I	:	Africa	100-199
Region II	:	Asia	200-299
Region III	:	South America	300-399
Region IV	:	North and Central America	400-499
Region V	:	South-West Pacific	500-599
Region VI	:	Europe	600-699
Antarctica	:		700-799

Rec. 18 (CMM-IV) - AMENDMENTS TO SPECIAL ARRANGEMENTS CONCERNING STORM WARNINGS ISSUED IN REGIONS WHERE TROPICAL CYCLONES MAY BE ENCOUNTERED

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING :

(1) Paragraph 10.2.2.1, Technical Regulations,

(2) Paragraph 11.1.2.1, WMO Publication No. 9.TP.4, Volume D, Part D, Chapter I,

(3) Paragraph 8.2.4 of the general summary of the third session of Regional Association II;

CONSIDERING that the special arrangements concerning storm warnings issued in regions where tropical cyclones may be encountered shall remain in conformity with the relevant parts of the Technical Regulations;

RECOMMENDS :

(1) That paragraph 11.1.2.1, sub-paragraph 2, WMO Publication No. 9.TP.4, Volume D, Part D, Chapter I, be amended as follows :

"2. Statement of type of warning

	Corresponding wind in Beaufort force	In knots
Warning	Up to 7	Up to 33
Gale warning	8-9	34-47
Storm warning	10 and over	48 or more
Hurricane (or local warning)	12	64 and over
Tropical disturbance of unknown intensity	wind speed uncertain	

(NOTE : The use of the word "warning" alone should not give rise to misunderstanding, as the text of the bulletin will make it clear.)",

(2) That the Secretary-General draw the attention of Members to the above decision.

Rec. 19 (CMM-IV) - INTERNATIONAL SYSTEM OF VISUAL STORM WARNING SIGNALS

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING Recommendation 19 (CMM-III) and the annex thereto;

CONSIDERING that the remarks at present appearing in the annex opposite the ball and cone day signals are liable to give rise to some ambiguity;

RECOMMENDS that these remarks be amended as follows :

(1) The remark against the ball day signal (near gale) to read :

"This signal applies to wind force 7 Beaufort (28-33 kt) (see Note 3)",

(2) The remark against the cone day signal (gale or storm) to read :

"The cones apply to wind of force 8 Beaufort (34-40 kt) or more (see Note 4)"

(3) The following notes to be added :

"(3) Or additionally, to force 6 (22-27 kt) if local circumstances - e.g. fishing activities, etc. - require such a lower limit.

(4) Or additionally, to force 7 (28-33 kt) if local circumstances necessitate the indication of wind direction.";

REQUESTS the Secretary-General to make the necessary changes in Volume D of WMO Publication No. 9.TP.4.

Rec. 20 (CMM-IV) - COLLECTION OF DATA FOR THE PREPARATION OF MARINE CLIMATOLOGICAL SUMMARIES

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING Resolution 35 (Cg-IV);

CONSIDERING :

(1) That some Members may receive copies of log-books of ship stations which have been recruited by another Member,

(2) That, according to Resolution 35 (Cg-IV), Members are requested to dispatch to the Members indicated on the map of the annex to Resolution 35 (Cg-IV) only the observations from the ship stations which have been recruited by them, but

(3) That some Members could overlook this limitation and dispatch also observations available to them from ship stations which they have not recruited, and

(4) That this practice would lead to duplication;

RECOMMENDS that the Members be invited to note, in application of Resolution 35 (Cg-IV), that those Members which receive copies of observations or log-books from ship stations they have not recruited should take care that copies of these data will not be dispatched to the Members responsible for the preparation of the marine climatological summaries.

Rec. 21 (CMM-IV) - USE OF SURFACE DATA FROM OCEANIC ISLANDS FOR THE PREPARATION OF MARINE CLIMATOLOGICAL SUMMARIES

THE COMMISSION FOR MARITIME METEOROLOGY,

CONSIDERING :

(1) That meteorological observations made at small islands may be generally unrepresentative of the conditions in the surrounding oceans, and

(2) That in cases where marine data is too sparse to provide valid statistical summaries, ocean island data has some value which cannot be ignored, particularly in anomaly studies;

RECOMMENDS :

(1) That the Commission for Climatology be asked to state which surface observations carried out on oceanic islands could, in certain conditions of environment, be used to supplement marine climatological summaries,

(2) That the Members interested be asked, after being informed of the opinion of the Commission for Climatology, and after consultation by correspondence with the Commission for Maritime Meteorology, to take steps to enable information to be made available on those meteorological elements which are representative of the surrounding oceanic areas.

Rec. 22 (CMM-IV) - WMO TECHNICAL NOTE ON THE PREPARATION AND USE OF WEATHER MAPS BY MARINERS

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING :

(1) Recommendation 21 (CMM-III),

(2) The decision taken by the Executive Committee on this recommendation, which is recorded in Resolution 18 (EC-XIII),

(3) The decision of the Executive Committee regarding the publication of some WMO Technical Notes in the four official languages of the Organization recorded in Resolution 16 (EC-XVI);

CONSIDERING that the value of the Technical Note "The preparation and use of weather maps by mariners" prepared by the working group of the Commission for Maritime Meteorology established for this purpose by Resolution 3 (CMM-III), as amended by the fourth session of the commission, would be enhanced if it were made available in the four official languages of the Organization;

RECOMMENDS that the Technical Note "The preparation and use of weather maps by mariners" be published in the four official languages of the Organization.

Rec. 23 (CMM-IV) - COLLABORATION WITH THE FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS IN THE PREPARATION OF BOOKLETS ON "FISHERMEN AND THE WEATHER"

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING the request in Recommendation 15 of the FAO Advisory Committee on Marine Resources Research that the World Meteorological Organization collaborate with the Food and Agriculture Organization (FAO) in the preparation of a booklet on "Fishermen and the weather";

CONSIDERING :

(1) The importance of weather advice to fishermen for the improvement of the safety and efficiency of fishing activities throughout the world,

(2) That fishing boats provide a potential source for weather observations, especially in sparse areas,

(3) That it will be necessary to prepare a number of booklets of varying contents and standards of weather information due to the different locations of fishing grounds and levels of education of fishermen;

RECOMMENDS :

(1) That the World Meteorological Organization accept in principle participation in a joint working group with FAO for the preparation of the required booklets on the understanding :

(a) That FAO will supply information on the educational standards of the fishermen to whom the booklets are likely to be issued by the Food and Agriculture Organization,

(b) That, as far as the World Meteorological Organization is concerned, the terms of reference of the working group should make provision for :

(i) Devising, having regard to stated educational standards, model weather booklets in outline form, which might be used by national Meteorological Services as a basis for providing amplifying texts in their own languages,

(ii) Drawing up sufficient outlines for use throughout the oceans of the world on the basis of the different weather régimes applying to fishing areas,

(iii) Taking into consideration, in this connexion, the report of the WMO Working Group on Weather Advice for Fishing Operations and any other relevant publications already available,

(2) That, subject to the concurrence of the permanent representatives concerned, the following experts of the World Meteorological Organization be invited to serve on the working group :

M. Bradbury (United Kingdom)
S. Gadish (Israel)
An expert nominated by Japan.

Rec. 24 (CMM-IV) - MANUAL ON PORT METEOROLOGICAL OFFICER ACTIVITIES

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING :

(1) Recommendation 13 (CMM-III) - Improving the voluntary observing ship scheme for "sparse areas",

(2) Circular letter CMM No. IV-23 of the president of the commission to its members and to the members of its working groups,

(3) Technical Regulations, paragraph 2.5.2.2;

CONSIDERING :

(1) That the main link between shipping and Meteorological Service is the port meteorological officer,

(2) That uniformity of action is desirable as far as possible to achieve successful results,

(3) That it is therefore advisable for Members to establish port meteorological officers in all maritime countries;

RECOMMENDS :

(1) That the Manual on port meteorological officer activities* be published in the four official languages of the Organization,

(2) That Members should arrange for its distribution to port meteorological officers,

(3) That Members continue their efforts to establish port meteorological officers.

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* See Annex XIX.

Rec. 25 (CMM-IV) - MANUAL ON THE VALUE AND USE OF THE INTERNATIONAL MARITIME METEOROLOGICAL PUNCH-CARD

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING :

(1) Resolution 20 (EC-XIII),

(2) Resolution 35 (Cg-IV);

CONSIDERING that countries which are not yet familiar with punch-card procedures need some guidance concerning the International Maritime Meteorological Punch-Card;

RECOMMENDS :

(1) That a manual on the value and use of the International Maritime Meteorological Punch-Card be published and distributed by the Secretariat of the World Meteorological Organization,

(2) That the pamphlet be composed as indicated in the annex* to this recommendation.

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* See Annex XX.

Rec. 26 (CMM-IV) - COLLABORATION WITH THE INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION ON STUDIES REGARDING OCEAN-ATMOSPHERE INTERACTION

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING :

(1) Recommendations III-1, III-13 and particularly Resolution III-17 of the Intergovernmental Oceanographic Commission,

(2) Resolutions 17 and 26 (Cg-IV) and the implementation measures already taken on these resolutions, and

(3) Resolution 5 (CMM-IV);

CONSIDERING that studies of the interaction between oceans and the atmosphere, confined to the meteorological aspects of the problem alone, would be incomplete and that a joint study of the meteorological and oceanographic factors offers a promising way to make further progress;

RECOMMENDS :

(1) That the World Meteorological Organization inform the Intergovernmental Oceanographic Commission of the existence within the Commission for Maritime Meteorology of a Working Group on Ocean-Atmosphere Interaction,

(2) That the two organizations, the World Meteorological Organization and the Intergovernmental Oceanographic Commission, jointly work out arrangements permitting the closest possible co-operation between the CMM working group and appropriate IOC bodies or experts so that the study of this problem is conducted as a whole under the aegis of the two organizations.

Rec. 27 (CMM-IV) - AMENDMENTS TO THE TECHNICAL REGULATIONS CONCERNING MANNED STATIONS ON FIXED PLATFORMS AND AUTOMATIC STATIONS ON UNMANNED PLATFORMS AND ANCHORED BUOYS

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING paragraph 5.4.3 of the general summary of the work of the Fourth World Meteorological Congress;

CONSIDERING :

(1) That manned stations on fixed platforms and automatic stations on unmanned platforms and anchored buoys are expected to play an increasingly important role,

(2) That these observing stations are not covered by the Technical Regulations;

RECOMMENDS that the additions and amendments shown in the annex* to this recommendation be made to the Technical Regulations.

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* See Annex XXI.

Rec. 28 (CMM-IV) - AMENDMENTS TO THE *INTERNATIONAL MARITIME METEOROLOGICAL* PUNCH-CARD

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING :

(1) Resolution 20 (EC-XIII),

(2) The report of the CMM Working Group on Marine Climatology;

CONSIDERING that there is a requirement for a number of punching procedures supplementary to those already specified in the International Maritime Meteorological Punch-Card;

RECOMMENDS that the following amendments be made to Appendix F to the Technical Regulations :

PART A : Layout for an International Maritime Meteorological Punch-Card

Column	Element	Punching procedures
22-23	Visibility, VV	WMO Code 4377 If the visibility has been measured, an x overpunch is given in col. 22. If fog is known to be present, but VV is not reported, col. 22 is to be punched 9 and col. 23 is to be punched 3 with an x overpunch.
40	Height of clouds, h	WMO Code 1600 If the height is measured, an x overpunch is given.

OVERPUNCHES

x / in column 22	Measured data for visibility
x / in column 23	Fog present but visibility not reported (9 punched in col. 22 and 3 in col. 23)
x / in column 40	Measured data for height of clouds

PART B : Supplementary Punching Procedures for Use of an International Maritime Meteorological Punch-Card for Exchange of Cards with Deviating Codes or Additional Data

Column	Element	Supplementary punching procedures
64	Indicator for location	6 10° Marsden square in col. 8 - 10 1° unit of latitude in col. 11 1° unit of longitude in col. 12 1/6° unit of latitude in col. 13 1/6° unit of longitude in col. 14
66	Indicator for VV	0 VV = 90-99, WMO Code 4377 (1955) 1 VV = 00-89, WMO Code 4377 (1955)
67	Indicator for waves	4 WMO Code 1555; 50 has been added to $d_w d_w$ to indicate H_w greater than 9 half-metres
68	Indicator for use of additional groups	1 Unassigned

NOTE : In view of the action taken by the Executive Committee in its Resolution 20 (EC-XIII), and of the decisions recorded in the present document, Recommendations 23 and 24 (CMM-III) need no longer be kept in force.

Rec. 29 (CMM-IV) - AMENDMENTS TO THE TECHNICAL REGULATIONS - SUPPLY OF AMENDMENTS TO THE LIST OF COASTAL STATIONS ACCEPTING SHIPS' REPORTS

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING :

(1) Technical Regulations, paragraph 6.2.2.1,

(2) WMO Publication No. 9.TP.4, Volume D, Part B,

(3) That a number of ships' reports are not transmitted because the radio officers do not have full and up-to-date details concerning coastal radio stations accepting ships' weather reports;

CONSIDERING :

(1) That it is of primary importance that the information concerning the coastal radio stations designated for the collection of ships' reports which is published in Part B of Volume D be kept up to date,

(2) That the present Technical Regulations do not make provisions to ensure the regular and prompt supply to the Secretariat of the necessary amendments to the information provided in application of paragraph 6.2.2.1;

RECOMMENDS that the following new paragraph be included immediately after paragraph 6.2.2.1 :

"6.2.2.2
A Member shall send necessary amendments to the information supplied under 6.2.2.1 to the Secretariat."

Present paragraphs 6.2.2.2 to 6.2.2.14 to be renumbered accordingly.

Rec. 30 (CMM-IV) - USE OF ABBREVIATION "OBS" IN SHIPS' WEATHER MESSAGES

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING :

(1) The report of the CMM Working Group on the Collection of Ships' Weather Reports and the Provision of Shipping Forecasts,

(2) Technical Regulations, paragraph 6.2.2.9,

(3) Radio Regulations (1959),

(4) Telegraph Regulations (1952);

CONSIDERING that ships' weather messages should receive priority handling as provided for in the Radio and Telegraph Regulations;

RECOMMENDS :

(1) That the Technical Regulations be amended to include after paragraph 6.2.2.9 the following regulation :

"The abbreviation "OBS" shall be included as a paid service indicator before the address in ships' weather messages transmitted from observing ships to coastal stations to secure appropriate priority handling of messages by coastal stations.",

(2) That Members should implement the procedures given in "RECOMMENDS" (1) above as soon as possible.

Rec. 31 (CMM-IV) - INCORPORATION OF MAIN PRINCIPLES OF RESOLUTION 35 (Cg-IV) INTO THE TEXT OF THE TECHNICAL REGULATIONS

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING Resolution 35 (Cg-IV);

CONSIDERING that the main principles of Resolution 35 (Cg-IV) should be incorporated in the Technical Regulations;

RECOMMENDS that section 8.3.1, International requirements, of the Technical Regulations be revised as shown in the annex* to this recommendation.

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* See Annex XXII.

Rec. 32 (CMM-IV) - AMENDMENTS TO THE TECHNICAL REGULATIONS - GENERAL

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING Resolution 19 (Cg-IV);

CONSIDERING :

(1) That certain developments in observing techniques are not adequately covered by the Technical Regulations,

(2) That no procedures exist to cover cases where coastal radio stations are discontinued;

RECOMMENDS that the additions and amendments shown in the annex* to this recommendation be made to the Technical Regulations.

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* See Annex XXIII

Rec. 33 (CMM-IV) - REVISION OF RESOLUTIONS OF THE EXECUTIVE COMMITTEE BASED ON PREVIOUS RECOMMENDATIONS OF THE COMMISSION FOR MARITIME METEOROLOGY

THE COMMISSION FOR MARITIME METEOROLOGY,

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

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

RECOMMENDS :

(1) That Executive Committee Resolution 18 (EC-XIII) be no longer considered necessary,

(2) That Executive Committee Resolution 19 (EC-III) be maintained in force.

A N N E X I

Annex to paragraph 5.1.3 of the General Summary

GUIDE TO METEOROLOGICAL INSTRUMENTS AND OBSERVING PRACTICES

10.8.3 Exposure and management

When the "bucket" method is used, the sample should be taken from the leeward side and from a position well forward of all outlets. The temperature should be read as soon as possible consistent with the thermometer taking up the temperature of the sample. The thermometer should not be withdrawn from the container; however, if the thermometer must be withdrawn, then it should be provided with a cistern around the bulb : this cistern should have a small heat capacity when empty but sufficient volume in order that the temperature of the sample of water withdrawn does not vary appreciably during the reading. The thermometer used must have a certificate and the accuracy of measurement should be $\pm$ 0.1°C. The bucket used should be a receptacle deemed adequate for this purpose by the Member recruiting the ship. When not in use, the bucket should be hung to drain in a shady place.

Observers using the condenser intake method should be specially warned as to the liability of parallax error when reading the thermometer, due to the relative inaccessibility of instruments in engine rooms.

When the condenser intake method is used, a note should be made in the log indicating the location of the intake thermometer in the engine room, the depth of the intake below sea-level, and the method used in obtaining a reading (e.g. whether the thermometer is removed from the well for the purpose of reading). The thermometer installation within the intake pipe to the engine room when the ship is built is normally not suitable for measurements of sea surface temperature. In ships in which the condenser intake method is used, the Member recruiting the ship should install, with the permission of the shipping company concerned, a suitable certified thermometer with which the sea temperature could be measured with an accuracy of 0.1°C. The thermometer should preferably be mounted in a special tube providing adequate heat conductivity between the thermometer bulb and the intake water.

ANNEX II

Annex to paragraph 5.8 of the General Summary

ACCURACY OF OBSERVATION REQUIRED FOR MARITIME PURPOSES

Elements	Accuracy required	Interval over which measured value is to be obtained
1. Atmospheric pressure	± 0.1 mb	Instantaneous, but sufficiently damped to provide a value within the required accuracy
2. Pressure tendency	± 0.2 mb	The difference between two such values
3. Temperature		
(i) dry-bulb temp.	± 0.1°C	Instantaneous
(ii) dew-point temp.	± 0.1°C	
(iii) sea surface temp.	± 0.1°C	
4. Wind		
(i) Apparent mean direction	± 5 degrees	10 minutes (several seconds during squall conditions)
(ii) Apparent mean speed	± 1 kt below 20 kt ± 5 % above 20 kt	
5. Precipitation accumulated amount	± 0.2 mm ($\leq$ 10 mm) ± 2 % ($>$ 10 mm)	As determined by instructions to observers
6. Waves		
(i) Wave period	± 0.5 sec	Requirement not yet known
(ii) Wave height	± 10 %	

NOTE : Under bad conditions at sea the required accuracies may often not be met.

A N N E X III

Annex to paragraph 6.11.1 of the General Summary

CMM REQUIREMENTS AS REGARDS CODES

Part A

SPECIFICATION OF REQUIREMENTS

1. General requirements

(a) The codes to be used by observers on board mobile ship stations shall, as far as the element permits, be direct-reading ones, i.e. the value of the element to be reported shall be encoded as measured or as observed;

(b) No use shall be made of coding artificialities such as those now existing with respect to reporting the difference between sea and air temperatures in half-degrees Celsius and to reporting the height of waves of 5 m and more;

(c) The sequence of the reported elements should be in an orderly and logical arrangement to simplify the task of the observer and facilitate further use of the reports;

(d) CMM has no objection to the use of code groups composed of a number of figures different from 5 if CSM considers the introduction of such groups in meteorological codes useful.

2. Requirements concerning routine sea surface observations

(based on elements now reported in FM 21.C code form)

Element	Requirement
Code name (SHIP)	*
Time of observation	
- Day of the week	*
- Actual time of observation	Accuracy of a quarter of an hour
Ship's position	
- Octant of the globe	*
- Latitude and longitude	*

* Present reporting procedure satisfactory.

Element	Requirement
Surface wind	
- Direction	*
- Speed	To be reported in whole knots or in whole metres per second in relation to the Beaufort scale
Horizontal visibility	*
Present weather	Present coding procedure with the addition of a new specification on blowing spray
Past weather	*
Pressure	*
Characteristic of pressure tendency	*
Amount of pressure tendency	*
Air temperature	Tenths of degree Celsius
Dew-point temperature	Tenths of degree Celsius
Sea surface temperature	Tenths of degree Celsius
Cloud	
- The fraction of the celestial dome covered by cloud	*
- The fraction of the celestial dome covered by all the C_L-cloud(s) present	*
- Amount of individual cloud layer or mass	*
- Clouds of the genera Sc, St, Cu and Cb	*
- Clouds of the genera Ac, As and Ns	*
- Clouds of the genera Ci, Cc and Cs	*
- Genus of cloud composing individual layer or mass	*
- Height of the base of the cloud	*
- Height of the base of cloud layer or mass	*
Amount of precipitation	*
Duration of precipitation	*

* Present reporting procedure satisfactory.

Element	Requirement
Special phenomena	
Wind waves	
- Direction	* (but see page 78)
- Period of waves	Intervals of one second (see under part B) of a scale ranging from 0 to above 20 seconds
- Height of waves	Intervals of 1/2 metre of a scale ranging from 0 to above 20 metres
Swell waves	
- Direction	*
- Period of waves	Intervals of one second of a scale ranging from 0 to above 20 seconds
- Height of waves	Intervals of 1/2 metre of a scale ranging from 0 to above 20 metres
Ice accretion on ships	
- Thickness of ice accretion in cm	*
- Rate of ice accretion	To be reported in quantitative form instead of qualitatively in very simple terms when CMM investigations have been completed
Sea ice conditions	
- Plain language form - Kind of ice - Effect of the ice on navigation - Bearing of ice edge - Distance to ice edge from reporting ship - Orientation of ice edge	*
Ship's course	*
Ship's average speed	Table extended to cover higher speeds (at least 34 knots)
Supplementary information (HAIL, PAST HAIL, SNOW or SLEET, SANDSTORM, COTRA)	
Windshift	Sudden changes in mean wind direction and speed occurring in the six-hour period preceding the observation to be reported in an optional group

* Present reporting procedure satisfactory.

3. Requirements concerning special weather reports

Element	Requirement
Code name (SPESH)	Present reporting procedures satisfactory for marine purposes (see note on page 78)
Time of observation - Day of the week - Actual time of observation	
Ship's position - Octant of the globe - Latitude and longitude	
Elements forming the principal object of a special report from ship	
Surface wind - Direction - Speed	
Horizontal visibility	
Present weather	
Past weather	
Cloud - The fraction of the celestial dome covered by cloud - Amount of individual cloud layer or mass - Genus of cloud forming individual layer or mass - Height of base of individual cloud layer or mass	
Air temperature	
Dew-point temperature	
Criteria for the taking of a special report in respect of : - Wind speed changes - Wind direction changes - Visibility change (fog) - Precipitation - Marked pressure changes - Selected weather phenomena	
Information of a frontal passage	

4. Requirements concerning sea upper-air observations

4.1 Common elements

Element	Requirement
Code name (TEMP SHIP, PILOT SHIP)	Present reporting procedures satisfactory for marine purposes
Time of observation - Day of the week - Actual time of observation	
Ship's position - Octant of the globe - Latitude and longitude	
Verification of ship's position - Number of Marsden squares - Unit figures in the latitude and longitude	
Message identifier	

4.2 Upper wind reports from ship

Element	Requirement
Data for levels approximating altitudes of standard isobaric surfaces	Present reporting procedures satisfactory for marine purposes
Maximum wind data	
Data for selected levels - Reporting intervals (500 m, 300 m)	
Wind vector differences computed between the levels : - 700 and 1000 mb - 500 and 1000 mb - 300 and 500 mb	
Significant changes - Criteria for wind shifts - Criteria for wind speed changes	

4.3 Upper-level pressure, temperature, humidity and wind report from ship

Element	Requirement
Surface data	Present reporting procedures satisfactory for marine purposes

Element	Requirement
Data for standard isobaric surfaces Standard levels Tropopause data - Criteria used to determine the tropopause level Maximum wind data - Criteria used to determine the maximum wind Data for significant levels in respect of : - Temperature - Humidity - Wind Criteria used to determine the significant levels in respect of : - Temperature - Humidity - Wind Wind vector differences Data obtained by visual observations during an aircraft sounding Data on the clouds observed at the moment of the release	Present reporting procedures satisfactory for marine purposes

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Part B

SUPPLEMENTARY INFORMATION REGARDING CMM REQUIREMENTS AS REGARDS CODES

Actual time of observation

Under certain conditions and within certain areas where shipping is sparse, the urgent need for more meteorological data makes it unavoidable that a number of ship's observations are carried out at times differing from the standard times of observation. CMM and a number of regional associations have already been faced with this problem. In order to make full synoptic use of such data for analysis and forecasting, particularly under rapidly changing conditions, it is considered necessary that the actual time of observation be reported with an accuracy of a quarter of an hour. This accuracy is also needed for checking the position of reporting ships when required.

Surface wind speed

An accuracy of 1 metre per second for wind speed observation is, on the basis of experience, considered satisfactory for marine purposes. It is desirable that also wind speed be included in the report in a direct reading form. Therefore, depending on the choice of units for international exchange, wind speed should be reported in full knots, or in full metres per second.

Present weather - Reporting on visibility obstruction due to blowing spray

Although not having made a thorough review of the present code 4677 - ww, the commission felt that this code was, in general, satisfactory for maritime purposes. The attention of the commission was drawn to the fact that this code makes no provision for reporting reduction of visibility caused by blowing spray. It was agreed that there is a requirement for reporting this phenomenon when no other more significant phenomenon is to be reported. As an illustration to this requirement, the commission stated that the addition of a proper phrase in the lower decade (00-09) of the present code 4677 - ww, preferably in specification 07, would satisfy the CMM request. Any new specification shall make clear that it does not apply to sea smoke.

Temperatures

Sea surface temperature

There is a long-standing and strong requirement from CMM for direct reporting of sea surface temperature as opposed to air-sea temperature difference. This change is urgently required because the present reporting procedure leads to so many errors that it puts a general doubt on the reliability of reported sea surface temperatures as a whole. The accuracy to a tenth of degree Celsius is required for forecasting fog, determination of the stability index of air masses, and for study of meteorological factors in relation to fishing grounds.

Air temperature

The accuracy of the tenth of a degree Celsius is required for reasons similar to those advanced for sea surface temperature. More weight will be put in the coming years on this requirement for an improvement of analysis and forecasting techniques of weather conditions above the oceans and seas. It may also well be that relatively soon this study

of air-sea interaction, which is now at the investigation stage, will develop into an operational part of meteorological work, thus requiring the above accuracy for air and sea surface temperatures.

Dew-point temperatures

Although the commission was aware of the difficulties encountered in obtaining accurate dew-point temperatures at sea stations, it felt that in the near future there will also be a requirement for an accuracy of a tenth of a degree Celsius, particularly as regards problems of cargo care and studies on the heat budget above ocean surfaces.

Reporting of the state of sea

The commission considered that the codes for reporting the waves should allow for a clear distinction to be drawn between wind waves and swell waves whenever it is possible to do so. It was considered that the present reporting instructions specified in Note (7) (v) under the code form FM 21. C - SHIP cover the point adequately. Since, generally, the direction of the wind waves does not differ appreciably from the direction of the mean wind, it would be acceptable to dispense with repeating in the wind waves group the information which appears already in the wind group. In contrast, the swell direction should always be reported in the swell group(s) as the wave period is a very important parameter for the forecasting of sea and swell waves; and since the wave period can be determined also by visual means with an accuracy of 1 second, the reporting of wave period in intervals of 1 second is a requirement of essential importance. As regards the height of waves, although the present interval of 1/2 metre is satisfactory, it is considered that the present coding system is inadequate since it results in numerous errors in reports. Should there be any great difficulty for CSM in developing a coding system to fulfil the above requirement, it is recommended that the president of CMM be contacted.

Ships' average speed

The present code table 4451 - v_s permits reporting of ships' speed in steps of 3 nautical miles per hour up to 24 nautical miles per hour only. All speeds above this value are reported by one single code figure. Since the number of ships moving at higher speeds is steadily increasing, some already obtaining speeds of over 30 knots, there is an urgent requirement for extending the range of speeds to be reported to at least 34 knots.

Windshift

A new demand has developed in the field of forecasting for shipping purposes and particularly for wave forecasting, regarding information on sudden changes in mean wind direction and speed, e.g. at the passage of a front occurring during the six-hour period preceding the synoptic report. There exists therefore a requirement for marine purposes to include in SHIP reports an additional operational group which would provide information on :

(a) The time at which the change occurred, specified in intervals of 1/2 hour;

(b) The mean wind direction prevailing before the change in tens of degrees;

(c) The mean wind force before the change, either expressed according to the Beaufort scale, or in tens of knots or in units of 5 m/s; this group to be reported wherever a sudden change in wind direction of 30° or more and/or a sudden change in wind speed of 15 knots or more has been observed. It is considered that the $9S_pS_ps_ps_p$ group is not suitable for this purpose, since its specifications are established on a Regional basis.

SPESH code - This code was established to meet an aeronautical requirement formulated by ICAO and its use is restricted in fact to ocean weather stations. There exists no precise marine requirement for this code form.

A N N E X IV

Annex to paragraph 9.6 of the General Summary

SHORTCOMINGS IN THE PRESENT CODE FM 46.C (IAC FLEET)

The commission considered that the following shortcomings should be brought to the attention of CSM :

1. To encode past data relating to pressure systems, Note 7 states that P_tP_c and $md_sd_sf_sf_s$ data relate to g_pg_p hours prior to the chart time given in the message preamble by G_cG_c, while PP and $QL_aL_aL_oL_o$ data relate to the chart time G_cG_c.

2. To encode past data for frontal systems, $F_tF_1F_c$ and $md_sd_sf_sf_s$ data relate to g_pg_p hours prior to chart time G_cG_c and $QL_aL_aL_oL_o$ to the chart time G_cG_c.

3. For prognostic data relating to pressure systems and fronts, i.e. data for P_tP_c and $md_sd_sf_sf_s$ (pressure systems); also $F_tF_1F_c$ and $md_sd_sf_sf_s$ (fronts) relate to g_pg_p hours following chart time given by G_cG_c in the message preamble and all $QL_aL_aL_oL_o$ data for both pressure systems and fronts relate to G_cG_c. Additionally, PP data also relate to G_cG_c.

4. When a message containing both past and prognostic positions is encoded in accordance with existing instructions, each $QL_aL_aL_oL_o$ group is repeated. This procedure is wasteful of communication time and cannot be justified in shipping broadcasts.

5. Additionally, past and prognostic positions, as now encoded in messages, must be computed from $md_sd_sf_sf_s$ data given for each pressure system and front. This arrangement is objectionable because ships' officers want past and prognostic positions encoded in the form $QL_aL_aL_oL_o$ which can be decoded at sight from simple inspection of coded messages.

A N N E X V

Annex to paragraph 9.7 of the General Summary

SPECIMEN WORDING OF SHIPPING BULLETINS

(PART II)
WEATHER SUMMARY 9 SEPTEMBER 0000Z

(LOW) (8 KNOTS)
DEPRESSION 987 MBS 63 NORTH 39 WEST MOVING SLOWLY NORTHEAST WITH FRONTAL TROUGH EXTENDING
(LOW)
TO SECOND DEPRESSION 1000 MBS 52 NORTH 50 WEST STOP ANOTHER FRONT WITH WAVES EXTENDING FROM
(8 KNOTS) (15 KNOTS)
SOUTHEAST ICELAND TO AZORES MOVING STEADILY EAST IN NORTH SECTION AND SLOWLY EAST IN

SOUTH SECTION

(PART III)
FORECASTS VALID TO 10 SEPTEMBER 0000Z

(BECOMING)
DENMARK STRAIT NORTH ICELAND STOP WIND WEST TO SOUTHWEST BACKING TO SOUTHERLY
(7 TO 16 KNOTS) (22 TO 33 KNOTS) (BECOMING)
FORCE 3 AND 4 AT FIRST INCREASING TO FORCE 6 AND 7 AND LATER VEERING SOUTHWEST
(22 TO 33 KNOTS)
FORCE 6 AND 7 STOP FROM 35 TO 65 NORTH AND 15 AND 40 WEST STOP WEST NORTHERN SECTION STOP
(28 TO 40 KNOTS) (11 TO 21 KNOTS)
WIND SOUTHWEST TO WEST FORCE 7 AND GALE FORCE 8 AT FIRST IN THE NORTH AND FORCE 4 TO 5
(22 TO 27 KNOTS)
IN THE SOUTH DECREASING SLOWLY TO FORCE 6 IN NORTH AND BECOMING VARIABLE
(7 TO 10 KNOTS) (28 TO 40 KNOTS)
FORCE 3 TEMPORARILY IN THE SOUTH STOP WIND LATER INCREASING SOUTHWEST FORCE 7 TO 8
(4 MILES)
IN SOUTH STOP OCCASIONAL RAIN OR SHOWERS STOP VISIBILITY MAINLY GOOD STOP

WEST CENTRAL SECTION .....

EAST SOUTHERN SECTION .....

NOTE : Words in parentheses directly above each term are alternative expressions that can be used in shipping bulletins.

A N N E X VI

Annex to paragraph 11.1 of the General Summary

AMENDMENTS TO THE DRAFT OF THE TECHNICAL NOTE "THE PREPARATION AND USE OF WEATHER MAPS BY MARINERS"

Table of Contents of Part I (Annex V to CMM-IV/Doc. 47) - At the end of the second page, add :

Appendix : Sample Weather Bulletin for Shipping and Weather Map (see CMM-IV/Doc. 47, Annex VII).

Page 1 (Annex V to CMM-IV/Doc. 47) - After the second paragraph, just before the note, introduce a new paragraph :

The meteorological code forms, code tables and specifications which are used in coded meteorological messages for shipping are specified in WMO Publication No. 9, Volumes B and D. They are also reproduced in some publications issued by national authorities concerned. Reference to these codes is recommended when reading or using the handbook. The code forms specifically referred to in the handbook are :

FM 11.C	SYNOP	(surface report from land station)
FM 21.C	SHIP	(surface report from ship in full form)
FM 22.C	SHIP	(surface report from ship in abbreviated form)
FM 23.C	SHRED	(surface report from ship in reduced form)
FM 26.B	SPESH	(special weather report from ship)
FM 46.C	IAC FLEET	(analysis in abbreviated form)
FM 61.C	MAFOR	(forecast for shipping).

Page 7 (Annex V to CMM-IV/Doc. 47)

At the bottom of the page, insert a new paragraph and the chart of "sparse areas" :

In sea areas from which a good number of observations are received in both space and time, analyses are made with confidence. As the number of observations decreases, in general, so does the accuracy of the synoptic chart analyses. In those ocean areas where the number of observations is very small, designated by the meteorologists as "sparse areas", the value of every observation is very high. Thus, ships make a considerable contribution to weather forecasting when they report regularly in these areas (sparse areas are shown on the attached chart).

Page 11 (Annex V to CMM-IV/Doc. 47)

1st paragraph, bottom line, delete "Appendix II for codes and code tables".

5th paragraph, 2nd line, amend to read :

(coded analysis in IAC FLEET code form, FM 46.C), there follows ...

Page 13 (Annex V to CMM-IV/Doc. 47) - Paragraph (c), amend to read :

Close examination of the IAC FLEET code form (FM 46.C), will reveal a "Waves or Temperature Section". With this section, it is possible to give .....

Paragraph 3, delete the last sentence.

Page 20 (Annex V to CMM-IV/Doc. 47) - Paragraph 3.6, amend to read :

The full table of symbols for entry of "present weather" (ww) is given in Appendix E of the WMO Technical Regulations. A very simple abridged list of symbols for present weather, sufficient for most practical purposes on board ships, is shown in Figure 7 .....

Page 22 (Annex V to CMM-IV/Doc. 47) - Delete the two paragraphs at the bottom of the page.

Page 23 (Annex V to CMM-IV/Doc. 47) - Delete the whole page, and replace by the following :

When the Celsius temperature is below 0°C (below freezing point), 50 is added to the number (ignoring the sign) when encoding. Accordingly, 50 has to be subtracted from any coded TT-value between 50 and 99 when decoding, for example :

TT = 53 : decoded -3°C

TT = 61 : decoded -11°C

The entry on the weather map will be -3 and -11 respectively.

Page 24 (Annex V to CMM-IV/Doc. 47) - Paragraph 3.9, 9th line, replace the sentence beginning "The table of symbols ....." by the following :

Appropriate symbols are used by meteorological offices ashore for plotting cloud types, past weather, amount of cloud and the characteristic of pressure tendency to obtain a complete representation of each individual report on the synoptic weather chart.

Page 39 (Annex V to CMM-IV/Doc. 47) - Paragraph 5, at the bottom, read :

IAC FLEET code form FM 46.C).

Page 53 (Annex V to CMM-IV/Doc. 47) - 2nd paragraph, 2nd line, add : "code form FM 46.C" after "IAC FLEET".

At the middle of the page, delete "Appendix II" and amend to read :

(for further details see the IAC FLEET code form FM 46.C - Weather area section).

Page 54 (Annex V to CMM-IV/Doc. 47) - 3rd paragraph, 6th line, replace "Appendix II" by "the IAC FLEET code form FM 46.C".

6th line from the bottom of the page, delete "Appendix II" and amend to read : "(See WMO Code 3940)".

Page 55 (Annex V to CMM-IV/Doc. 47) - At the bottom of the page, delete "(See Appendix II)".

Page 56 (Annex V to CMM-IV/Doc. 47) - Under Figure 29, insert the following note :

(The model $\frac{\text{air}}{\text{sea}}$ temperature has been used with ship reports).

Page 9 (Annex VI to CMM-IV/Doc. 47) - In the text for Figure 54, 5th line, amend to read "roaring forties". 7th line, read : "transposed .....".

5th line from the bottom, replace "Appendix II" by the following : "code forms FM 21.C, FM 22.C: FM 23.C".

Page 17 (Annex VI to CMM-IV/Doc. 47) - Under Figure 54, insert the following note :

The model $\frac{\text{air}}{\text{sea}}$ temperature has been used with ship reports.

A N N E X VII

Annex to paragraph 11.2 of the General Summary

OUTLINE OF A BOOKLET ENTITLED "FISHERMEN AND THE WEATHER"

Introduction

The usefulness of considering weather and weather forecast.

Safety of the vessel (storms, icing, fog, etc.).

Influence of weather factors on fishing operations.

Chapter 1 - Basic meteorological knowledge for fishermen

1. Air circulation systems : Low, high, tropical cyclone, typhoon.
2. Air masses : Places of origin, properties, movements, changes.
3. Fronts : Formation, structure, movements, how to discover their approach visually, changes of weather by their passage. The polar front and intertropical convergence zone.
4. Visibility : Fog at sea and how it is formed; ocean areas where fog often occurs.

Chapter 2 - Climate

1. Definition of climate.
2. Climatic regions (oceanic).
3. Map of major fishing areas and their climate.
4. Climate of the fishing grounds of the nation or organization concerned.

Chapter 3 - Effects of the weather on the ocean

1. Waves : Sea waves and swell, and how they are formed.
2. Ocean currents : Places of formation; courses over the oceans and seasonal changes
3. Sea surface temperature : Map and description of short-range and seasonal changes.

Chapter 4 - Local weather forecasting

Local weather forecasting by means of visual and instrumental observations; avoidance of tropical cyclones and of typhoons.

Chapter 5 - Weather service for fishermen

1. Weather chart : Weather chart; station model and symbols for plotting of the observations.

2. Analysis : Analysis of the plotted chart, isobars, lows and highs, fronts, air masses, rainbelts and fog distribution.

3. Forecast : Prediction of movements and changes of lows and highs, air masses, rainbelts, and elaboration of forecasts for areas in question. Short-range forecasts and extended forecasts.

4. Meteorological broadcasts : meteorological broadcasts in plain language in different countries, time-tables, frequencies, languages used, issuing stations.

5. Visual storm warning signals.

Chapter 6 - Weather reports from fishing vessels

1. The importance of sending regular weather reports to services ashore.

2. How to observe the weather visually.

3. Meteorological instruments and the handling of them.

4. How to report the weather : Abbreviated code form or plain language; transmitting to coastal radio station.

Chapter 7 - Examples of effects of weather on fishing operation

Storm and wind waves, swell, dense fog, icing and sea ice.

A N N E X VIII

Annex to paragraph 11.7 of the General Summary

AMENDMENTS TO SECTIONS 9.5.1 AND 9.5.2 OF THE GUIDE TO CLIMATOLOGICAL PRACTICES

9.5.1 (3rd paragraph)

Marine observations of all nations are needed for maritime climatological studies, especially for climatological summaries and for the marine part of the World Climatic Atlas (see 7.3.1). To meet this requirement, certain Members (known as responsible Members) have accepted responsibility for specific areas of the oceans and seas as shown in Annex 9.D. They will undertake the preparation of climatological summaries for selected representative sub-areas within their area of responsibility, and will act as collecting centres for surface marine observations of all nations made within their allotted area.

The International Maritime Meteorological Punch-Card (see page 135) has been designed to facilitate the exchange and summarization of marine surface data. This punch-card is of the standard 80-column type, and its layout follows very closely WMO Code Form FM 21.C which is used for synoptic maritime messages (see WMO Publication No. 9.TP.4, Volume B). Through provision of a number of spare columns, the design will meet both national and international requirements.

The punch-cards of surface marine observations are to be sorted half-yearly and dispatched to the responsible Members concerned at the addresses listed in Annex 9.E. If punch-card facilities are not available, the observations should be copied from the log-books on the standard form given in Annex 9.F. These forms should be sent to an appropriate responsible Member who will undertake to punch and sort the cards for distribution to any other responsible Member concerned. The most suitable responsible Member would be the one responsible for the area where the standard forms contain the most observations.

Observations from auxiliary ship stations made in areas where the number of reporting ships is inadequate, or in areas which are rarely traversed by ocean-going ships, should be punched on the International Maritime Meteorological Punch-Card and forwarded to the appropriate responsible Member provided that, on being checked, the observations are considered to be of a sufficiently high standard.

9.5.2 (2nd paragraph)

The procedures for preparing marine climatological summaries are given in Part A of Annex 9.G, and the contents of the summaries in Part B (for fixed ship stations) and Part C (for selected representative sub-areas).

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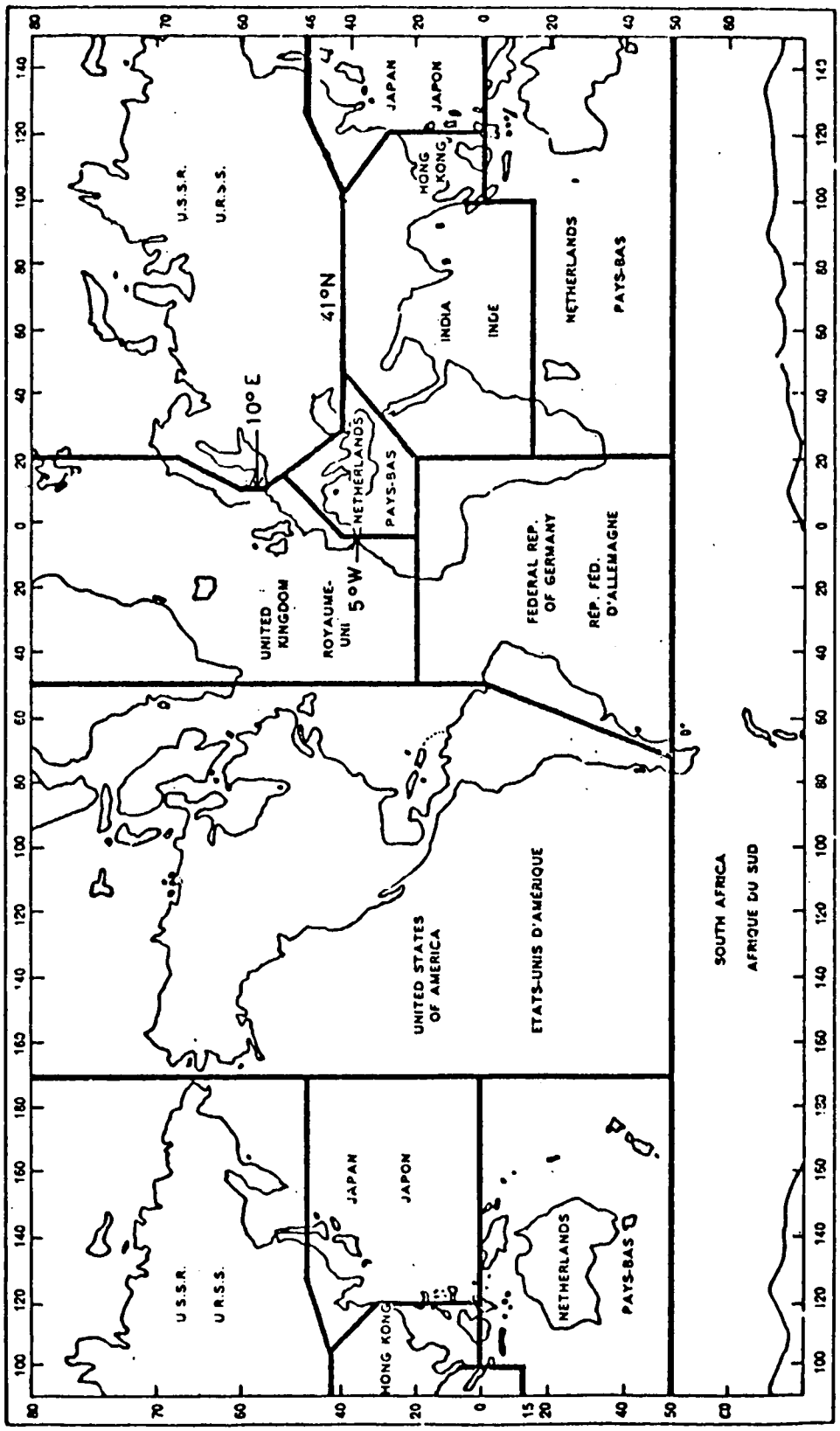
Annex 9.D

AREAS OF RESPONSIBILITY AND RESPONSIBLE MEMBERS

Annex to Resolution 35 (Cg-IV)



Annex 9.E - ADDRESSES OF RESPONSIBLE MEMBERS

Hong Kong	Director, Royal Observatory, Nathan Road, Kowloon, Hong Kong.
Federal Republic of Germany	Deutscher Wetterdienst - Seewetteramt, 2 Hamburg 4, Bernhard-Nocht-Strasse 76, Federal Republic of Germany.
India	Deputy Director General of Observatories, (Climatology and Geophysics), Meteorological Office, Poona 5, India.
Japan	Marine Division, Japan Meteorological Agency, Ote-machi, Chiyoda-ku, Tokyo, Japan.
Netherlands	Koninklijk Nederlands Meteorologisch Instituut, Utrechtse weg 297, De Bilt, Netherlands.
South Africa	Director, Weather Bureau, Private Bag 97, Pretoria, South Africa.
United Kingdom	(1) Punch-cards : Meteorological Office Met.O.18c, London Road, Bracknell, Berks., England
	(2) Standard forms requiring punching : Meteorological Office Met.O.1, London Road, Bracknell, Berks., England.
U.S.A.	Director, National Weather Records Center, Asheville, North Carolina U.S.A.
U.S.S.R.	Scientific Research Institute for Aeroclimatology, Ulica Tchaikovskogo No. 28/35, Moscow, U.S.S.R.

*

* *

STANDARD FORM FOR COPYING OBSERVATIONS FROM MOBILE SHIP STATIONS

CODED FOR DIRECT PUNCHING ON TO THE INTERNATIONAL MARITIME METEOROLOGICAL PUNCH CARD

NAME OF SHIP .... VOYAGE(S) .... READ BACK AGAINST LOG BOOK BY ....

NAME OF COUNTRY .... TO .... MET. OFFICER IN CHARGE ....

TEMP. INDICATOR	YEAR		MONTH		DAY		OCTANT	LAT. Tenths of Degrees			LONG. Tenths of Degrees			HOUR G.M.T.		TOTAL CLOUD AMOUNT	WIND DIRECTION Tens of degrees		WIND SPEED Knots		VISIBILITY		PRESENT WEATHER (ww)		PAST WEATHER (W)	CORRECTED PRESSURE Tenths of Millibars					TEMPERATURE DRY BULB Tenths of Degrees			TEMPERATURE WET BULB Tenths of Degrees			CLOUDS N_h	C_L	h	C_M	C_H	SEA TEMP. Tenths of Degrees			AIR-SEA DIFF. Tenths of Degrees			WAVES WIND WAVES DIRECTION Tens of degrees		PERIOD		HEIGHT Half Metres		SWELL WAVES DIRECTION Tens of degrees		PERIOD		HEIGHT Half Metres		COUNTRY WHICH HAS RECRUITED SHIP		CARD IND.											DEW POINT Tenths of Degrees			WIND FORCE			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
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Annex 9.G - Part A

PROCEDURES FOR PREPARING MARINE CLIMATOLOGICAL SUMMARIES

1. Each responsible Member shall prepare climatological summaries annually for a number of selected representative areas in its area of responsibility, for the fixed ship stations within its area and, upon mutual agreement, for fixed ship stations operated solely by the responsible Member in an area of another responsible Member.

2. Monthly climatological summaries shall be prepared on an annual basis starting with the year 1964. Responsible Members should also prepare similar summaries for the years 1961 to 1963 inclusive and 10 years climatological summaries starting with the period 1961-70.

3. In order to provide the data essential for the study of climatic change, the responsible Members are encouraged to extend the collecting of the marine meteorological observations for the selected representative areas and for fixed ship stations, and the preparing of the climatological summaries, to the years before 1961, and to prepare climatological summaries for these earlier years going as far back in time as possible. Members are requested to supply the necessary data by reproducing the corresponding marine punch-cards from their files without cost to the responsible Members who are willing to process the marine observations for former years.

Annex 9.G - Part B

DATA TO BE INCLUDED IN THE CLIMATOLOGICAL SUMMARIES FOR FIXED SHIP STATIONS

Definition of area within which observations are to be regarded as "on station"

The "on station" area should be defined as the smallest area of 1° squares in which 95 per cent or more of the observations lie during all or nearly all the months of the year.

1. Dry-bulb temperature

(a) Monthly means;

(b) Mean for the year, computed from monthly means;

(c) Extremes with dates and hours of occurrence and 5, 25, 50, 75 and 95 percentile values for each month;

(d) Number of observations.

2. Dew-point temperature

(a) Monthly means;

(b) Mean for the year, computed from monthly means;

(c) Extremes with dates and hours of occurrence and 5, 25, 50, 75 and 95 percentile values for each month;

(d) Number of observations.

3. Sea temperature

(a) Monthly means;

(b) Mean for the year, computed from monthly means;

(c) Extremes with dates and hours of occurrence and 5, 25, 50, 75 and 95 percentile values for each month;

(d) Number of observations.

4. Air-sea temperature difference

(a) Monthly means;

(b) Mean for the year, computed from monthly means;

(c) Extremes with dates and hours of occurrence and 5, 25, 50, 75 and 95 percentile values for each month;

(d) Number of observations.

5. Visibility

(a) Percentage frequency for each month for each code figure 90-99 inclusive (WMO Code No. 4377);

(b) Annual percentage frequency for each code figure 90-99 inclusive;

(c) Number of days for each month and for the year with VV = 90-93 and/or W =4;

(d) Number of observations.

6. Weather

(a) Number of days for each month with precipitation, i.e. days when one or more of the ww or W code figures (WMO Codes No. 4500 and No. 4677) listed in subsections (b) to (e) were reported (excluding ww = 17, 98);

(b) Number of days for each month with rain and/or drizzle (ww = 20, 21, 24, 25, 50-67, 80-82; W = 5, 6, 8);

(c) Number of days for each month with snow and/or rain and snow (ww = 22, 23, 26, 68-79, 83-86; W = 7);

(d) Number of days for each month with hail (ww = 27, 87-90);

(e) Number of days for each month with thunderstorms (ww = 17, 29, 91-99; W = 9);

(f) Number of days for each month with

(i) gales (Beaufort force ≥ 8)
(ii) storms (Beaufort force ≥ 10)
(iii) hurricane force winds (Beaufort force = 12);

(g) Number of complete observing days for items (a) to (f);

(h) Total number of days annually for each item (a) to (f);

(i) Monthly percentage frequency of occurrence of precipitation at the time of observation (ww = 50-97, 99);

(j) Annual percentage frequency of occurrence of precipitation at the time of observation (ww = 50-97, 99);

(k) Number of observations for items (i) and (j);

(l) If measured, monthly and annual amount of precipitation;

(m) Annual percentage frequency of occurrence of each individual ww code figure 50-97, 99.

7. Wind direction and speed

(a) Monthly percentage frequencies for the following ranges of speed

(i) 0 to 4 knots
(ii) 5 to 9 knots
(iii) 10 to 14 knots
(iv) 15 to 19 knots
(v) 20 to 24 knots
(vi) 25 to 29 knots
(vii) 30 to 39 knots
(viii) 40 to 49 knots
etc.

and for directions by sectors of 30°, true north bisecting the first sector;

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

(c) Monthly percentage frequency of occurrence of observations for each range of speed irrespective of direction;

(d) Mean monthly wind speed in knots, derived from all wind speed observations;

(e) Mean wind speed for the year, computed from monthly means;

(f) Number of observations corresponding to item (d);

(g) Highest wind speed for each month and for the year, with dates and hours of occurrence;

(h) Vector mean wind for each month and its components (W to E and S to N directions taken as positive).

8. Pressure

(a) Monthly means for each hour of observation;

(b) Monthly means for all hours of observation;

(c) Mean for the year, computed from monthly means;

(d) Number of observations;

(e) Extremes with dates and hours of occurrence and 5, 25, 50, 75 and 95 percentile values for each month.

9. Cloud

(a) Monthly mean total amount for each hour of observation;

(b) Monthly mean for all hours of observation;

(c) Monthly mean for all hours of observation in respect of low cloud only (defined as cloud for which h is any code figure [WMO Code No. 1600] from 0 to 8 inclusive);

(d) Monthly percentage frequency of observations in the following ranges of total cloud amount (all hours of observation combined) :

(i) 2 oktas or less
(ii) 3 to 5 oktas inclusive
(iii) 6 or 7 oktas
(iv) 8 oktas;

(e) As item (d), but for low cloud only;

(f) Percentage frequency of height of low cloud for each month, subdivided into ranges corresponding to WMO Code 1600;

(g) Same for the year for items (a) to (f) inclusive computed from the monthly means or frequencies;

(h) Number of observations.

10. Waves

Only the waves with greatest height should be selected. If two or more waves in the same observation have equal height, the one with the largest period should be selected. If the periods are also equal, the mean direction should be used.

Monthly percentage frequency tables are to be prepared as shown in Figure 1 (reproduced on the following page).

Height period and direction are given in the following intervals :

Height (metres)	Period (seconds)	Direction (degrees)
≤3/4	5 or less	30° throughout
1 - 1 1/2	6 or 7	
2 - 2 1/2	8 or 9	
3 - 3 1/2	10 or 11	
4 - 5 1/2	12 or 13	
6 - 7 1/2	14 or 15	
8 - 9 1/2	16 or 17	
≥10	18 or 19	
	>19	
X not determined	X not determined	

The tables give :

(a) Percentage frequency of any combination of wave height, period and direction;

(b) Percentage frequency of any combination of wave height and period irrespective of direction;

(c) Percentage frequency of any combination of wave height and direction irrespective of period;

(d) Percentage frequency of any combination of wave period and direction irrespective of height;

(e) Percentage frequency of any wave height irrespective of period and direction;

(f) Percentage frequency of any wave period irrespective of direction and height;

(g) Percentage frequency of any wave direction irrespective of height and period;

(h) Total number of observations.

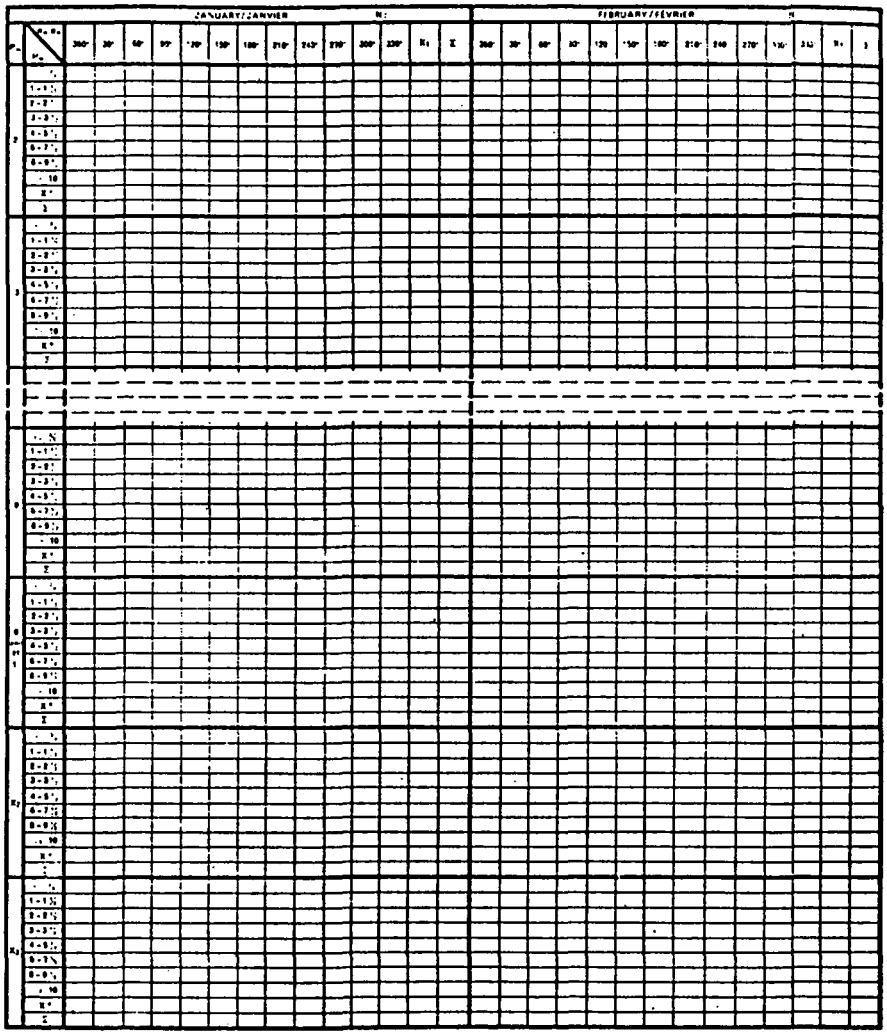
NOTE : Reference item A(6) - Weather. It is recommended that the number of days with precipitation etc. be obtained by making appropriate entries in the log-book at the end of each day, as shown in the following example :

Precipitation ✓	Rain or drizzle ✓	Snow or rain and snow	Hail ✓	Thunder	Fog ✓	Gale	Storm	Hurricane

In order to facilitate the computation of the monthly and annual totals, these entries can be punched in fixed columns as "1" on a "day-card". If this is done, the sorting of the International Maritime Punch-Cards by the various combinations of ww and W is avoided and an accurate total obtained.

Annex 9.G - Part B - Figure 1

MONTHLY PERCENTAGE FREQUENCY OF WAVE DIRECTIONS BY SPECIFIED PERIODS AND HEIGHTS



LEGEND :
X°: Period and direction observed, but not wave height
X_1 : Period and height observed, but not wave direction
X_2 : Direction and height observed, but not wave period
X_3 : Frequency of height by specified direction regardless of period
N : Number of observations

Annex 9.G - Part C

DATA TO BE INCLUDED IN THE CLIMATOLOGICAL SUMMARIES FOR SELECTED REPRESENTATIVE AREAS

1. Dry-bulb temperature

(a) Monthly means;

(b) Mean for the year, computed from monthly means;

(c) 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;

(d) Monthly and annual total number of observations.

2. Dew-point temperature

(a) Monthly means;

(b) Mean for the year, computed from monthly means;

(c) 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;

(d) Monthly and annual total number of observations.

3. Sea temperature

(a) Monthly means;

(b) Mean for the year, computed from monthly means;

(c) 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;

(d) Monthly and annual total number of observations.

4. Air-sea temperature differences

(a) Monthly means;

(b) Mean for the year, computed from monthly means;

(c) 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;

(d) Monthly and annual total number of observations.

5. Visibility

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

(b) Total number of observations for the year for each code figure 90-99;

(c) Monthly and annual total of observations.

6. 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 thunderstorms at the time of observation (ww = 17, 91-99);

(e) Monthly number of observations with :

(i) gales (Beaufort force ≥ 8)
(ii) storms (Beaufort force ≥ 10)
(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) Annual number of occasions for each item (a) to (f);

(h) Monthly and annual total number of observations.

7. 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) Mean monthly wind force according to the Beaufort scale, derived from all wind observations;

(e) Mean wind force for the year computed from monthly means;

(f) Monthly and annual total number of observations.

8. Pressure

(a) Monthly means for all hours of observation;

(b) Mean for the year, computed from monthly means;

(c) Frequency table in :

(i) 2 mb steps between 0 and 30°latitude, based on the intervals 0.0 to 1.9 mb, e.g. 990.0 to 991.9 mb;
(ii) 4 mb steps N of 30°N and S of 30°S, based on the intervals 0.0 to 3.9 mb, e.g. 996.0 to 999.9 mb;

(d) Monthly and annual total number of observations.

9. 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 and annual 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) Mean for the year for items (a) and (b), computed from monthly means;

(e) Monthly and annual total of observations.

10. Waves

Monthly frequency tables are to be prepared exactly as for fixed ship stations, except that the numbers of observations will be given for each month instead of the monthly percentage frequencies.

NOTES :

(1) If in any individual month there are no observations in a particular selected representative area, the annual mean for that year will not be computed.

(2) In preparing a climatological summary for a decade or longer period, the summary for each month will be prepared first by combining all available means for the same month. The decadal mean will be based on these monthly means.

(3) If in any individual month the number of observations in a selected representative area is less than 10, no frequency tables will be prepared for that month.

A N N E X IX

Annex to paragraph 12.1 of the General Summary

BACKGROUND AND UTILIZATION OF PROPOSED WMO UNIFIED ICE CODE

I. HISTORICAL

The principle of a unified ice code with two common five-digit groups for all three observing platforms, aircraft, ship and shore, was tentatively agreed upon during the second session of CMM. The two common groups contain those elements observable from all platforms. The advantage of having as nearly as possible the same code form for each type of observation is realized when all reports are combined for machine data processing.

After referring this code to the ice reporting services of the various member nations, several minor changes were suggested and subsequently incorporated into the proposed unified code. In January of 1958, the U.S.S.R. delegate reported that the majority of his country's experts did not approve of the unified code, and forwarded a special aerial reconnaissance code embodying a concept consisting basically of a shorthand method for transforming an aerial ice reconnaissance message into numerical form. Word messages of this type are now prepared by U.S.,U.S.S.R.,Canadian and Danish personnel at the conclusion of reconnaissance flights. At the present time these messages are not digitized for international dissemination. At a meeting of the Working Group on Sea Ice in February 1958, it was suggested that both the Unified Ice Code and the special shorthand summary type code be accepted by WMO as a complete ice observing procedure. In November 1958, the U.S.S.R. working group member agreed to the adoption of both codes for aerial observations. Although he affirmed the desirability of a Unified Ice Code, he also noted that many Soviet experts see difficulty in devising compatible codes for observations from ships and coastal stations.

At Third Congress, in April 1959, Congress noted with satisfaction that the U.S.S.R. no longer objected to the adoption of a dual set of codes and hoped that acceptable proposals would be developed in the near future. During the summer of 1959, the United States tested both codes in aerial ice reconnaissance flights in the Arctic. Both codes, with all terms compatible with the International Ice Nomenclature, were considered in acceptable form for adoption.

In January 1960, the U.S.S.R. member reaffirmed the acceptance of the two codes for aircraft observing, and suggested some minor changes in the aircraft portion of the Unified Code. He also expressed the opinion that the codes for ships and shore stations must be radically revised, thereby defeating the basic concept of the Unified Code.

The third session of CMM,in August 1960, recommended two ice reporting codes : a Unified Code for reporting individual observations from aircraft, ship, and shore stations; and a special code for converting aerial ice reconnaissance messages from plain language to numerical form. Resolution 18 (EC-XIII) noted this recommendation and referred it to the president of CSM for study.

The Commission for Synoptic Meteorology stated that such a complicated code needs extensive trial before adoption on a world-wide basis. The Secretary-General was requested to draw the attention of Members to the code's existence to insure that Members which have opportunity to do so may test it. After these trials, the participating countries are to report on their evaluations at the next CMM and CSM meetings.

II. GENERAL

The United States has been evaluating the code on aircraft reconnaissance missions since 1962. This evaluation can be divided into several facets such as data acquisition, operational use of the data, data processing and storage, and research use of the data. A preliminary, non-statistical report on the United States' experience with the code in aircraft reconnaissance is presented in the following pages.

III. SPECIFIC

A. Data acquisition

In order to test the Unified Ice Code, it was first necessary to observe the ice and encode it using WMO procedures. The Arctic Basin ice research flights known as BIRDS EYE provided a suitable platform for such a test. BIRDS EYE commenced in March 1962, one of the stated objectives in its operations plan being "To evaluate proposed WMO ice codes". The initial procedures, followed on the first five missions, consisted of observing at ten-minute intervals areas of twenty-mile radius along the aircraft's flight path. These procedures were found to be too gross for using a spot code. Commencing with BIRDS EYE mission 6 in September 1962, procedures were modified. The observing area, or "spot", was decreased to two nautical miles. This "spot" was defined as the semicircular area, two nautical miles in radius, directly beneath and forward of the observer in the aircraft. All mandatory and supplemental groups were to be observed only within this "spot". Optional groups were observed up to the limits of visibility. Observations were begun when ice was first encountered, and thereafter at ten-minute intervals past the hour, e.g., 0000, 0010, 0020, etc. These procedures continue to be used on the BIRDS EYE missions. In early 1964 procedures for observing on aerial reconnaissance flights other than BIRDS EYE were altered to give a picture of ice conditions along a track in greater depth. In addition to the every ten-minute "spot" observations described previously, observations are taken at the intervening five-minute intervals, staggered to the right and left of the flight path.

Log sheets and work sheets have been developed and modified, with a view towards giving the observer more time to observe the ice in greater detail. At the present time, the form depicted in Attachment 1 is utilized as a work sheet for recording the ice features and encoding into WMO format. This form includes space for numerically recording ice features, space for navigational features such as latitude, longitude and ground speed, a plotting graph for keeping a constant pictorial representation of ice characteristics and features which will later be encoded into the optional groups of the WMO message. In conjunction with this, the form depicted in Attachment 2 is completed by the navigator. He records all required navigation information at times coinciding with the observation points. At periodic intervals the ice observer transposes the data from the navigation log to the ice work sheet. He can then use his ice data and the navigation data and record the WMO observation. The WMO observation can then easily be transmitted by radio to the ground or can be retained if early use of the data is not required.

The United States has found many advantages accruing from the use of the Unified Ice Code in aerial reconnaissance. A consistency of observations from one observer to another has increased the value of the ice information obtained in aerial reconnaissance. Encoding, decoding, dissemination and comprehension of the ice message has been facilitated. More information is obtained than is usually available when using ice mapping techniques. Observer training is simplified since most observers have experience with 5-figure group weather codes, and can easily grasp the concept of this code.

Testing the Unified Ice Code for ship and shore observations has been deferred until some experience could be gained using the code in the air. An experimental ship/shore

ice log shown in Attachment 3, based on the Unified Ice Code, has been prepared and is currently in use in the Antarctic. This utilization will provide the experience required before the log can be finalized and before any evaluation can be made as to the merit of the Unified Ice Code in ship and shore observations.

B. Operational use of WMO spot observations

United States ice forecasters have tested the use of Unified Ice Code aerial reconnaissance messages in operational ice forecasting. Ice reconnaissance messages have been transmitted to the forecasters in WMO format as depicted in Attachment 4, and a station model has been devised as shown in Attachment 5 to plot the transmitted data on charts. A comparable plain language message is shown in Attachment 6. The data is plotted and analysed by trained ice analysts. This type analysis is only possible when using a numerical code such as the WMO Unified Ice Code since isolines can be drawn for most of the ice features included in the code. From these charts, combined with meteorological charts, forecasts are prepared and disseminated to interested users. A sample WMO analysis and comparable ice map may be seen in Attachments 7 and 8.

The forecasters have found that the code facilitates their job in many ways. Much information is reported which has not been available when ice mapping techniques were used, decoding of the ice reports is simplified and ice observations are consistent from one observer to another and therefore more accurate. In addition, there is more rapid dissemination from observer through the forecaster to the user. For a small area, such as approaches to a harbour, the code gives a thorough coverage if frequent reconnaissance is flown.

Forecasters have also found some inadequacies in the code. The code provides for only predominant and secondary ages and flow sizes. This sometimes does not add up to 100 per cent and the information which is not reported due to code restrictions may be important to the forecaster. Determination of the exact location of boundaries between various concentrations is sometimes difficult but it is questionable whether more accuracy is acquired through ice mapping. Forecasters feel that the addition of groups over and above the predominant and secondary groups for age and floe size would be a notable improvement. They would also like some method of reporting the pack boundary to eliminate transmission of an additional message. In the I_B group, code No. 3, "Drift Ice", could be used to indicate the pack boundary, or a code No. 9 could be added to specifically indicate "Pack Boundary".

The experience of forecasters in using the WMO Unified Ice Code has, on the whole, been very favourable. Some improvements are indicated, but the code in its present form has proved its worth as an ice reporting tool.

C. Data processing and storage

The WMO Unified Ice Code lends itself admirably to machine processing procedures. This is, of course, one of the prime reasons for United States espousal of a numerical code. All of the data from the BIRDS EYE Ice Reconnaissance Missions have been entered on punchcards. This is done using three cards for each WMO observation, and filling the data chronologically. The data are subsequently entered on tapes which can be fed into a map plotter and a machine plotted chart can be prepared for any ice features which are needed. After the chart is analysed it is easy to compare the same months or seasons for several years or to note the trend in the ice over the course of a few months or a year. All log forms devised for use with the Unified Ice Code are designed to facilitate automatic data processing.

By use of these automatic data processing methods, it is possible to detect deficiencies in observer training and observing procedures. It also makes it possible to determine geographic areas where more emphasis should be placed on data collection. It is anticipated that it will, after sufficient quantities of data have been collected, provide the basis for an objective method of ice forecasting.

Ship and shore data will be stored on punch-cards in the future as will all aerial reconnaissance data other than BIRDS EYE. Accumulation of enough data will make it possible to initiate an ice data quality control programme. This programme will be necessary to aid in establishing standards for, and control over, the type of sea ice obtained, methods of obtaining it, and quality of data. This type of analysis has never been possible prior to use of the numerical Unified Ice Code.

D. Research use of the data

The punch-cards described in the previous paragraphs will inevitably aid in ice research. Heretofore, the researcher has found it necessary to search through stacks of ice maps, various codes, and ice messages in foreign languages. Use of this numerical code will allow him to process much larger amounts of data in a shorter time. He will also be able to use data obtained by foreign countries without being concerned with language differences.

Research into ice growth, deformation, and deterioration currently being conducted in the United States has been accelerated since WMO spot code data have been available on punch-cards. A further impetus to these research projects is expected when ship and shore WMO data become available for automatic data processing.

IV. CONCLUSIONS

The United States, having used the WMO Unified Ice Code, continues to support its adoption. It is possible that further testing will reveal the need for minor changes, but the basic concept of a numerical spot code is unassailable. Nothing has been proposed that fills the requirements for a world-wide ice reporting system nearly as well as this code.

Utilization of this code will make it possible to maintain and expand a quasi-synoptic sea ice reporting network in the Arctic regions, which is necessary if sea ice prediction techniques are to be further developed and refined.

Attachments : 8

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* *

NAVOCEANO-3930/7 (1-63)

WMO—NAVOCEANO ICE REPORTING FORM

FLIGHT | TRACK | DATE | FROM | TO | PAGE | OF

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
OBSERVATION NUMBER	GG = TIME IN HOURS GMT gg = TIME IN MINUTES GMT	VISIBILITY	1—ICE CRYSTALS SLUSH, SLUDGE	ICE RIND	PANCAKE ICE	2—BROKEN ICE, SMALL ICE CAKE	3—ICE CAKES	4—SMALL ICE FLOES	5—MEDIUM ICE FLOES	6—BIG ICE FLOES	7—VAST ICE FLOES	8—FAST ICE	ICE BRECCIA/ICE MOSAIC	9—ICE OF LAND ORIGIN	TOTAL CONCENTRATION OF ICE	0—ICE CRYSTALS	SLUSH	SLUDGE	1—PANCAKE ICE	2—ICE RIND	3—YOUNG ICE	4—MEDIUM WINTER ICE	5—THICK WINTER ICE	6—YOUNG POLAR ICE	7—ARCTIC PACK	1—RAFTED ICE	4, 5—RIDGES	2, 3—HUMMOCKS	8—BASTRUGI + ORIENTATION	1, 2—PUDDLES	3, 4, 5—THAWING HOLES	FROZEN PUDDLES	7—ROTTEN ICE	SNOW CONCENTRATION	GROWLERS AND BERGY BITS	ICEBERGS	OBSERVER
			REPORTED IN TENTHS														REPORTED IN PERCENT																					

WMO ICE CODE—AIRCRAFT OBSERVATIONS

VV	Q	L_1	L_2	L_3	L_4	L_5	L_6	G	G	E	E	h	h	h	C_1	C_2	S_0	F_0	F_1	T	T_L	W_1	C_1	S_m	C_3	S_2	C_1	C_2	V	I_B	B	B	D	D	I_W	W_0	β	β	W_d	9	G_A	G_A	B_B	B_B

OBS	$L_1L_2L_3$	$L_4L_5L_6$	TTK	GS	hhh	o/o	P/C	o/o	P/C	dd/ff	±°C
GG gg	39	40	41	42	43	44	45	46	47	48	49

ANNEX IX - Attachment 2

HYDRO ICE RECON NAVIGATION LOG

DATE _____ PILOT _____ NAV _____ A/C TYPE ___ BUNO _____

FROM _____ TO _____ ATD _____ ATA _____ SQDN _____

TIME Z	POSITION	GH	TTK	TH	GS	ALT	DD/FF	°C	REMARKS

PAGE ___ OF ___

NHO 3930/4

U.S. NAVAL OCEANOGRAPHIC OFFICE
SHIP–SHORE ICE LOG
(EXPERIMENTAL)

REPLACES H.O. MISC 15584 AND PRNC-NAVOCEANO-3167/54

SHIP OBSERVATIONS ICE B
VESSEL NAME ____________
HULL TYPE AND NUMBER ____________
VOYAGE: FROM ____________
TO ____________

SHEET NO. ______
MONTH ______
YEAR ______

SHORE OBSERVATIONS ICE C
STATION NAME ____________
INTERNATIONAL INDEX NUMBER ____________
SITE NUMBER ____________
LOCATION ____________

Column	Table No.	Group	Heading	Symbol
1			OBSERVATION NUMBER	O
2			OBSERVERS INITIALS	O
3			MESSAGE IDENTIFIER: ICE B SHIP / ICE C SHORE STATION	SYMBOL
4		SHIP	DAY OF WEEK GMT	Y
5	1	SHIP	OCTANT OF GLOBE	Q
6		SHIP	LATITUDE IN DEGREES AND TENTHS	$L_a L_a L_a$
7		SHIP	LONGITUDE IN DEGREES AND TENTHS	$L_o L_o L_o$
8		SHIP	HOUR IN GMT	G G
9		SHORE	INTERNATIONAL BLOCK NUMBER	I I
10		SHORE	INTERNATIONAL INDEX NUMBER	i i i
11	2		TOTAL ICE CONCENTRATION	C_T
12	2		PREDOMINANT FORM CONCENTRATION	C_P
13	3		PREDOMINANT STAGE OF DEVELOPMENT	S_D
14	4		PREDOMINANT FORM OF ICE	F_P
15	4		SECONDARY FORM OF ICE	F_S
16	5		CONSTRUCTION AND SURFACE FEATURE	T
17	6		EXTENT OF RIDGING AND HUMMOCKING	T_C
18	7		TYPE OF OPENING IN ICE	W_t
19	8		EXTENT OF FAST ICE	C_f
20	9		STAGE OF MELTING	S_m
21	10		ICE THICKNESS	I_T
22	11		DEPTH OF SNOW	D_S
23	12		WATER SKY OR ICE BLINK	S_I
24	8		WIDTH OF SHORE LEAD	L_S
25	13		VISIBILITY	V
26	2		CONCENTRATION OF SECONDARY FORM OF ICE	C_S
27	3		SECONDARY STAGE OF DEVELOPMENT	S_2
28	2		CONCENTRATION OF PREDOMINANT STAGE	C_1
29	2		CONCENTRATION OF SECONDARY STAGE	C_2
30			FILLER GROUP	/
31		SHORE	HOUR IN GMT	G G
32	18	SHORE	FORM OF FAST ICE	C_C
33	19	SHORE	TREND IN BEHAVIOR OF ICE NEAR SHORE	B_T
34	20	SHORE	ICE DRIFT NEAR SHORE	I_D
35	14		INDICATOR FOR ICE EDGE OR OPEN WATER	I_B
36			TRUE BEARING TO ICE EDGE IN TENS OF DEGREES	B B
37			DISTANCE TO ICE EDGE IN NAUTICAL MILES	D D
38	14		INDICATOR FOR ORIENTATION	I_W
39	15		ORIENTATION	W_o
40			LENGTH IN NAUTICAL MILES	ℓ ℓ
41	16		WIDTH	w_d
42			INDICATOR	//
43	17		GROWLERS AND BERGY BITS	$G_A G_A$
44	17		ICE BERGS	$B_B B_B$
45			END OF MESSAGE INDICATOR	1 9 9 9 1
46			DATE TIME GROUP OF MESSAGE IN GMT	DATE TIME
47				REMARKS

Attachment 4

FM: BASE OPS GOOSE BAY LABRADOR
TO: NAVOCEANO WASH D.C.
INFO: NS ARGENTIA
BT
UNCLAS
ICE A.

10523 54910 40010 52454 41900 25339

10525 54410 45010 42454 41900 15229

10528 54810 50010 63554 41900 24429

10529 55210 55010 63554 41900 20429

10533 55011 00010 52545 41900 14619

10537 54811 05010 52545 41900 14619

10537 55411 10010 73554 41900 14719

10538 56011 15010 95556 41900 35909

10541 56011 20010 63554 41900 15909

10544 56311 25010 63554 41900 15909

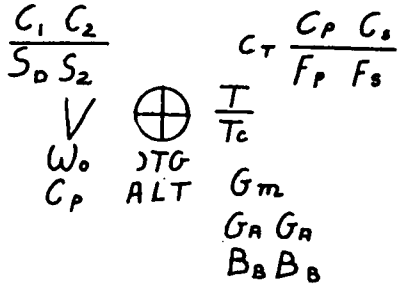
10542 54811 30010 63554 41900 15090

12 MAR 1964 3.1 C. ROGGE R. ROSEBERRY

EXAMPLE WMO ICE MESSAGE

Attachment 5

WMO STATION MODEL



Attachment 6

FM: BASE OPS GOOSE BAY LABRADOR
TO: NAVOCEANO WASH D.C.
INFO: NS ARGENTIA
BT
UNCLAS

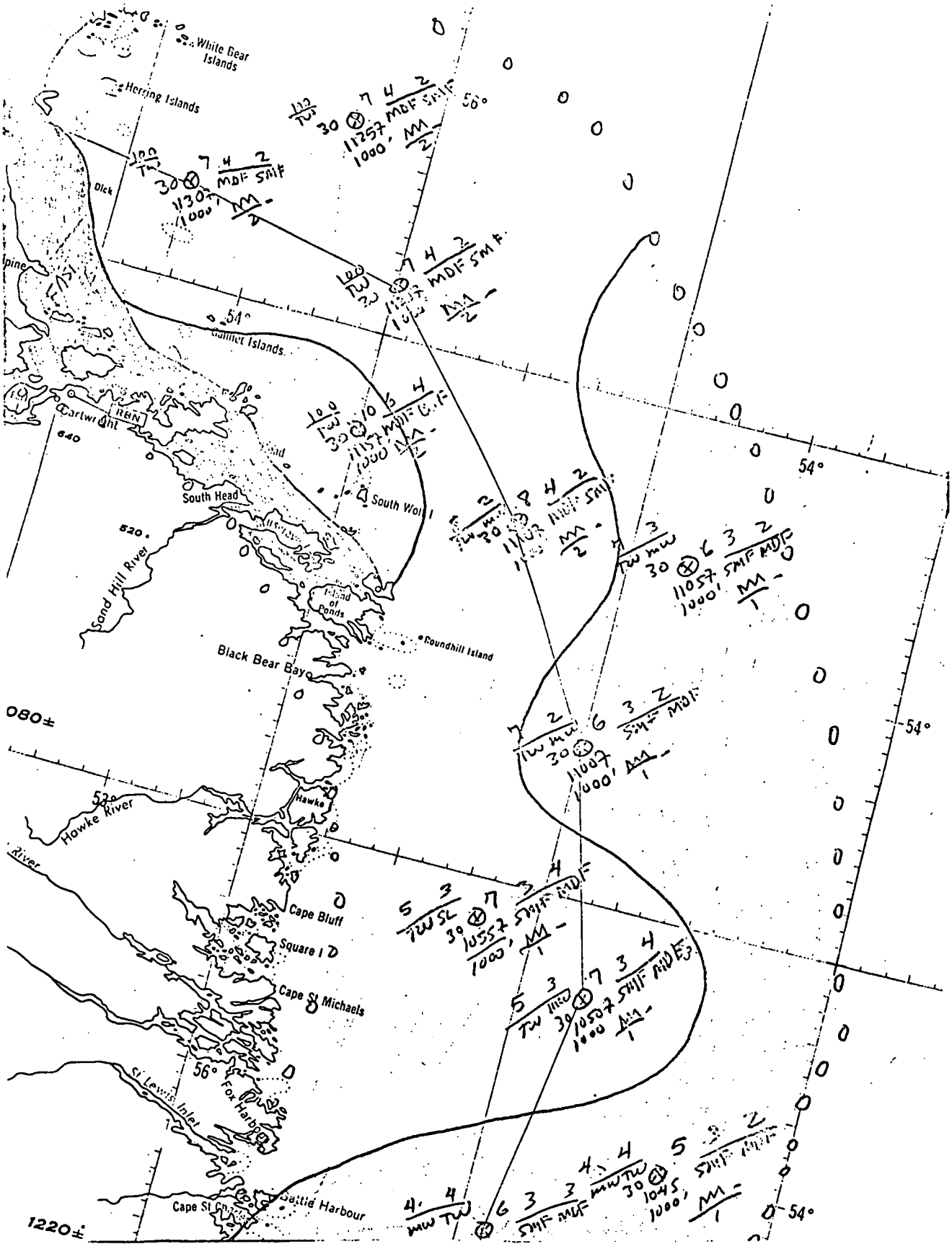
ICE. 121040Z - 121142Z MAR. THREE PT ONE. ALT 1000 FT. TRK 5218N 5455W 53N 5445W 54N 5539W SE TIP GEORGE IS 5414N 5728W. OBS 30 MI FAST ICE 5422N 5730W TO NE TIP GEORGE IS, RSM SE TIP GEORGE IS 54N 5706W OUTER IS NORTH TIP SOUTH WOLF IS, ALL BAYS AND COVES ENDG NE TIP HAWKE IS. SW LN WHITE BEAR IS 54N 5643W 5353N 56W NORTH TIP SOUTH WOLF IS 064 TEN TW RIG TWO. NW LN 5357N 5443W 5326N 5512W 5252N 5432W 5236N 5507W ENDG NW TIP BATTLE HARBOUR IS SEVEN TO NINE TENTHS CONC. 8TW2MW RIG TWO. SE LAST LINE FIVE TO SIX TENTHS CONC 6TW3MW1Y RIG ONE. AREA NW WHITE BEAR IS ALG CST FAST ICE.

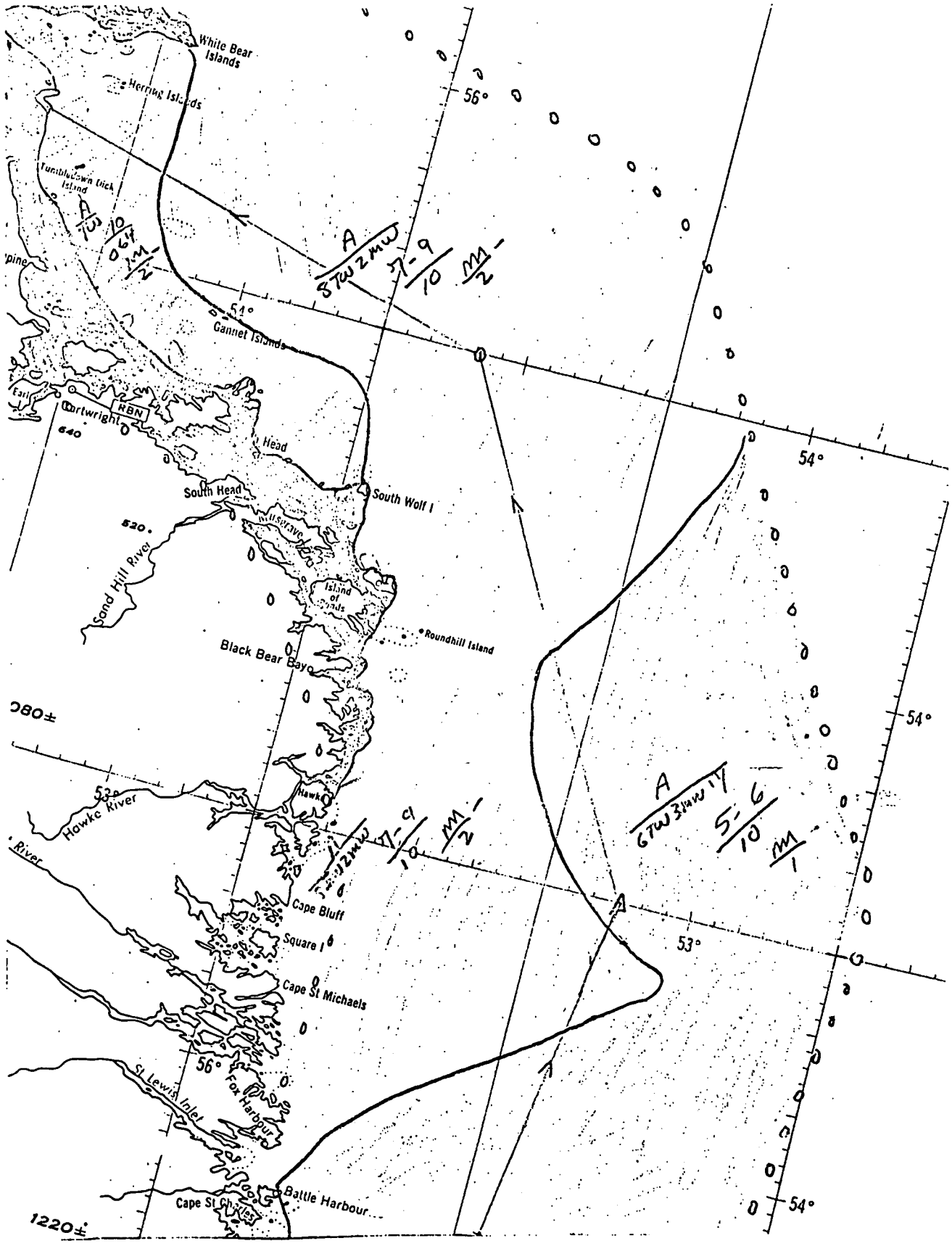
C. ROGGE R. ROSEBERRY

EXAMPLE ICE MAPPING WORD MESSAGE

*

* *


White Bear Islands
Herring Islands
Dick
Gannet Islands
Cartwright
South Head
South Wolf I
Sand Hill River
Head of Ponds
Roundhill Island
Black Bear Bay
080±
Hawke River
Hawke
Cape Bluff
Square I
Cape St Michaels
St Lewis Inlet
Fox Harbour
Cape St
Battle Harbour
1220±
54°
56°


White Bear Islands
Herring Islands
Tumbledown Dick Island
Gannet Islands
RBN
Cartwright
South Head
South Wolf I
Sand Hill River
Island of Ponds
Roundhill Island
Black Bear Bay
Hawke River
Cape Bluff
Square I
Cape St Michaels
Fox Harbour
St Lewis Inlet
Cape St Charles
Battle Harbour
56°
54°
53°
54°
54°
640
520
080±
1220±

A N N E X X

Annex to paragraph 12.4 of the General Summary

ABBREVIATED FORM OF THE WMO UNIFIED ICE CODE (ICE D)

ICE D $YQL_aL_aL_a$ $L_oL_oL_oGG$ $C_TC_PF_PS_DC_l$ $S_2C_2TT_CS_m$

(I_BBBDD) $(L_WW_o11w_d)$ $(9G_AG_AB_BB_B)$

NOTES :

(1) Groups shown in parentheses are optional groups.

(2) If no ice is observed, the group $C_TC_PF_PS_DC_l$ is encoded as 000/0. If no ice is observed due to darkness or other causes, including times when aircraft are flying above the undercast, and the observer is reasonably certain he is over ice, C_T will be coded either as a solidus (/) or in the appropriate code figure if determined by radar or other means.

(3) The group $I_WW_o11w_d$ is omitted from the message when symbol I_B in the group I_BBBDD is coded as 1, 2 or 3.

(4) When symbol I_B is encoded as four or higher, data for the group $I_WW_o11w_d$ must be included in the message. The groups I_BBBDD $I_WW_o11w_d$ may be repeated in the message as many times as the observer considers necessary to convey an accurate and complete picture of observed ice conditions.

REMARKS :

Specifications of symbolic letters of this code are the same as those for the WMO Unified Ice Codes A, B and C (see annex to Recommendation 28 (CMM-III)).

A N N E X XI

Annex to Recommendation 5 (CMM-IV)

NEW TABLE FOR EQUIVALENT SPEEDS FOR THE BEAUFORT NUMBERS

Equivalent speeds

Beaufort scale number	Metres per second					Knots	
	Mean	Limits	Interval			Mean	Limits
			between limits	lower half	upper half		
0	0.8	0 - 1.3	-	-	0.5	1	0 - 2
1	2.0	1.4 - 2.7	1.3	0.6	0.7	4	3 - 5
2	3.6	2.8 - 4.5	1.7	0.8	0.9	7	6 - 8
3	5.6	4.6 - 6.6	2.0	1.0	1.0	11	9 - 12
4	7.9	6.7 - 8.9	2.2	1.1	1.1	15	13 - 16
5	10.2	9.0 - 11.3	2.3	1.2	1.1	19	17 - 21
6	12.6	11.4 - 13.8	2.4	1.2	1.2	24	22 - 26
7	15.1	13.9 - 16.4	2.5	1.2	1.3	29	27 - 31
8	17.8	16.5 - 19.2	2.7	1.3	1.4	35	32 - 37
9	20.8	19.3 - 22.4	3.1	1.5	1.6	41	38 - 43
10	24.2	22.5 - 26.0	3.5	1.7	1.8	47	44 - 50
11	28.0	26.1 - 30.0	3.9	1.9	2.0	54	51 - 57
12	-	$\geq$ 30.1	-	2.1	-	-	$\geq$ 58

A N N E X XII

Annex to Recommendation 8 (CMM-IV)

PROPOSED GUIDE TO REPORTING PRECIPITATION AT SEA

1 Description of Precipitation	2 To be reported as	3 Effect on visibility	4 Effect on radar
1 Slight drizzle or light, wet mist - Can be readily detected on the face and on wheelhouse windows, but produces very little run-off from decks.	51	Reduced to 3-5 miles	No apparent effect.
2 Moderate drizzle or wet mist - Causes windows and decks to stream with moisture; condenses on rigging and superstructure.	53	Reduced to 1-3 miles.	Possibly a weak, poorly defined echo extending only to short range.
3 Thick drizzle or thick wet mist - as for 2, but definitely impairs visibility.	55	Reduced to ½ to 1 mile.	Weak poorly defined echo extending to range of up to 4 n.m.
N.B. Although it is doubtful if true drizzle occurs at sea, very wet mists are a common feature and are thought likely to deposit as much moisture as drizzle, though this cannot, perhaps be regarded strictly as precipitation.			
4 Slight rain - Rain of low intensity, that is to say, the rate of accumulation on the deck is small. Such rain may consist of scattered large drops or more numerous smaller drops.	61	Negligible, though visibility unlikely to be over 6 miles.	Possibly a weak poorly defined echo extending only to short range.
5 Moderate rain - Rain falling fast enough to form puddles rapidly.	63	Reduced to 2-4 miles.	Rather weak, poorly defined echo extending to a range of up to 10 n.m. Parts of echo at shortest range may remain visible on selecting short pulse.

1	2	3	4
6 Heavy rain - A downpour which makes a roaring noise on awnings and deck-heads and forms a misty spray of fine droplets by splashing on deck surfaces.	65	Reduced generally to 1-2 miles but occasionally to ½-1 mile.	Poorly defined echo but extending to ranges of over 10 n.m. (long pulse) and 3 n.m. (short pulse).
7 * Slight Shower as for slight rain.	80	As for slight rain.	Isolated echo of limited extent with fairly well-defined edges. Such echoes will remain visible to ranges of up to 5 n.m. and parts at shortest range will remain visible on selecting short pulse.
8 * Moderate Shower as for moderate rain.	81	As for moderate rain.	Isolated bright echo of limited extent with well-defined edges. Such echoes will remain visible to ranges of up to 15 n.m. with parts remaining visible to ranges of up to 5 n.m. on selecting short pulse.
9 * Heavy Shower as for heavy rain.	81	As for heavy rain	Isolated bright echo of limited extent with well-defined nearer edge. Such echoes will remain visible to ranges of up to 30 n.m. (long pulse) or 20 n.m. (short pulse).
10 Violent Shower - Used to report the intense showers frequently experienced in the Doldrum belt and occasionally associated outside tropical and equatorial regions with thunderstorms. * The scale of intensity applied to rain needs to be increased when applied to showers because the convective processes which cause them are generally more vigorous than the frontal or orographic uplift associated with continuous precipitation.	62	Reduced to less than ½-mile.	Bright echo with more distant edges rather poorly defined. Such echoes will remain visible to ranges of over 30 n.m. (long pulse) or 20 n.m. (short pulse)
11 Slight snow - Flakes are small and sparse	71	Little effect though visibility unlikely to be over 4 miles.	Weak poorly defined echo extending to range of up to 5 n.m.
12 Moderate snow - Larger flakes falling sufficiently thickly to impair visibility substantially	73	Reduced to ½-1 mile.	Poorly defined echo but extending to range of over 15 n.m. Parts of echo at shortest range may remain visible on selecting short pulse.
13 Heavy snow - reduces visibility to a low value.	75	Reduced to less than ¼ mile.	Poorly defined echo but extending to range of over 15 n.m. (long pulse) or 10 n.m. (short pulse)
14 Slight hail - Sparse hailstones, usually of small size and often mixed with rain.	89	Reduced to 3-5 miles.	Well defined bright echo of limited extent. Such echoes will remain visible to ranges of up to 30 n.m. (long pulse) or 20 n.m. (short pulse).

1	2	3	4
15 Moderate hail - Fall sufficient to whiten the decks.	90	Reduced to 1-3 miles.	Well defined bright echo. Such echoes will remain visible to ranges of up to 45 n.m. (long pulse) or 30 n.m. (short pulse).
16 Heavy hail - Rarely experienced in temperate latitudes at sea. At least some of the stones exceed ¼ in. in diameter.	90	Reduced to less than 1 mile.	Well defined intense echoes. Such echoes will remain visible to ranges of over 45 n.m. and are virtually unchanged on selecting short pulse.
17 Precipitation within sight, reaching the surface of the sea but distant, (estimated to be more than 5 Km) from the Ship.	15		Appearance will depend on type and intensity of precipitation (see 1-16).
18 Precipitation within sight, reaching the surface of the sea, near to but not at the Ship.	16		

Notes: (1) When continuous precipitation is reported the time of onset and cessation should be noted in the log.

(2) The duration of moderate, heavy, or violent showers should be noted in the log.

(3) When precipitation in sight (WW= 15 or 16) is reported the following facts should be noted in the log:

(a) Whether precipitation is occurring in an extended belt or as isolated showers.

(b) If showers number in sight at time of report.

(c) Intensity of precipitation as indicated by radar.

The above table shows the probable appearance of various types and intensities of precipitation on the P.P.I. of a "typical" X-Band marine radar having peak pulse power of 20 kW, pulse lengths of 0.5 μs and 0.1 μs and a 6 ft. scanner.

Notes:

(1) The detection ranges are approximate even for the stated radar. For X-Band radars with lower peak power, shorter pulse lengths or in poor condition the detection ranges will be reduced. For X-Band radars with higher peak power, longer pulse lengths or larger aerials some slight increase over the quoted detection ranges may be expected.

(2) All detection ranges are quoted for long pulse operation unless otherwise stated. It is assumed throughout that anti-clutter controls (differentiation, swept gain, etc.) are not in operation, their normal effect being to eliminate all but the most intense precipitation echoes.

(3) The table is intended to assist in the reporting of present weather at the ship and not to over-rule good visual observation. Detection ranges are quoted as a guide but it cannot always be assumed that the precipitation intensity some miles away is similar to that being experienced at the ship. This applies particularly in showery conditions. The statements "extending to ranges of ..." and "such echoes will remain visible to ranges of ..." must always be applied with caution since they also assume that the echoes are there to be detected.

(4) Ranges quoted for snow in 11, 12 and 13 assume air temperatures remaining above 0°C. For really dry snow below zero the 'appearances' would probably move up one code figure, 11 then being virtually undetectable by radar.

A N N E X XIII

Annex to Recommendation 11 (CMM-IV)

Annex XIII - Part I

PLAN FOR THE COLLECTION AND DISSEMINATION OF SHIPS' WEATHER REPORTS

The procedures given below are designed to ensure transmission of ship's reports to coastal radio stations and provide a degree of freedom to overcome difficulties in clearing weather messages. The plan also takes into account the WMO meteorological telecommunications systems through which the reports received at coastal radio stations should be retransmitted in territorial and subregional transmissions for international exchanges.

(1) Weather reports from mobile ship stations should (without special request) be transmitted from the ship to the nearest convenient coastal radio stations situated in the zone in which the ship is navigating (see Part II of the present annex). The expression "nearest convenient coastal radio station" implies that a ship's weather report should be transmitted to the nearest coastal radio station in the zone unless radio propagation conditions or other circumstances make it necessary to transmit the report to another station which is then considered the nearest convenient station in the zone.

(2) If a radio officer finds difficulties in contacting promptly the nearest convenient coastal radio station in the zone in which the ship is navigating, he should endeavour to clear his weather messages by applying the following procedures in the order given below :

(a) Transmission to any other coastal radio station in the zone in which the ship is navigating;

(b) Transmission to any coastal radio station in an adjacent zone within the same Region;

(c) Transmission to any coastal radio station in any other zone within the same Region; or

(d) Transmission to a coastal radio station in any adjacent zone in a neighbouring Region or, failing that, to any other station in a neighbouring Region.

NOTES :

1. The order of the procedures shown under (b), (c) and (d) above should normally be followed unless it is changed by inter-regional agreement in order to meet particular cases in zones at the border of the Regions.

2. Details of the coastal radio stations designated to receive weather reports free of charge to the ships are published in WMO Publication No. 9.TP.4, Volume D, Part B.

(3) As a result of mutual arrangement between the Members concerned or regional or inter-regional agreements, Members may issue instructions to their mobile ship stations to the effect that their weather reports be transmitted for preference via one of their home coastal radio stations designated for the collection of reports from the zone.

(4) All reports received from ships at coastal radio stations in one territory should be promptly collected at the territorial broadcast or similar centre of the territory and retransmitted to the subregional centre(s) concerned, for further international dissemination. (See Technical Regulations 6.2.2.7, 6.3.3, and 6.3.4.)

(5) Coastal radio stations will be shown on the map and listed in WMO Publication No. 9.TP.4, Volume D, only if the Member responsible for the operation of that station confirms in writing to the Secretary-General that :

(a) They will, for the purpose of receiving ships' reports :

(i) Keep a continuous 24-hour watch; or

(ii) Keep a watch for at least 30 minutes, beginning at 0000, 0600, 1200, and 1800 GMT daily.

At type (ii) stations it is understood that at these periods and other hours the order of priority will be maintained, which, according to Article 37 of the Radio Regulations, is to be given to the transmission of ships' weather reports in the mobile service and that watch will also be kept for a similar minimum time at the beginning of the nearest "single operator period" following those standard synoptic hours; or

(iii) Keep watch for shorter periods (stations with limited hours of operation) than those mentioned under (ii) above but when these stations are considered of particular value because they are located in an area where coastal radio stations are sparse.

Stations of type (iii) above should be included in Volume D only with the agreement of the president of the Commission for Maritime Meteorology;

(b) The meteorological authority of the country in which a coastal radio station is situated will be responsible for ensuring that all radio weather messages from ships received at the station are speedily disseminated, including (by regional agreement) "delayed" reports up to 24 hours old.

(6) If any particular coastal radio station is shown consistently to fail to accept promptly ships' weather reports or if the subsequent retransmission is deficient, the president of the regional association concerned should take steps with a view to improving the situation, and if such action does not succeed, he should take steps with a view to removing that station from the list concerned.

(7) Part II of this annex shows the broad outline of the zones for the collection of ships' reports and also the corresponding subregional centres (or centres with similar functions) responsible for the international dissemination of the reports collected by coastal radio stations in their zones. In this connexion :

(a) The boundaries of these zones may be adjusted by regional associations as necessary;

(b) By way of exception, zones pertaining to one Region may extend into the sea area of an adjacent Region, if so agreed between the two regional associations concerned;

(c) Along the border line between two Regions, zones pertaining to each Region may overlap each other if so agreed between the two regional associations concerned.

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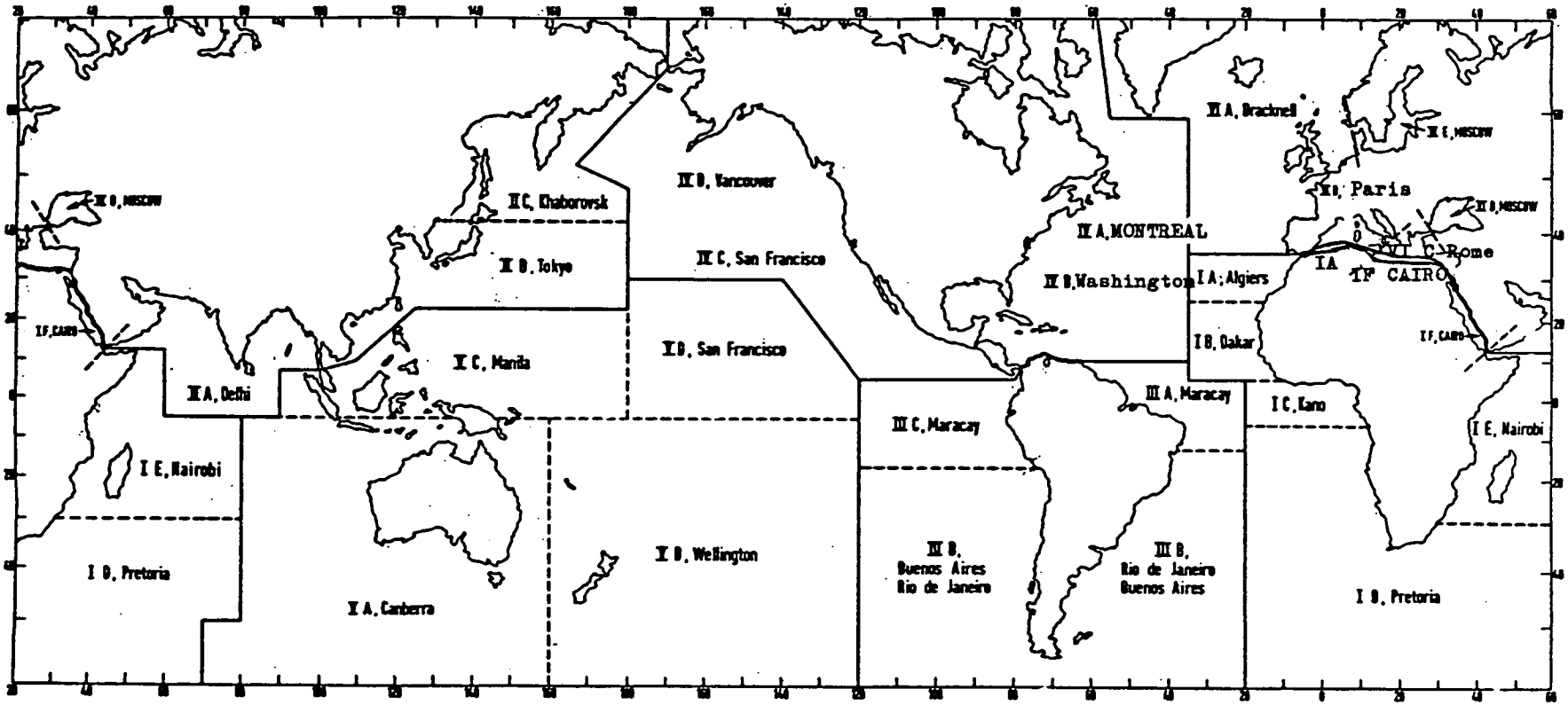
Annex XIII - Part II

BROAD OUTLINE OF ZONES FOR THE COLLECTION AND DISSEMINATION OF SHIPS' REPORTS



Note : The names shown in the map are those of the corresponding subregional centres (or centres fulfilling similar functions).

A N N E X XIV

Annex to Recommendation 12 (CMM-IV)

TRANSMISSION OF WEATHER MESSAGES BY "SINGLE-OPERATOR" SHIPS

"Single-operator" ships, in making weather observations and transmitting messages, should be guided by the procedures in the order given below :

(a) As a general principle, observations should be made and transmitted at the main standard synoptic times, 0000, 0600, 1200, and 1800 GMT.

(b) When operational difficulties on board ship make it impracticable to make and/or transmit a surface synoptic observation at a main standard time (0000, 0600, 1200 and 1800 GMT), to ensure transmission of a message to a coastal station before the radio officer goes off duty, the actual time of observation should be as near as possible to the main standard time. Alternatively, in special cases, observations may be taken one full hour earlier than the main standard time and be timed accordingly (i.e. 2300, 0500, 1100 or 1700 GMT respectively). However, it is emphasized that these departures should be regarded only as an exception when the instructions given in (a) above cannot be followed.

(c) When it is impracticable to follow instructions given in (a) and (b) above, the observations should be taken and transmitted at 0300, 0900, 1500 or 2100 GMT respectively. For example, if the radio officer is scheduled to complete his watch by 2200 GMT, the observation should be taken and the message transmitted at 2100 GMT.

(d) When an observation is made at 0300, 0900, 1500 or 2100 GMT in order to ensure its transmission to a coastal station, it is desirable that the observation at the next main standard synoptic time, i.e. 0600, 1200, 1800 or 0000 GMT, should be made for climatological purposes and if possible transmitted as indicated in (e) below.

(e) Observations made at any of the standard times 0000, 0600, 1200 and 1800 GMT can be transmitted up to four hours after the time of observation if this arrangement will fit in with the radio officer's watch hours. (Note : An observation received four hours late is much better than receiving no weather message at all.) In the southern hemisphere and other areas where few reports are received from ships, an observation message may be transmitted as much as 12 hours after the time of the observation.

ANNEX / ANNEXE XV

Annex to Recommendation 13 (CMM-IV)

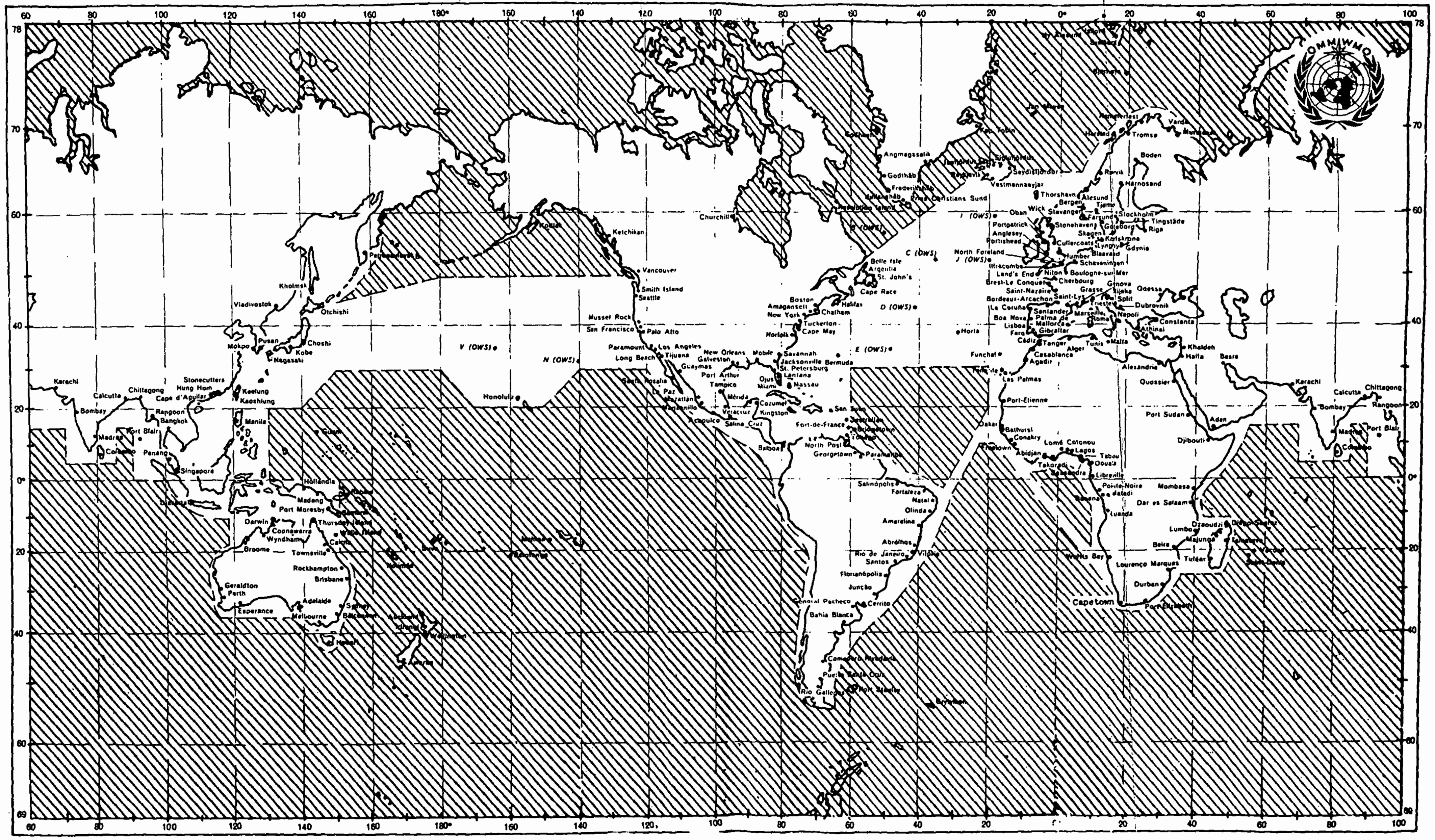
Annexe à la Recommandation 13 (CMM-IV)

OCEAN AREAS WHERE THE NUMBER OF METEOROLOGICAL OBSERVATIONS IS INADEQUATE

All ships under way in shaded ocean areas are requested to send radio weather messages to the coastal radio stations shown on the map

ZONES OCEANIQUES OU LE NOMBRE D'OBSERVATIONS METEOROLOGIQUES EST INSUFFISANT

Tous les navires faisant route dans les zones océaniques ombrées sont priés d'envoyer des messages météorologiques aux stations radio-côtières indiquées sur la carte



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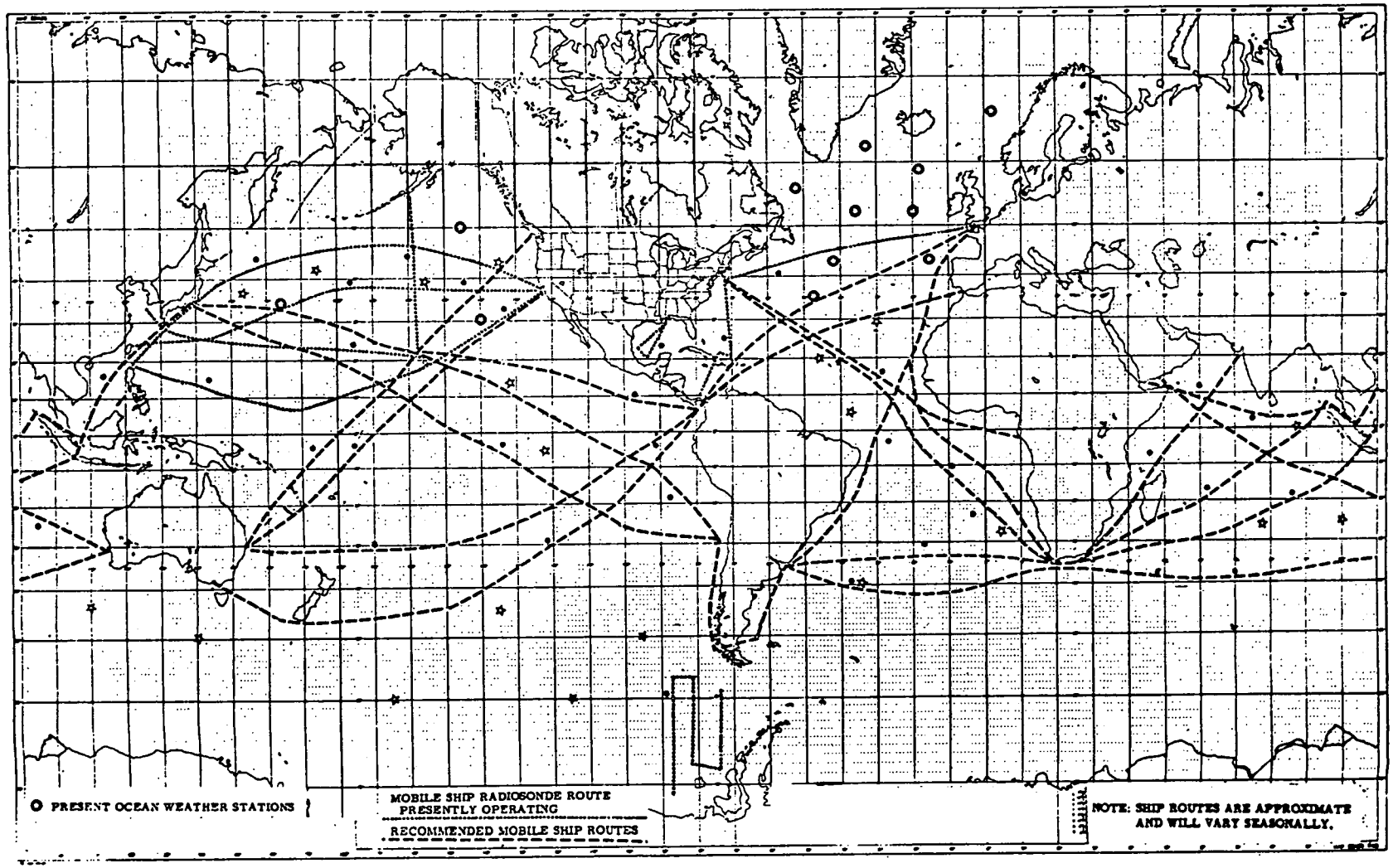
A N N E X XVI

Annex to Recommendation 14 (CMM-IV)

MOBILE SHIP RADIOSONDE ROUTES



A N N E X XVII

Annex to Recommendation 15 (CMM-IV)

Annex XVII - Part II

ACTION TO BE TAKEN TO PROVIDE SHIPPING FORECASTS FOR OCEAN AREAS IN WHICH SUCH SERVICES HAVE NOT YET BEEN IMPLEMENTED

The following action is requested :

(a) Brazil should be asked to consider the possibility of extending the present area of their bulletins further to seaward as indicated on Map B.

(b) Argentina should be asked to confirm that the broadcast will continue to be issu for the area extending 300 miles from the coast and in addition to issue bulleti for the area between 30°S and 50°S to seaward of this zone.

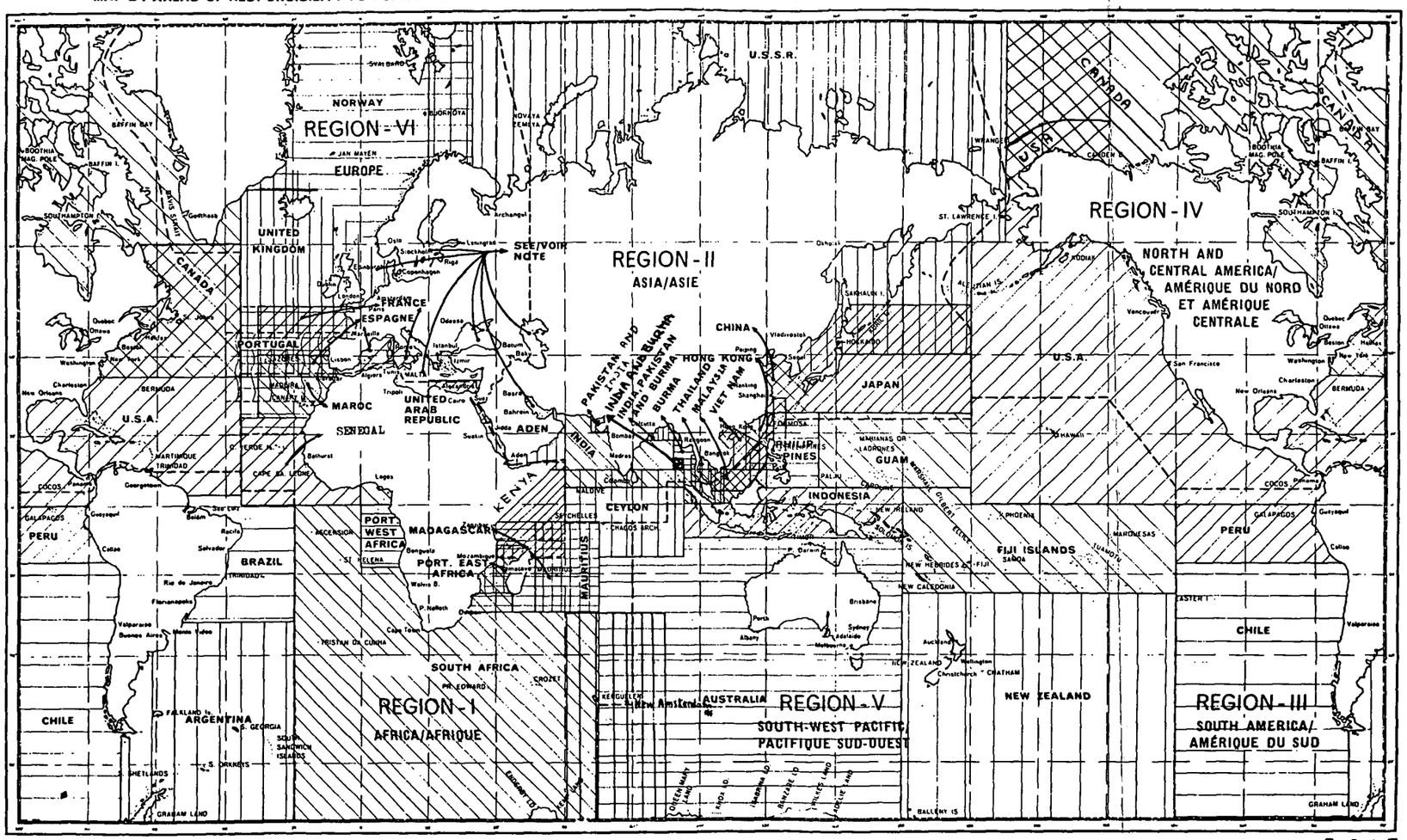
(c) Peru should be asked to issue bulletins for the area at present shown on Map B a allocated to them.

(d) Chile should be asked to issue bulletins for the whole of the area shown at present on Map B.

(e) A further approach should be made to the Australian and New Zealand authorities to seek their agreement to extending their present area of responsibility to cover the areas shown below :

Australia	(i)	the area south of 55°S between 140°E and 160°E
	(ii)	the area south of 45°S between 90°E and 140°E
New Zealand	(i)	the area south of 25°S between 120°W and 150°W
	(ii)	the area south of 55°S between 150°W and 160°E.

MAP B : AREAS OF RESPONSIBILITY FOR SHIPPING FORECASTS **CARTE B : ZONES DE RESPONSABILITÉ POUR LES PRÉVISIONS DESTINÉES À LA NAVIGATION MARITIME**



Note: Responsibility for service in this area is mutually assigned to countries bordering this sea.

La responsabilité de cette zone est attribuée par voie d'accord mutuel aux pays situés en bordure de cette mer.

*New Amsterdam 37°50'S 77°34'E
Area : South of 30°S and between 60°E and 90°E overlapping with the areas of Australia and South Africa.

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(Imprimé en 1956) - (Tirage 1956)

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A N N E X XVIII

Annex to Recommendation 16 (CMM-IV)

FACSIMILE BROADCASTS USEFUL FOR MARITIME PURPOSES

(a) Suggested contents

1. Surface analysis charts with the following additional features :
   (i) Areas in which the wind speed is 34 knots or more (Beaufort force 8 or more);
   (ii) Movement of pressure centres (direction and speed).
2. Surface prognostic charts
3. Sea conditions charts actual
4. Sea conditions charts prognostic
5. Extended forecast charts
6. Ice conditions charts (actual and prognostic)
7. 500 mb analysis charts
8. Sea surface temperature charts
9. Bathy-thermograph traces
10. Layer depth charts

NOTE : All charts used in transmissions should indicate chart scale and projection.

(b) Schedules

1. Strict adherence to published transmission schedules is essential to assist ships in the reception of charts.
2. Members should arrange their schedules in so far as possible so that the charts of interest to shipping are transmitted successively.

A N N E X XIX

Annex to Recommendation 24 (CMM-IV)

MANUAL ON PORT METEOROLOGICAL OFFICER ACTIVITIES

1. INTRODUCTION

The following outline of duties applies to a port meteorological officer in a large harbour; in smaller ports the duties should be adapted to this pattern as far as possible.

1.1 Personnel requirements

According to the Technical Regulations (WMO No. 49.BD.2/3), paragraph 2.5.2.2, each Member of WMO concerned should appoint port meteorological officers, having maritime experience, at its main ports. Apart from maritime experience, a port meteorological officer (P.M.O.) should also have experience in and knowledge of meteorology, theoretical as well as practical. He should avail himself of every opportunity to keep his knowledge of meteorology and oceanography up to date. Also, linguistic knowledge, in particular of the English language, would be an advantage, as most ships' officers whose mother tongue is not English are able to express themselves in this language. If (an)assistant(s) to the P.M.O. is (are) appointed,it is advisable that he should also fulfil the above-mentioned requirements.

1.2 Location of the office of a port meteorological officer

The office of the P.M.O. should preferably be situated in the centre of the harbour area. The possibility of more visits to ships will thus be increased and it will facilitate the visits of voluntary ships' observers to the P.M.O.'s office. Depending on the circumstances, the P.M.O. should be provided with appropriate means of transport, especially in cases where the transport of instruments and supplies to ships is required.

2. DUTIES OF A PORT METEOROLOGICAL OFFICER

Paragraph 2.5.2.2 of the Technical Regulations (TR) describes the main duties of a P.M.O. as follows :

I. (a) To instruct and maintain contact with observers on board ships on the national register of the Member concerned and maintain and inspect meteorological instruments installed on board these ships.

(b) Upon request of the master of any ship, irrespective of its State of registry, to check meteorological instruments and to provide advice or assistance in meteorological matters.

(c) To maintain liaison with the owners or local agents of ships of all nationalities with a view to enlisting the ships' co-operation in furnishing reports in accordance with paragraphs 2.2.1.5 and 2.2.1.5.1, provided that the ships' basic instructions for making and reporting observations are not modified by such action.

To this paragraph the following points should be added :

II. To promote and maintain co-operation with :

(1) The national meteorological centre(s) and neighbouring P.M.O.s,

(2) Harbour authorities and shipping companies,

(3) Merchant marine schools.

III. Office activities necessary for supervision of observing ships.

The following outline of duties applies to a P.M.O. in a large harbour; in smaller ports the duties should be adapted to this pattern as far as possible.

2.1 The main task, visits to ships

2.1.1 Purpose of visits to ships

The purpose of visits to ships is :

(a) To maintain personal periodic contact with master, deck- and radio-officers.

(b) To check meteorological instruments.

(c) To provide instructions regarding observations, keeping of meteorological log-books and transmission of weather reports.

(d) To provide the necessary forms (log-books, etc.).

(e) To provide weather information.

2.1.2 Selection of ships to be visited

The P.M.O. should gather sufficient information concerning ships' movements to enable him to prepare a good selection of ships to be visited. The P.M.O. should make use of the International List of Selected and Supplementary Ships, issued by WMO (WMO No. 47.TP.18).

In deciding the order in which ships should be visited, it must be kept in mind that the geographical position of the port influences the decision on this sequence.

2.1.2.1 Ports situated near "sparse areas"

In ports situated near "sparse areas" the P.M.O. should give priority to the visiting of "other" ships (ships which have not yet been recruited as selected or supplementary ships) irrespective of their nationality with a view to increasing the meteorological observations from the "sparse areas" (see also TR 2.2.1.5.1). Next he should endeavour to make regular visits to selected and supplementary ships on his national register and, finally, selected and supplementary ships recruited by other countries could be visited, either at the master's request or on the initiative of the P.M.O. This sequence is recommended, because selected and supplementary ships normally make observations in sparse areas.

2.1.2.2 Other ports

In other ports the P.M.O. should give priority to regular visits to selected and supplementary ships on the national register, these being under his supervision. The same priority applies to the auxiliary ships having the port of the P.M.O. as home port.

If circumstances permit, visits should be made to other sea-going vessels. The order in which they should be visited is difficult to suggest, but priority must be given to selected, supplementary and auxiliary ships which regularly call at the port of the P.M.O., but seldom call at their home ports (e.g. line services between foreign ports, tanker- and tramp-trade).

2.1.3 Activities during visits to ships

The activities of the P.M.O. during visits to ships depend on the classification of each ship visited.

2.1.3.1 Visits to selected and supplementary ships on the national register

The maintaining of personal contact with the master, deck- and radio-officers is considered to be of great importance. Their co-operation, generally voluntary, is of great value to all Meteorological Services, and the ships' observations are indispensable in the preparation of a reliable weather forecast. The P.M.O. establishes a link between the ship as a weather observing station and the meteorological centres on land.

The observations are also of great value for scientific purposes (e.g. in the climatological and research field). According to TR 3.5.1.2, selected and supplementary ships shall record observations in a meteorological log-book. In this regard the P.M.O. should explain that it is very desirable that the observations be recorded regularly at the main standard time (00, 06, 12 and 18 GMT) whether the observation has been transmitted as a radio weather message or not, as such observations will be used later for a variety of purposes.

When the P.M.O. visits a sea-going vessel, he should first of all introduce himself to the master or his representative. Next he will explain the purpose of his call. During the discussion with the master or his representative, he will request permission to call on the deck- and radio-officers present; he will ask permission to check the meteorological instruments on board and to examine the meteorological log-books if available.

When observations or transmissions of weather reports are not properly or regularly carried out, he should make tactful enquiries and try to improve the situation. The P.M.O. should enquire regarding difficulties concerning observing practices, coding, and transmission of weather reports. If such difficulties have been experienced, he should try to find a solution to each problem. Moreover he should try to note how the observations have been made and should give appropriate instruction if necessary.

If errors in coding are known to have been made, and mistakes have occurred in keeping the meteorological log-book, the P.M.O. should endeavour to discuss them. If the meteorological log is still on board, he may review it with the deck-officers present and, through discussion and examples, illustrate the proper coding of observations.

The meteorological instruments on board should be checked and, if incorrectly exposed, the P.M.O. should tactfully inform the officer concerned. The corrected barometer reading should be compared with a standard barometer ashore or with a portable inspection barometer. If the error exceeds 0.5 mb, a mercurial barometer should be replaced. An aneroid barometer may be adjusted or, if desirable (e.g. in case of maintenance), be replaced. In case of an error of less than 0.5 mb a note of this error should be made and brought to the attention of the ship's officers. (The meteorological centre where log-books are examined for climatological and other scientific purposes is better able to judge which corrections should be applied, provided that all information about instrumental errors are forwarded by the P.M.O. to the meteorological centre concerned.) If replacement is necessary, but not possible, the P.M.O. should indicate the corrections which should be applied.

The aneroid barometer should be adjusted in such a way that, while observing at the average height above the sea surface, a barometer reading indicates the pressure as it would be at sea-level. No correction for height of the barometer above sea-level needs to be applied in this case. The influence of varying heights of the barometer (difference in draft) can be neglected because of the small change in pressure due to these variations (a difference of one metre equals 0.12 mb). The error is, in any case, usually less than the limits of the accuracy of the instrument.

He should remind observers of the importance of checking the barometer regularly (at least twice a year). This can be done in most major ports by their P.M.O.s (see TR 2.5.2.3). For further particulars concerning P.M.O.'s see WMO Publication No. 9, Volume D, Part C. In view of the fact that the duration of ships' calls at ports is becoming shorter and shorter, the P.M.O. should mention that barometer checks can also be made when passing a coastal meteorological station at a short distance. In this case the corrected barometer reading together with time, date and ship's position at the moment of reading the barometer, should be noted in the log-book. When at a later date the P.M.O. receives the log-book, he is in a position to judge whether the instrument is still in good condition.

When checking the psychrometer, whatever type is used on board, the P.M.O. should give special attention to the serviceability of the thermometers, the cleanliness of the wick of the wet-bulb thermometer,and the functioning of the instrument itself. He should also ask if the corrections to be applied to the thermometer readings are being made (see also TR 3.4.1.2). The same applies to the thermometer with which the sea temperature is observed (see also TR 3.4.10.1).

Attention must be paid to other meteorological instruments in use (such as a barograph, anemometer).

The P.M.O. should also provide weather information to the master and officers and discuss the general weather situation and the weather forecasts valid for the harbour, its approaches and the adjacent sea area. This can best be done with the help of the latest available weather chart which provides at the same time a good opportunity to draw attention to the importance of the ships' report as plotted on the chart.

As a final remark it should be stated that the P.M.O. should tactfully try to stimulate interest in maritime meteorology and oceanography among the deck-officers of the ship. In this connexion he should try to give an explanation of special phenomena which may have been or could be observed. The P.M.O. should discuss with the radio-officers any difficulties experienced in transmitting reports to coastal stations (see also TR 6.2.2.12). He should point out the importance of recording the details of any difficulty experienced in clearing a report to a coastal station. All necessary information concerning the transmission of weather reports and up-to-date weather information should be supplied (see TR 6.2.2.3). Special attention should be drawn to the fact that in certain areas weather messages transmitted up to 12 hours after observing time are still of value to the receiving meteorological centre (see TR 6.2.2.6 and TR 6.2.2.13).

2.1.3.2 Visits to selected and supplementary ships recruited by other countries

The activities of the P.M.O. during visits to selected and supplementary ships recruited by other countries are much the same as described in paragraph 2.1.3.1, and should be carried out at the request of the master of the ship.

Contrary to what has been said about the checking of barometers on selected and supplementary ships on the national register when passing coastal stations, the barometers of selected and supplementary ships of foreign registry should only be checked on request.

2.1.3.3 Visits to "other" ships on the national register

As stated before, the P.M.O. in ports at or near "sparse areas" should give priority to ships crossing "sparse areas". Broadly outlined, the approach to non-selected and non-supplementary ships will be similar to that to ships mentioned under 2.1.3.1.

If the ship is already co-operating as an auxiliary ship, the P.M.O. may encourage the master and may eventually attempt to recruit the ship as a selected or a supplementary ship (see also TR 2.2.1.5).

The discussions with deck- and radio-officers should be the same as those on selected and supplementary ships. The instruments, as a rule being ship's property, are to be checked (and, in case of an aneroid barometer, the instrument is to be adjusted, if so desired).

If calibration of the barometer is not possible, the error should be determined and noted on a correction card. The master then is able to get a general idea about the errors of this instrument through more checks. The observers should be given instruction on observing the use of codes (SHRED FM 23.C), the areas where observations should be made, and the procedure for the transmission of weather reports. The necessary code tables, sparse area chart, etc., should be supplied. In general, no instruments will be supplied to auxiliary ships.

If the ship is not as yet co-operating, the P.M.O. should show the master the "sparse area" chart issued by WMO and should discuss which observations could be made, which code should be used (SHRED FM 23.C),and how the transmission of weather reports is organized (see also TR 3.1.1.5 and 5.1.1.2). If the master gives his consent, the P.M.O. should then check the instruments and proceed as mentioned above.

Irrespective of whether observations are to be made or not, weather information may be provided and the barometer checked, if this is requested. The checking of the barometer is also of importance in regard to the international compulsory observations during tropical storms (International Convention for Safety of Life at Sea). (See also TR 3.3.1.6 and 3.3.1.7.)

2.1.3.4 Visits to "other" ships on foreign register

The activities of the P.M.O. during visits to these ships are the same as for the ships mentioned under 2.1.3.3, except that the local agent of the ship should first be contacted (see TR 2.5.2.2 (c)). The effort to add such a ship to the list of selected or supplementary ships,however, should normally be left to the P.M.O, of the home port.

Note : The P.M.O. should also give assistance to naval vessels if requested. Many of these ships carry out meteorological observations, also in "sparse areas".

2.2 To promote and maintain co-operation with shore-authorities

2.2.1 Co-operation with national Meteorological Services and neighbouring P.M.O.'s

As a rule the P.M.O. will be a staff-member of a national Meteorological Service, but even if this is not the case, he should act according to the instructions received from this Service. He should maintain close co-operation with the marine division of this Service (or if no such division exists, with the division which deals with ships' observations) especially with a view to ascertaining in which sea areas the lack of observations is most serious.

In order to operate as efficiently as possible, good co-operation with neighbouring P.M.O.'s is obviously necessary.

2.2.2 Co-operation with harbour authorities and shipping companies

A good understanding with harbour authorities and shipping companies is of great value for an efficient visiting programme for the P.M.O. Close co-operation with shipping companies may result in more selected and supplementary ships.

2.2.3 Co-operation with merchant marine schools

In most of the important ports a navigation school has been established. Good contact with the director and teachers is very useful. The majority of the schools giving lectures in meteorology mainly deal with theory. More attention should be given to the practical side, making observations, keeping a log-book, preparing weather charts and drawing conclusions from the same. The P.M.O. will meet many trained and future observers in these schools. He may try to organize excursions or lectures (see also TR 10.3.1.1).

2.3 Office activities necessary for supervision of observing ships

2.3.1 Supply of instruments, log-books, etc., to observing ships

The P.M.O. should have available at his office sufficient instruments, spare parts for same, meteorological handbooks, blank log-books and forms for weather reports to supply to ships concerned. In this connexion he should maintain an efficient system of supply.

2.3.2 Communication by telephone with observing ships

If a personal visit is not possible a telephone call (or if available with V.H.F.) is recommended. At present many ships have the facility of an installed telephone connexion. Some ships are equipped with V.H.F. apparatus to be used in port, when moored on buoys. Though such a contact demands less time, a personal visit is preferable. By telephone (or V.H.F) it is possible to check the barometer, to provide weather information and to make an appointment for a visit of the P.M.O. The P.M.O. should draw attention to the value of this means of communication.

2.3.3 Inspection of log-books

The meteorological log-books should be examined either by the P.M.O., or by the Meteorological Service to which the documents are forwarded (see also TR 2.5.2.5 and 3.5.1.4). If the Meteorological Service is situated at some distance from the port of the P.M.O., and the normal channels of communication result in delay, it is recommended that meteorological log-books coming from the ship be examined by the P.M.O. In this case corrections or omissions in coding or keeping a log-book can more quickly be brought to the attention of the observers concerned.

Considerable tact is needed in communicating errors or omissions to the attention of the ship. Though a verbal contact is preferable, contact in writing will often be the only way. After examination the log-books are ready for further processing.

2.3.4 Care of instruments

Small repairs and adjustments to instruments can sometimes be performed by the P.M.O. For extensive repairs, tests and calibrations, he should have access to a repair shop. If this repair shop could be attached to his office, it would eliminate delays,which is important considering the short stays of ships in port.

2.3.5 Preparing weather information

In order to be able to supply weather information, the P.M.O. should have the necessary meteorological instruments and an appropriate communication system with the national Meteorological Service. Telex-communication or a facsimile apparatus might be very useful for this purpose. An apparatus for duplicating weather charts for distribution to ships may also be desirable.

If national needs require it, the P.M.O. might be provided with instruments to measure wind direction and speed, air temperature and humidity, and air pressure, and perhaps a recording raingauge in order to assist in answering inquiries from shipping companies, stevedores, etc.

3. FAMILIARIZATION VOYAGES

It is recommended that occasional familiarization voyages might usefully be made by port meteorological officers or their assistants so that the problems of the marine observers can be fully understood.

4. AWARDS AND CERTIFICATES

The issue of awards or certificates is a ready means of showing appreciation for the careful carrying out of observations, for the transmission of weather reports, and for keeping good quality log-books. On such occasions when presentations are made, adequate publicity should be given in recognition for the voluntary services rendered.

A N N E X XX

Annex to Recommendation 25 (CMM-IV)

MANUAL ON THE VALUE AND USE OF THE INTERNATIONAL MARITIME METEOROLOGICAL PUNCH-CARD

1. INTRODUCTION

In many investigations involving marine data (e.g. study of secular variation of sea surface temperature, calculations of energy exchanged between sea and atmosphere) and in particular in the preparation of marine climatological atlases, a large amount of computation is involved. An atlas covering an ocean for each month of the year can be based on several million individual ships' observations, nearly all the ships being mobile and on various trades, and the computation of many meteorological elements for each month will be enormous. In order to avoid an immense amount of tedious manual computation, all marine observations should be made available on punched cards, since in this form they can readily be sorted by geographical position. A detailed explanation of punched card systems is given in Chapter 6 of the WMO Guide to Climatological Practices. It is sufficient to mention here that a series of up to 80 figures may be represented by punched holes in the columns of one 80-column card. With the aid of suitable punched card machines, cards may be sorted into groups, according to any of the figures punched in them, and the cards in each group counted. The figures in any set of columns (e.g. temperature to tenths of a degree Celsius) may be totalled and frequency analyses can be obtained automatically. Punched card electronic calculators and computers can be used for all computational work involving addition, subtraction, multiplication, division and selection, and collation with other information such as logarithms, trigonometric functions, etc.

2. DIVISION OF RESPONSIBILITY FOR OCEANS AND SEAS

Marine climatological data have an international character, since within any given ocean area, ships of various nationalities make meteorological observations. For the purpose of preparing climatological summaries for representative ocean sub-areas, and of collecting data with a view to the eventual preparation of the marine section of the World Climatic Atlas, the oceans and the seas have been divided into areas of responsibility (as indicated on the map on page 87. The intention is that all punched cards for marine observations (whatever the nationality of the ship) within any area of responsibility will be collected by the Meteorological Service of the Responsible Member named on the map for that area (examples to be given later when the division of the oceans has been finally settled).

3. THE INTERNATIONAL MARITIME METEOROLOGICAL PUNCH-CARD

However, in order to be able to make the best possible use of machine methods of data processing for any statistical investigation for some particular region involving the use of all available marine data, it is essential that the marine observations, whatever the nationality of the ship making them, should be in an international code and punched on an international punch-card according to internationally agreed instructions. The International Maritime Meteorological Punch-Card (IMMPC) has been devised for this purpose. Details of the layout of the card with some notes on punching procedures are given in Appendix I. A specimen of the card is shown in Appendix II.

4. PUNCHING PROCEDURES

4.1 Temperatures

Appendix I is divided into two parts, A and B. If temperatures are measured in tenths of degrees Celsius, current observations are to be punched in accordance with the procedures of Part A (i.e. column 1 is punched 1 and column 63 is punched 0), and reference to Part B is unnecessary. If, however, temperatures are measured in whole or half degrees Celsius, column 1 is punched 3 (for whole degrees) or 5 (for half degrees), and column 63 is punched 5. If temperatures are measured in degrees Fahrenheit, one of the figures 2, 4, 6 or 7 should be punched in column 1 according to circumstances (e.g. 4 is punched in column 1 if the temperature is measured in whole degrees Fahrenheit), and column 63 is punched 5. All other columns are punched according to Part A.

4.2 Waves

In Part A, two columns (51-52 for wind waves, 57-58 for swell waves) have been allocated to the period of waves in order to allow of possible modifications to the present WMO code which may eventually be introduced in order to enable the wave characteristics to be reported more accurately. In the meantime, it is necessary to make use of columns 51 and 57 respectively when one figure is punched for P_w. The synoptic code FM 21.C caters for more than one swell group, but only one can be punched on the IMMPC. If there is more than one swell group reported, that swell which has the greatest wave height should be punched. If two swell groups have the same height, the one with the longer period should be punched. If they have the same height and period, the one whose direction is farther from the wind direction should be punched.

4.3 Air-sea temperature difference and dew point

If the air-sea temperature difference (columns 46-48) and dew-point temperature (columns 74-76) are not available in tenths of degrees, the columns 46-48 and 74-76 should not be punched. The Responsible Member will enter these elements mechanically in the appropriate columns with the aid of a suitable electronic calculator. However, it is highly desirable that the dry and wet-bulb temperatures and the sea temperature should be always observed and punched in tenths of degrees.

4.4 Examples of punching

A few examples showing how ships' observations are to be punched, with some explanatory notes, are given in Appendix III.

5. NEED FOR FULL CO-OPERATION BY ALL MARITIME COUNTRIES

The scheme outlined in section 2 of this annex, whereby certain Members accept responsibility for a defined oceanic area with respect to the collection of all surface marine data and the preparation of climatological summaries within that area, is designed to ensure that marine observations from ships of all countries are used in the preparation of any marine climatological publications, or in the pursuance of scientific investigations in marine climatology. It cannot be emphasized too strongly that the success of the scheme is dependent on the fullest co-operation by all maritime countries in ensuring that :

(a) All marine meteorological observations supplied for international use, after being carefully checked as explained in paragraph 9.4 of the WMO Guide to Climatological Practices, are punched on the International Maritime Meteorological Punch-Card;

(b) A copy of these cards is sent to the appropriate collecting centre, i.e. to the Members specified on the map, see page 87.

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* *

APPENDIX I

PART A

LAY-OUT FOR AN INTERNATIONAL MARITIME METEOROLOGICAL PUNCH-CARD

Column	*Element*	*Punching procedures*
1	Temperature indicator	1 — Celsius
2 - 3	Year GMT	Last two digits
4 - 5	Month GMT	01-12 January to December
6 - 7	Day GMT	01-31
8	Octant of the globe, O	WMO Code 3300
9 - 11	Latitude, $L_aL_aL_a$	Tenths of degrees, WMO specifications
12 - 14	Longitude, $L_oL_oL_o$	Tenths of degrees, WMO specifications
15 - 16	Time of observation, GG	Nearest whole hour GMT, WMO specifications
17	Cloud amount, N	Oktas, WMO Code 2700
18 - 19	True wind direction, dd	Tens of degrees, WMO Code 0877; if the data for wind direction and speed have been measured an x overpunch is given in col. 18
20 - 21	Wind speed, ff	Tens and units of knots, hundreds omitted; values in excess of 99 knots to be indicated by an x overpunch in col. 20
22 - 23	Visibility, VV	WMO Code 4377
24 - 25	Present weather, ww	WMO Code 4677
26	Past weather, W	WMO Code 4500
27 - 31	Air pressure	Tenths of millibars
32 - 34	Air temperature	Tenths of degrees Celsius; negative temperatures to be indicated by an x overpunch in col. 32
35 - 37	Wet bulb temperature	Tenths of degrees Celsius; negative temperatures to be indicated by an x overpunch in col. 35; ice on wet bulb to be indicated by an x overpunch in col. 37
38	Amount of lowest clouds, N_h	As reported for C_L or, if no C_L cloud is present, for C_M; in oktas, WMO Code 2700
39	Genus of C_L clouds	WMO Code 0513
40	Height of clouds, h	WMO Code 1600
41	Genus of C_M clouds	WMO Code 0515
42	Genus of C_H clouds	WMO Code 0509
43 - 45	Sea temperature	Tenths of degrees Celsius; negative temperatures to be indicated by an x overpunch in col. 43
46 - 48	Air-sea temperature difference *	Difference air minus sea surface temperature in tenths of degrees Celsius; negative differences to be indicated by an x overpunch in col. 46
49 - 50	Direction of wind waves, d_wd_w	Tens of degrees, WMO Code 0885
51 - 52	Period of wind waves, P_w	WMO Code 3155 (use col. 51 when one figure is punched for P_w)
53 - 54	Height of wind waves	Half-meter values, based on WMO Code 1555 *Examples:* Less than ½ m to be punched 00 3 ½ m to be punched 07 7 m to be punched 14 11 ½ m to be punched 23 The Notes (1), (2) and (4) of Code 1555 apply, in no case 50 should be added to d_wd_w in col. 49-50

* Should be included only if available in tenths of degrees.

Column	Element	Punching procedures
55 – 56	Direction of swell waves, $d_w d_w$	Tens of degrees, WMO Code 0885
57 – 58	Period of swell waves, P_w	WMO Code 3155 (use col. 57 when one figure is punched for P_w)
59 – 60	Height of swell waves	Half-meter values, based on WMO Code 1555 *Examples:* Less than ½ m to be punched 00 3 ½ m to be punched 07 7 m to be punched 14 11 ½ m to be punched 23 The Notes (1), (2) and (4) of Code 1555 apply, in no case 50 should be added to $d_w d_w$ in col. 49–50
61 – 62	Country which has recruited ship	Number to be assigned by WMO
63	Card indicator	0 — Punched according to WMO codes, effective in year indicated in col. 2–3; if another figure has been punched in this column, this indicates that the card has been punched according to the supplementary punching procedures (Part B)
64 – 73		Not to be punched
74 – 76	Dew-point temperature *	Tenths of degrees Celsius; negative temperatures to be indicated by an x overpunch in col. 74
77	Wind force **	Beaufort wind scale 0–9 values 10–12 to be punched 0–2 with an x overpunch in col. 77
78 – 80		Not to be punched

* Should be included only if available in tenths of degrees.

** Optional, should be included only if the wind force has been estimated according to the Beaufort scale.

NOTES:

(1) Members using the punch-card system for their current maritime observations will reproduce the international maritime punch-cards mechanically from their own punch-cards, punching zero in col. 63 and leaving blank the spare col. 64–73, 78–80, which may be used by the Responsible Members for computing purposes.

(2) When preparing for exchange of data with deviating codes or from former years a Member may use the col. 1, 64–73, 78–80 for indicating deviating codes and for providing additional data. In this case, col. 63 is punched 1, 2, 3, 4 or 5 (see Part B) and all columns will be punched according to Part A modified by Part B as far as requested by the Responsible Member.

(3) When temperature and pressure are reported in whole units, the column of the tenths of these units is to be punched 0.

(4) The x's appearing in some of the above-mentioned WMO codes must not be punched.

(5) If an element is missing the columns concerned are left blank.

Overpunches

x/ x or 11 overpunch in column specified

x/ in column 18	Measured data for wind direction and speed
x/ in column 20	Wind speed, 100 knots or more
x/ in column 32	Negative values of air temperature
x/ in column 35	Negative values of wet-bulb temperature
x/ in column 37	Ice on wet bulb
x/ in column 43	Negative values of sea surface temperature
x/ in column 46	Air temperature lower than sea temperature
x/ in column 74	Negative value of dew point
x/ in column 77	Beaufort wind scale, 10 or more

A p p e n d i x I

Part B

Supplementary punching procedures for use in exchange of cards when temperatures are not given in tenths of degrees Celsius

Column	Element		Supplementary punching procedures
1	Temperature indicator	2	Tenths of degrees Fahrenheit
		3	Whole degrees Celsius (col. 34, 37, 45, 48, 76, punched 0)
		4	Whole degrees Fahrenheit (col. 34, 37, 45, 48, 76, punched 0)
		5	Halves of degrees Celsius
		6	Halves of degrees Fahrenheit
		7	Tenths of degrees Fahrenheit, but whole degrees for dew point (col. 76 punched 0)
63	Card indicator	5	Data with deviating codes as indicated in col. 1, otherwise punched according to WMO codes effective in year indicated in col. 2-3, col. 64-73, 78-80 left blank.

NOTE : The above is an extract (relating only to temperature) from the supplementary punching procedures which are given in full in Part B of Appendix F to the WMO Technical Regulations (Volume I).

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A p p e n d i x II

See page 140

ANNEX XX - A p p e n d i x III

Examples of the use of the International Maritime Meteorological Punch-Card

Col	1	2 3	4 5	6 7	8	9 10 11	12 13 14	15 16	17	18 19	20 21	22 23	24 25	26	27 28 29 30 31	32 33 34	35 36 37
Element	Temperature Indicator	Year	Month	Day of month	Octant of globe	Latitude to 0.1°	Longitude to 0.1°	Hour (GMT)	Total cloud (oktas)	True wind direction in tens of degrees	Wind speed in knots	Visibility	Present weather	Past weather	Air pressure to 0.1 millibar	Air temperature to 0.1 degree	Wet-bulb temperature to 0.1 degree
I	1	5 9	0 3	0 5	0	4 6 0	4 5 2	0 0	9	0 9	0 7	9 1	4 5	6	0 9 7 9 8	0 9 9	0 9 3
II	1	5 9	0 4	2 7	0	4 9 5	1 9 7	0 6	8	1 8	3 0	9 6	8 1	2	1 0 1 6 6	1 2 2	1 1 5
III	1	5 9	1 2	0 9	0	4 4 0	4 0 0	1 8	8	2 9	5 2	9 4	8 1	8	0 9 7 8 4	1 4 4	1 3 0
IV	2	5 9	0 5	0 4	0	2 8 8	7 9 6	0 0	8	0 0	0 0	9 6	1 1	2	1 0 1 2 5	5 9 8	5 6 2

Col.	38	39	40	41	42	43 44 45	46 47 48	49 50	51 52	53 54	55 56	57 58	59 60	61 62	63	64 73	74	75 76	77	78 79 80
Element	Amount lowest cloud (oktas)	Type C_L clouds	Height of clouds	Type C_M clouds	Type C_H clouds	Sea temperature to 0.1 degree	Air-sea temperature difference to 0.1 degree	WIND WAVES: Direction in tens of degrees	WIND WAVES: Period	WIND WAVES: Height in half metres	SWELL WAVES: Direction in tens of degrees	SWELL WAVES: Period	SWELL WAVES: Height in half metres	Country which has recruited ship	Card indicator	Not to be punched		Dew-point temperature to 0.1 degree	Beaufort force	Not to be punched
I	9		0			0 8 1	0 1 8							0 0	0				3	
II	8	3	4			1 2 4	0[x] 0 2	2 0	4	0 8				0 0	0				7	
III								3 0	5	1 8				0 0	0				0[x]	
IV	5	2	4	8		7 4 2	1[x] 4 4	0 0		0 0	0 0		0 0	0 2	5				0	

Col. 1 and col. 63	The temperatures in the first three observations are given in tenths of degrees Celsius, so col. 1 is punched 1 and col. 63 is punched zero. The temperatures in the fourth observation are in tenths of degrees Fahrenheit, so col. 1 is punched 2 and col. 63 is punched 5.
Col. 2-3	All observations are made in the year 1959.
Col. 4-7	The first observation is from 5 March, the second from 27 April, the third from 9 December and the fourth from 4 May.
Col. 8-26	The punchings in these columns are the same as the code figures of the elements, as given in the synoptic weather report (code form FM 21A).
Col. 27-31	The pressure of the first observation is 979.8 mb, of the second 1016.6 mb and so on.
Col. 32-34	The temperature of the first observation is 9.9°C, of the second 12.2°C, of the third 14.4°C, and of the fourth 59.8°F (compare the columns 1 and 63).
Col. 35-37	As for air temperature. Should there have been a negative wet-bulb temperature, say -3.2°C, there would have been punched $\overset{x}{0}32$ in col. 35-37 if there was no ice on the wet bulb, and $\overset{x}{0}\overset{x}{3}2$ if there was ice on the wet bulb.
Col. 38-42	First observation : N_h=9, C_L=x, h=0, C_M=x, C_H=x. Columns 39, 41 and 42 (for C_L, C_M and C_H) are left blank according to note (4) to part A. Second observation col. 41 and 42 are left blank because C_M=C_H=x. Third observation col. 38-42 left blank, because cloud group was missing, see note (5).
Col. 43-45	First observation : sea temperature is 8.1°C (see col. 1 and 63). Third observation : sea temperature was missing, so col. 43-45 is not punched, see note (5). Fourth observation : sea temperature is 74.2°F (see col. 1 and 63).
Col. 46-48	The air-sea temperature difference in the second observation was negative, (-0.2°C), so there is punched an x or 11 overpunch in col. 46. In the third observation the difference was not available in tenths of degrees, so col. 46-48 was left blank (see note (5) to part A).
Col. 49-51, 53-54	First observation : no observation of wind waves. Second observation dd=20 (col. 49-50), period 4 = 8 or 9 seconds (col. 51-52), height of waves 4 m (col. 53-54). Third observation dd=30, period 5 = 10 or 11 seconds, height of waves 9 m. Fourth observation : calm or smooth sea (height of waves less than 1/4 metre).
Col. 55-57, 59-60	First 3 observations : swell not observed. Fourth observation : no swell.
Col. 61-62	For the first 3 observations the country which recruited the ship was the Netherlands, for the fourth it was the U.S.A. (See Annex to Recommendation 24 of the third session of the Commission for Maritime Meteorology.)
Col. 63	See col. 1.
Col. 74-76	Dew point was not available in tenths of degrees, so col. 74-76 is left blank.
Col. 77	Beaufort wind force of first observation was 3, of second 7, of third 10,and of fourth 0.
Col. 64-73, 78-80	Not punched. These columns are left blank for computing purposes.

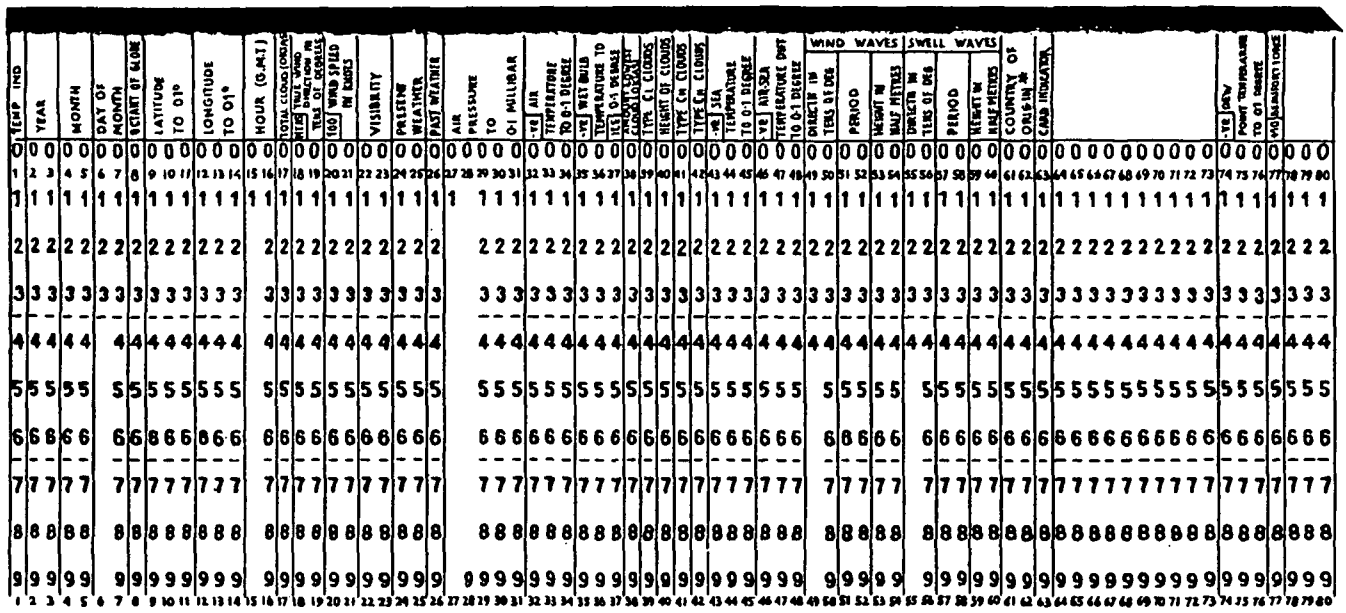
General Remarks

i. If an element is punched, all columns reserved for that element must be punched, e.g. 979.8 mb is punched 09798 in column 27-31 and 9.9°C is punched 099 col. 32-34 (see first observation).

ii. By an x is meant an x or 11 overpunch in the column specified. The punching machines provide for such overpunches.

Appendix II

Reproduction of a specimen of the International Maritime Meteorological Punch-Card (IMMPC)



* Instead of "Country of origin" - read : "COUNTRY WHICH HAS RECRUITED SHIP".

A N N E X XXI

Annex to Recommendation 27 (CMM-IV)

AMENDMENTS TO THE TECHNICAL REGULATIONS CONCERNING NEW OBSERVATION PLATFORMS AND AUTOMATIC OBSERVING STATIONS

1. In the Technical Regulations, Chapter I, Definitions, insert, as appropriate alphabetically, the following definitions :

Marine automatic meteorological instrument

An instrument automatically measuring a single meteorological parameter at sea, which may be recorded and/or transmitted to a distant point.

Marine automatic meteorological observing station

A station at sea composed of automatic meteorological instruments.

Platform-based marine meteorological station

A meteorological station on a structure in shallow waters.

Anchored marine automatic station

A floating station held at a fixed ocean location by an anchorage system.

Drifting marine automatic station

A floating station that is free to drift under the influence of wind and current.

Anchored marine meteorological observation station

Meteorological station on a manned buoy anchored at a fixed ocean location.

2. Amend Technical Regulation 2.1.2.1 to read :

Surface synoptic stations.

A. Land stations :

   (a) Principal stations;

   (b) Supplementary stations.

B. Sea stations :

   (a) Mobile ship stations :
      (i) Selected ship stations;
      (ii) Supplementary ship stations;
      (iii) Auxiliary ship stations.

   (b) Fixed ship stations :
      (i) Lightship stations;
      (ii) Ocean weather stations.

(c) Stations on manned anchored buoys.

(d) Automatic floating stations :
  (i) anchored;
  (ii) drifting.

(e) Platform-based stations :
  (i) Manned;
  (ii) Automatic.

N O T E S :

(1) Stations aboard ships assigned to ocean weather station duty and sailing to and from their fixed maritime location are considered as selected ship stations.

(2) For reporting purposes, lightship stations may be considered as either land or sea stations.

A N N E X XXII

Annex to Recommendation 31 (CMM-IV)

AMENDMENTS TO SECTION 8.3.1 OF THE TECHNICAL REGULATIONS

Introduce the following new paragraphs :

8.3.1.6
Members operating fixed ship stations and selected and supplementary ship stations should ensure that all surface observations from these stations are punched in accordance with the layout of the International Maritime Meteorological Punch-Card, sorted half-yearly and dispatched to the Responsible Members concerned.

8.3.1.7
Members who operate selected or supplementary ship stations but are not able to comply with 8.3.1.6 above should copy the observations from the log-books of their selected ships on a standard form and send these forms to an appropriate Responsible Member who will undertake to punch and sort the cards for distribution to any other Responsible Member concerned.

NOTE : It is assumed that each Meteorological Service following this procedure would wish to send all its standard forms to one Responsible Member and that this Member would be the one responsible for the area where the standard forms contain most observations.

8.3.1.8
Members operating auxiliary ship stations should make available to Responsible Members the observations of those auxiliary ships which were made in areas where the number of reporting ships is inadequate, or in areas which are rarely traversed by ocean-going ships, provided that, on being checked, the observations are considered to be of a sufficiently high standard.

A N N E X XXIII

Annex to Recommendation 32 (CMM-IV)

AMENDMENTS TO THE TECHNICAL REGULATIONS

1. Amend the following Technical Regulations as follows :

Technical Regulation 3.1.1.2 r)
Technical Regulation 3.1.1.3 r) Sea ice and/or icing on board ship when
Technical Regulation 3.1.1.4 j) appropriate.

2. Insert, as appropriate alphabetically, in Technical Regulation 3.1.1.5 :

(g) Pressure;
(h) Temperature;
(i) Sea ice and/or icing on board ship, when appropriate.

3. Amend Technical Regulation 3.4.10.1 to read :

Sea surface temperature should be measured by either the "bucket" method or the condenser intake method or by the use of a thermistor.

4. Add a new Technical Regulation after Technical Regulation 3.5.1.2 :

Observations made at auxiliary ship stations should be recorded in a meteorological log-book when practicable.

5. Technical Regulation 2.5.2.2, first line : replace "port meteorological liaison officers" by "port meteorological officers".

6. Insert a new regulation after Technical Regulation 6.2.2.5 :

When it is necessary to change the zones of responsibility for the collection of ships' reports or to discontinue coastal stations, provision shall be made to continue to meet the requirements of Members concerned.

7. Amend Technical Regulation 6.2.2.10 to read :

Members should arrange with their telecommunication services for the inclusion of four-letter call-signs of ships in the preamble of reports from selected, supplementary and auxiliary ship stations when transmitted from coastal stations to collecting centres.

8. Amend Technical Regulation 10.2.2.5 to read :

The first warning of a tropical storm or a storm of hurricane intensity should be broadcast as soon as possible, regardless of existing schedules.

9. Amend Technical Regulation 3.5.1.3 to read :

The entries in a ship's meteorological log-book should follow the sequence of elements in the appropriate international code form.

10. Insert a new regulation after Technical Regulation 10.2.2.1 :

When it is necessary for a Member to discontinue shipping forecasts issued in accordance with 10.2.2.1, provision should be made to continue to meet the requirements of ships in the area.

RECOMMENDATIONS OF THE COMMISSION FOR MARITIME METEOROLOGY

ADOPTED PRIOR TO ITS FOURTH SESSION AND MAINTAINED IN FORCE

Rec. 27 (CMM-III)- INCLUSION OF DAYS OF METEOROLOGICAL PHENOMENA IN THE SPECIFICATIONS OF THE MARINE SECTION OF THE WORLD CLIMATIC ATLAS

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING Resolution 32 (Cg-III);

CONSIDERING,

(1) That in 1956 the World Meteorological Organization published the "World distribution of thunderstorm days" (Publ. No.21.TP.21, 1956) to meet the requirements of the International Telecommunication Union, but that this publication (dealing with a climatic element) was not a detailed climatological study of thunderstorm activity;

(2) That the Responsible Members* should include thunderstorm frequency and number of days of other meteorological phenomena in the marine section of the World Climatic Atlas;

(3) That land climatological data for certain elements are usually expressed in terms of the number of days of their occurrence, whereas marine climatological data for the same elements from mobile ship stations are expressed in terms of percentage frequency of occurrence of the element;

RECOMMENDS,

(1) That Members be invited to investigate the statistical relations between percentage frequency of occurrence of selected meteorological elements and number of days of the same elements, firstly at the locations of ocean weather stations, and secondly on the basis of data from mobile ship stations, in so far as available, by studying consecutive observations covering periods of one day for fixed, limited, oceanic areas;

(2) That Members be invited to compare the results of these investigations for several varied geographic locations, for the same elements, to determine whether the relationships established in selected geographic locations are applicable in other locations;

(3) That these comparisons be submitted for consideration by the fourth session of the Commission for Maritime Meteorology.

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* See Recommendation 22 (CMM-III) in WMO Publication No. 101.RP.41.

Rec. 28 (CMM-III) - CODES FOR REPORTING SEA ICE

THE COMMISSION FOR MARITIME METEOROLOGY,

NOTING,

(1) Recommendation 12 (CMM-II);

(2) Resolution 33 (EC-IX);

(3) Resolution 6 (CMM-II);

(4) General Summary of the work of Third Congress, paragraph 5.14.3;

CONSIDERING,

(1) That a new set of codes for reporting ice observations from aircraft, ships, and shore stations for the purpose of international exchange should be made available as soon as possible;

(2) Proposals made by the Working Group on sea ice for the adoption of two ice reporting codes : a unified code for reporting individual observations from aircraft, ships and shore stations (Part A of the annex to this recommendation*); and a special code for converting aerial ice reconnaissance messages in plain language to numerical form (Part B of the annex to this recommendation*);

RECOMMENDS that these codes be adopted for the international exchange of ice data.

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* See Annex X to the Abridged Final Report of the third session of the Commission for Maritime Meteorology (WMO - No. 101.RP.41).

LIST OF DOCUMENTS

Doc. No.	Title	Agenda item	Submitted by
1	Provisional agenda Add.1 and 2	1.3	-
2	Explanatory memorandum to the provisional agenda Add.1 and 2	1.3	-
3	Report of the Working Group on Marine Climatology	3.1, 10.1, 10.2, 11.7, 11.8, 14.2, 14.5	Chairman of the working group
	Add.1	3.1, 11.7	Secretary-General
	Add.2	3.1, 14.2	New Zealand
4	Report of the Working Group on Technical Problems	3.4, 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8, 6.3, 11.9.3	Chairman of the working group
	Corr.1 Add.1	3.4, 5.5	New Zealand
5	Report of the Working Group on Weather Advice for Fishing Operations	3.5, 5.9, 6.6, 8, 9.2, 11.2	Chairman of the working group
	Add.1	3.5, 11.2	New Zealand
6	Report of the Working Group on the Study of a World-wide Network of Surface and Upper-Air Sea Stations	3.6, 8, 13.2, 14,1	Chairman of the working group
	Add.1	3.6, 8, 13.2	
	Add.2	3.6, 14.1	
	Add.3	3.6, 8	New Zealand
7	Required accuracy of measurement	5.8	President of CMM
8	Reporting of sea-surface temperature Add.1	6.1	President of CMM Secretary-General
9	Reporting of rainfall observations	6.2	President of CMM

Doc. No.	Title	Agenda item	Submitted-by
10	Reporting of the state of the sea	6.4	President of CMM
11	Reporting on ice accretion on ships	6.5	President of CMM
	Ship position verifying group	6.8	President of CMM
	Add.1		Secretary-General
13	Terms of intensity of meteorological phenomena	6.9	President of CMM
	Add.1		New Zealand
14	Visual storm warning signals	9.5.2	Federal Republic of Germany
15	Review of recommendations and resolutions concerning the field of maritime meteorology Add.1	18, 19	Secretary-General
16	Report of the Working Group on the Collection of Ships' Weather Reports and the Provision of Shipping Forecasts	3.7, 7.1	Chairman of the working group
	Item A of the working group's terms of reference : Collection and dissemination of ships' weather reports Corr.1		
17	Report of the Working Group on the Collection of Ships' Weather Reports and the Provision of Shipping Forecasts	3.7, 7.2, 7.3	Chairman of the working group
	Item B of the working group's terms of reference : Fact-finding study of the difficulties encountered in the collection of ships' weather reports		
18	Report of the Working Group on the Collection of Ships' Weather Reports and the Provision of Shipping Forecasts	3.7, 9.1, 9.3.2	Chairman of the working group
	Item C of the working group's terms of reference : Review of present areas of responsibility for shipping forecasts and suggestions for improvement		
19	Report by the president of the commission	2	President of the commission
20	Report of the CMM representative on the CSM Working Group on Codes	4.1, 6.4, 6.11	President of CMM

Doc. No.	Title	Agenda item	Submitted by
21	Safety regulations for oceanographic and meteorological buoys	13.2	Secretary-General
22	Reporting of ice accretion on ships	6.5	Secretary-General
	Summary of information supplied by Members		
23	Technical report on port meteorological liaison officer activities	11.4	President of CMM
24	Units used in coded messages for international exchange	6.10	Secretary-General
	Add.1		IMCO
25	Locust reports from ships	6.7	Secretary-General
26	Co-ordination between times of observation aboard ships and the times of watch of radio-officers in single-operated ships in various zones	7.3	President of CMM
27	Complete re-examination of the selection of cloud pictures most appropriate to a cloud album intended for exclusive use by observers at sea	11.6	President of CMM
28	Mobile ship stations	8	Secretary-General
	Map of oceanic areas where the number of meteorological observations is inadequate		
29	Report by the CMM representative on the CCl Working Group on Climatic Atlases Add.1	4.2, 10.2	F.E. Lumb
30	Establishing criteria which facsimile transmissions should fulfil for publication in WMO No. 9.TP.4, Volume D	9.3.2	Secretary-General
31	Review of the present system of areas of responsibility and procedures relating to the collection and dissemination of ships' weather reports	7.1	Secretary-General
	Survey on the effectiveness of the ship reporting scheme and dissemination of the reports Corr.1		

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32	Establishing special practices for the transmission of meteorological charts intended for reception by ships	9.3.1	Secretary-General
33	Codes for exchange of analyses and prognoses	9.6	Secretary-General
34	Forecast for shipping FM 61.C - MAFOR	9.4	Secretary-General
35	Information to be supplied by Members with respect to coastal stations designated for the reception of reports from ships (paragraph 6.2.2.1 of the Technical Regulations)	14.3	Secretary-General
36	Routing of ships by means of extended weather and wave forecasting	15	Netherlands
37	General code questions	6.11	Secretary-General
38	Re-examination of the selection of cloud pictures	11.6	South Africa
39	Contents of WMO Publication No. 9.TP.4, Volume D Part E - Meteorological and non-meteorological codes and observation practices	11.11	Secretary-General
40	Outline of a booklet on instructions and advice to fishermen Collaboration with FAO on the preparation of a booklet on "Meteorology for fishermen"	11.2	Secretary-General
41	Changing the recommended practice in paragraph 6.2.2.9 of the Technical Regulations into a standard practice	14.4	Secretary-General
42	Codes for reporting sea ice	12.4	Secretary-General
43	Report of the CMM Representative on the CSM Working Group on the Minimum Performance Characteristics of Automatic Stations Suitable for the World-wide Network of Surface Observations	4.3, 8	Secretary-General
44	Co-ordination between times of observation aboard ships and single-operator ships	7.3	South Africa

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45	Report of the Working Group on the Preparation of Syllabi on Oceanographic Training of Meteorological Personnel	3.8, 11.3	Chairman of the working group
46	Contents of WMO Publication No. 9.TP.4, Volume D Equivalents given in Part C of Volume D	11.11	Secretary-General
47	Report of the Working Group on the Preparation and Use of Weather Maps by Mariners Add.1	3.3, 11.1, 11.5	Chairman of the working group
48	Collection and dissemination of meteorological observations from shipping	3.7, 7.1, 7.2	United Arab Republic
49	Reporting of sea surface temperature	6.1	South Africa
50	Mobile ship stations Meteorological log-book for auxiliary ships	8	Netherlands
51	Climatological summaries Inclusion of isolated islands in the marine climatological summaries	10.1	Federal Republic of Germany
52	Codes and coding devices for fishing vessels Add.1	6.6	South Africa
53	Special arrangements concerning storm warnings issued in regions where tropical cyclones may be encountered	9.5.1	Secretary-General
54	Review of the present areas of responsibility for shipping forecasts An overlapping area between Burma and India	9.1	Secretary-General
55	Weather advice for fishing operations Amendment of WMO Publication No. 9.TP.4, Volume C, Chapter I, Part III	9.2	Federal Republic of Germany
56	Ship position verifying group Memorandum on the desirability of including verifying groups in coded weather reports	6.8, 6.11	Netherlands

Doc. No.	Title	Agenda item	Submitted by
57	General code questions Modification of Code 4451 (symbol v_s)	6.11	United States of America
58	Code form FM 46.C - Analysis in abbreviated form (IAC FLEET)	9.6	United States of America
59	Codes for reporting sea ice Abbreviated form of the proposed WMO Unified Ice Code	12.4	United States of America
60	Review of the present system of areas of responsibility and procedures relating to the collection and dissemination of ships' weather reports Weather reports from ships crossing "sparse" areas	7.1, 8	South Africa
61	Report of the Working Group on the Collection of Ships' Weather Reports and the Provision of Shipping Forecasts Review of present areas of responsibility for shipping forecasts and suggestions for improvement Add.1	3.7, 9.1	Secretary-General
62	Report of the Working Group on Technical Problems Equivalent speeds for the Beaufort numbers	3.4, 5.5	United States of America
63	Ice symbols	12.1	Canada
64	Report by the president of the commission. Preparation of a text on the organization of meteorological activities in the field of maritime meteorology	2	Secretary-General
65	International Maritime Meteorological Punch-Card (IMMPC)	10.1, 14.2, 18	Federal Republic of Germany
66	Application of meteorology to oceanography	13.1	Secretary-General
67	Proposed Guide to Reporting Precipitation at Sea	5.2	United Kingdom
68	Report of the Working Group on Sea Ice	3.2, 11.9.2, 12.1, 12.2, 12.3	Chairman of the working group

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69	Some measurements of wind speeds at sea using anemometers mounted on a dan buoy and on the British ocean weather vessel "Weather Surveyor"	5.5	United Kingdom
70	Reporting of sea surface temperature. Measurement of sea surface temperatures by near surface reference temperature devices	5.1, 6.1	United States of America
71	General code questions. Reporting of blowing spray	6.11	United States of America
72	Climatological summaries. Publication of annual marine climatological summaries	10.1	Secretary-General
73	Climatological summaries	10.1	IUGG representative
74	Reporting of meteorological observations by ships	6	South Africa
75	Climatological summaries	10.1	Japan
76	Locust reports from ships	6.7	FAO
77	Special arrangements concerning storm warnings issued in regions where tropical cyclones may be encountered	9.5.1	France
78	General code questions. The solidus (slant or oblique stroke)	6.11	South Africa
79	Organization of the session. Draft text for inclusion in the general summary of the work of the session	1	Secretary-General
80	Report of Committee A to Plenary on Agenda items 5.3 and 5.3.1 5.3 Wind structure at sea 5.3.1 Studies on the régime of land and sea breezes over the sea	5.3, 5.3.1	Chairman of Committee A
81	Report of Committee A to Plenary on Agenda item 11.6 - Complete re-examination of the selection of cloud pictures most appropriate to a Cloud Album intended for exclusive use by observers at sea	11.6	Chairman of Committee A

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82	The location of thunderstorm centres over oceanic areas by means of weather satellites as compared to that achieved by the classical methods used in weather forecasting	16	Toma Runcanu Meteorological Institute of the Romanian People's Republic
83	Report of Committee B to Plenary on Agenda item 8 - Organization of meteorological networks at sea	8	Chairman of Committee B
84	Report of Committee A to Plenary on Agenda item 11.7 - Guide to Climatological Practices, Chapter 9, Marine Climatology,and Chapter 13, Application of Climatological Data	11.7	Chairman of Committee A
85	Report of Committee A on Agenda item 14.2 - International Maritime Meteorological Punch-Card	14.2	Chairman of Committee A
86	Report of Committee A to Plenary on Agenda item 10.3 - International punch-card for recording precipitation observations during the International Indian Ocean Expedition	10.3	Chairman of Committee A
87	Report of Committee A to Plenary on Agenda item 10.2 - Marine section of the World Climatic Atlas	10.2	Chairman of Committee A
88	Technical advice with regard to the publication of climatological summaries	10.1	Federal Republic of Germany
89	Report of Committee B to Plenary on Agenda item 3.6 - Working Group on the Study of a World-Wide Network of Surface and Upper-Air Sea Stations	3.6	Chairman of Committee B
90	Report of Committee B to Plenary on Agenda item 4.3 - CMM representative on the CSM Working Group on the Minimum Performance Characteristics of Automatic Stations Suitable for the World-Wide Network of Surface Observations	4.3	Chairman of Committee B
91	First report of Committee B to Plenary on Agenda item 6.10 - Units used in coded messages for international exchange	6.10	Chairman of Committee B

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92	Report of Committee A on Agenda item 11.1 - Handbook on "The Preparation and Use of Weather Maps by Mariners" Corr.1	11.1	Chairman of Committee A
93	First report of Committee B to Plenary on Agenda item 7.2 Difficulties encountered in the collection of ships' weather reports Rev.1 (French only) and 2	7.2	Chairman of Committee B
94	Report of Committee B to Plenary on Agenda item 9.3 - Facsimile broadcasts of weather charts for shipping Rev.1 (French only)	9.3	Chairman of Committee B
95	Report of Committee B to Plenary on Agenda item 7.3 - Co-ordination between times of observation aboard ships and the times of watch of radio-officers in "Single operator" ships in various zones Rev.1 (French only) and 2	7.3	Chairman of Committee B
96	Report of Committee B to Plenary on Agenda item 9.3 - Facsimile broadcasts of weather charts for shipping	9.3	Chairman of Committee B
97	Report of Committee A to Plenary on Agenda item 11.9.1 - paragraph 10.9 - Ocean waves	11.9.1	Chairman of Committee A
98	Report of Committee A to Plenary on Agenda item 11.10 - Revision of Technical Notes No. 2 (Parts I and II) and No. 47	11.10	Chairman of Committee A
99	Report of Committee A to Plenary on Agenda item 5.2 - Precipitation measurements at sea	5.2	Chairman of Committee A
100	Report of Committee A to Plenary on Agenda item 11.2 - Outline of a booklet on instructions and advice to fishermen	11.2	Chairman of Committee A
101	Report of Committee A to Plenary on Agenda item 5.4 - Measurement of relative and true wind at sea	5.4	Chairman of Committee A

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103	Report of Committee A to Plenary on Agenda item 5.7 - Observation of waves	5.7	Chairman of Committee A
104	First report of Committee B to Plenary on Agenda item 13.2 - Safety regulations for oceanographic and meteorological buoys	13.2	Chairman of Committee B
105	Report of Committee B to Plenary on Agenda item 11.11 - Contents of WMO Publication No. 9.TP.4, Volume D	11.11	Chairman of Committee B
106	Report of Committee B on Agenda item 3.7 - Working Group on the Collection of Ships' Weather Reports and the Provision of Shipping Forecasts	3.7	Chairman of Committee B
107	Report of Committee B to Plenary on Agenda item 9.1 - Review of present areas of responsibility for shipping forecasts Rev.1	9.1	Chairman of Committee B
108	Report of Committee B to Plenary on Agenda item 9.5.2 - Visual storm warning signals	9.5.2	Chairman of Committee B
109	Report of Committee B to Plenary on Agenda item 9.4 - Forecast for shipping, FM 61.C - MAFOR	9.4	Chairman of Committee B
110	Report of Committee B to Plenary on Agenda item 9.6 - Code form 46.C, Analysis in abbreviated form (IAC FLEET)	9.6	Chairman of Committee B
111	Report of Committee B to Plenary on Agenda item 6.6 - Codes and coding devices for fishing vessels	6.6	Chairman of Committee B
112	Report of Committee B to Plenary on Agenda item 5.9 - Difficulties encountered by fishing vessels in making weather observations	5.9	Chairman of Committee B

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113	Report of Committee B to Plenary on Agenda item 3.5 - Working Group on Weather Advice for Fishing Operations	3.5	Chairman of Committee B
114	Report of Committee A to Plenary on Agenda item 5.8 - Required accuracy of measurement	5.8	Chairman of Committee A
115	Report of Committee B to Plenary on Agenda item 11.4 - Technical report on port meteorological liaison officer activities	11.4	Chairman of Committee B
116	Report of Committees A and B to Plenary on Agenda item 6.2 - Reporting of rainfall observations	6.2	Chairmen of Committees A and B
117	Report of Committees A and B to Plenary on Agenda item 6.3 - Reporting of visibility	6.3	Chairmen of Committees A and B
118	Report of Committees A and B to Plenary on Agenda item 6.7 - Locust reports from ships	6.7	Chairmen of Committees A and B
119	Report of Committees A and B to Plenary on Agenda item 6.9 - Terms of intensity of meteorological phenomena	6.9	Chairmen of Committees A and B
120	Report of the Nomination Committee to Plenary on Agenda item 20 - Election of officers	20	Chairmen of the Nomination Committee
121	Report of Committees A and B to Plenary on Agenda item 11.5 - Guide for the use by marine observers on board mobile ship stations	11.5	Chairman of Committee A
122	Report of Committee A to Plenary on Agenda item 13.1 - Application of meteorology to oceanography	13.1	Chairman of Committee A
123	Report of Committee B to Plenary on Agenda item 9.7 - Standardization of details and wording of forecast in Part III of weather bulletins for merchant shipping	9.7	Chairman of Committee B
124	Report of Committee B to Plenary on Agenda item 14.4 - Changing the recommended practice in paragraph 6.2.2.9 of the Technical Regulations into a standard practice	14.4	Chairman of Committee B

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125	Report of Committee B to Plenary on Agenda item 9.2 - Weather advice for fishing operations Rev.1	9.2	Chairman of Committee B
126	Report of Committee A to Plenary on Agenda item 11.8 - Guide : "The value and use of the International Maritime Meteorological Punch-Card"	11.8	Chairman of Committee A
127	Report of Committee A to Plenary on Agenda item 10.1 - Climatological summaries	10.1	Chairman of Committee A
128	Report of Committees A and B to Plenary on Agenda items 6.1, 6.4, 6.5, 6.8 and 6.12	6.1, 6.4, 6.5, 6.8, 6.12	Chairmen of Committees A and B
129	Report of Committee B to Plenary on Agenda item 9.5.1 - Special arrangements concerning storm warnings issued in regions where tropical cyclones may be encountered	9.5.1	Chairman of Committee B
130	Report of Committee B to Plenary on Agenda item 14.3 - Information to be supplied by Members with respect to coastal stations designated for the reception of reports from ships (paragraph 6.2.2.1 of the Technical Regulations)	14.3	Chairman of Committee B
131	Report of Committee B to Plenary on Agenda item 14.1 - Inclusion of manned stations on fixed platforms, automatic stations on unmanned platforms and anchored buoys in paragraph 2.1.2.1 of the Technical Regulations	14.1	Chairman of Committee B
132	Report of Committee B to Plenary on Agenda item 2 - Report by the president of the commission	2	Chairman of Committee B
133	Report of Committees A and B to Plenary on Agenda item 14.5 - Amendments to the Technical Regulations - General	14.5	Chairmen of Committees A and B
134	Report of Committee B to Plenary on Agenda item 15 - Routing of ships by means of extended weather and wave forecasting	15	Chairman of Committee B

Doc. No.	Title	Agenda item	Submitted by
135	Report of Committee A to Plenary on Agenda items 11.9.2, 12.1, 12.2, 12.3, 12.4 - Sea ice	11.9.2, 12.1, 12.2, 12.3, 12.4	Chairman of Committee A
136	Report of Committees A and B to Plenary on Agenda item 6.11 - General code questions	6.11	Chairmen of Committees A and B
137	Report of Committee A to Plenary on Agenda item 5.1 - Measurement of sea surface temperature	5.1	Chairman of Committee A
138	Report of Committee A to Plenary on Agenda item 11.9.3 - General (Guide to meteorological instruments and observing practices)	11.9.3	Chairman of Committee A
139	Report of Committee A to Plenary on Agenda item 5 - Meteorological observations made aboard ships	5	Chairman of Committee A
140	Report of Committee A to Plenary on Agenda item 11.3 - Oceanographic training of meteorological personnel	11.3	Chairman of Committee A
141	Report of Committee A to Plenary on Agenda item 5.5 - Equivalent speeds for the Beaufort numbers	5.5	Chairman of Committee A
142	Report of Committees A and B to Plenary on Agenda items 18 and 19	18, 19	Chairmen of Committees A and B
143	Report of Committee A to Plenary on Agenda item 5.6 - Estimating wind at sea especially during the night	5.6	Chairman of Committee A

PUBLICATIONS OF THE WMO

Reports

WMO - No.

7. RP. 1 – Annual report for 1951 of the Secretary-General of the WMO. English – French. *Not for sale.*

10. RP. 2 – Commission for Maritime Meteorology. Abridged final report of the first session, London, July 1952. English – French. *Price: Sw. fr. 3.—*

11. RP. 3 – Regional Association VI (Europe). Abridged final report of the first session, Zurich, May - June 1952. English – French. *Price: Sw. fr. 3.—*

12. RP. 4 – Annual report of the WMO, 1952. English – French. *Not for sale.*

13. RP. 5 – Regional Association I (Africa). Abridged final report of the first session, Tananarive, January 1953. English – French. *Price: Sw. fr. 3.—*

14. RP. 6 – Commission for Climatology. Abridged final report of the first session, Washington, March 1953. English – French. *Price: Sw. fr. 3.—*

16. RP. 7 – Commission for Synoptic Meteorology. Abridged final report of the first session, Washington, April 1953. English – French. *Price: Sw. fr. 6.—*

18. RP. 8 – Commission for Aerology. Abridged final report of the first session, Toronto, August - September 1953. English – French. *Price: Sw. fr. 3.—*

19. RP. 9 – Commission for Instruments and Methods of Observation. Abridged final report of the first session, Toronto, August - September 1953. English – French. *Price: Sw. fr. 3.—*

22. RP. 10 – Regional Association III (South America). Abridged final report of the first session, Rio de Janeiro, September 1953. English – Spanish. *Price: Sw. fr. 3.—*

23. RP. 11 – Regional Association IV (North and Central America). Abridged final report of the first session, Toronto, August 1953. English – French. *Price: Sw. fr. 3.—*

27. RP. 12 – Commission for Agricultural Meteorology. Abridged final report of the first session, Paris, November 1953. English – French. *Price: Sw. fr. 3.—*

28. RP. 13 – Regional Association V (South-West Pacific). Abridged final report of the first session, Melbourne, January 1954. English – French. *Price: Sw. fr. 3.—*

29. RP. 14 – Annual report of the WMO, 1953. English – French. *Not for sale.*

WMO - No.

31. RP. 15 – Commission for Bibliography and Publications. Abridged final report of the first session, Paris, November - December 1953. English – French. *Price: Sw. fr. 3.—*

33. RP. 16 – Commission for Aeronautical Meteorology. Abridged final report of the first session, Montreal, June - July 1954. English – French. Volume I, *Price: Sw. fr. 3.—* Volume II, *Price: Sw. fr. 9.—*

37. RP. 17 – Regional Association VI (Europe). Resolutions and recommendations adopted since the first session, June 1952 - December 1954. English – French. *Price: Sw. fr. 1.—*

41. RP. 18 – Annual report of the WMO, 1954. English – French. *Not for sale.*

43. RP. 19 – Regional Association II (Asia). Abridged final report of the first session, New Delhi, February 1955. English – French – Russian. *Price: Sw. fr. 3.—*

52. RP. 20 – Annual report of the WMO, 1955. English – French. *Not for sale.*

54. RP. 21 – Regional Association VI (Europe). Abridged final report of the second session, Dubrovnik, March 1956. English – French. *Price: Sw. fr. 3.—*

57. RP. 22 – Annual report of the WMO, 1956. English – French. *Not for sale.*

59. RP. 23 – Commission for Maritime Meteorology. Abridged final report of the second session, Hamburg, October - November 1956. English – French. *Price: Sw. fr. 3.—*

61. RP. 24 – Regional Association I (Africa). Abridged final report of the second session, Las Palmas, January-February 1957. English – French. *Price: Sw. fr. 3.—*

62. RP. 25 – Commission for Climatology. Abridged final report of the second session, Washington, January 1957. English – French. *Price: Sw. fr. 3.—*

64. RP. 26 – Commission for Instruments and Methods of Observation. Abridged final report of the second session, Paris, June - July 1957. English – French. *Price: Sw. fr. 3.—*

65. RP. 27 – Commission for Aerology. Abridged final report of the second session, Paris, June - July 1957. English – French. *Price: Sw. fr. 3.—*

69. RP. 28 – Annual report of the WMO, 1957. English – French. *Not for sale.*

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

Supplement to WMO Publication No. 164.RP.61

Decisions of the Executive Committee on the Abridged Final Report of the Fourth Session of the Commission for Maritime Meteorology

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This document is a supplement to WMO Publication No. 164.RP.61 - Abridged Final Report of the fourth session of the Commission for Maritime Meteorology - and should be considered as a guide to the status of the decisions adopted at that session.

A. DECISIONS RECORDED IN THE GENERAL SUMMARY OF THE WORK OF EC-XVII

5.3.9 Maritime Meteorology (including the report of the president of CMM)

5.3.9.1 The Executive Committee noted with approval the report of the president of CMM. The conclusions of the Executive Committee on the recommendations and resolutions developed by the session are contained in Resolutions 14 and 15 (EC-XVII).

5.3.9.2 The Executive Committee decided to postpone final consideration of Recommendation 5 (CMM-III) - EQUIVALENT SPEEDS FOR THE BEAUFORT NUMBERS - until its next session at which time a decision would be taken on the matter. This decision resulted from the fact that the majority of the members of the Executive Committee had doubts whether the scientific evidence for the change-over to the new scale was sufficient to justify the financial and procedural repercussions which it would entail. While opinions remained devided it was decided that, to enable EC-XVIII to arrive at a decision, the presidents CCI and CSM should be requested to arrange for the forthcoming fourth session of their commissions to examine the procedural and other repercussions of the proposed change, without entering into the study of the proposed scale itself, and to report to EC-XVIII.

5.3.9.3 The Committee also reviewed the General Summary of the work of the session and decided to record the following decisions :

Paragraph 8.2.1.1 - Technical conference on automatic weather stations

The decision of the Executive Committee on this matter is recorded under items 5.1 and 5.2.

Paragraph 9.2.3 (partially) - Transmission of report from fishing vessels

The Committee decided to approve the request and to direct the Secretary-General to bring it to the attention of Members.

Paragraph 9.2.4 - Recruitment of fishing vessels

The Executive Committee decided to approve this request and to direct the Secretary-General to bring it to the attention of Members.

Paragraph 10.1 - Layout of the monthly percentage frequency tables for wave observations

The Executive Committee authorized the President of the Organization to take, on behalf of the Executive Committee, necessary action when the proposal of the president of CMM for amending Resolution 35 (Cg-IV) will have been submitted to him.

B. RESOLUTIONS

Resolution 14 (EC-XVII) - REPORT OF THE FOURTH SESSION OF THE COMMISSION FOR MARITIME METEOROLOGY

THE EXECUTIVE COMMITTEE,

HAVING CONSIDERED the report of the fourth session of the Commission for Maritime Meteorology,

DECIDES :

(1) To note the report;

(2) To note without comments the resolutions adopted by the fourth session of the Commission for Maritime Meteorology;

(3) To embody the substance of Recommendation 14 (CMM-IV) in Resolution 15 (EC-XVII).

(4) To take action as follows on the other recommendations :

Recommendation 1 - Measurement of sea surface temperature

(a) Approves this recommendation,

(b) Directs the Secretary-General to bring it to the attention of Members, urging them to make a special effort to improve the measurements of sea surface temperature at mobile ship stations.

Recommendation 2 - Precipitation measurement at sea

(a) Approves this recommendation subject to the concurrence of ICAO in respect of RECOMMENDS (2),

(b) Directs the Secretary-General to bring it to the attention of Members.

Recommendation 3 - Investigations on wind structure at sea

(a) Approves this recommendation,

(b) Directs the Secretary-General to bring it to the attention of Members and to prepare the requested report for CMM-V.

Recommendation 4 - Measurement of wind at sea

(a) Approves this recommendation emphasizing the need for more study regarding the exposure of anemometers,

(b) Directs the Secretary-General to bring it to the attention of Members.

Recommendation 5 - Equivalent speeds for the Beaufort numbers

(a) Decides to postpone final consideration of this recommendation until its XVIIIth session at which time a decision will be taken on the matter,

(b) Requests the presidents of CSM and CCl to arrange for the consideration, at the forthcoming fourth session of their respective commissions, of the procedural and other repercussions of the proposed change-over to the new scale and without entering into the study of the proposed scale itself and to submit their conclusions thereon to the XVIIIth session of the Executive Committee.

Recommendation 6 - Reporting of ice accretion on ships

(a) Approves this recommendation subject to the concurrence of ICAO as regards the studies to be carried out on board O.W.S.,

(b) Directs the Secretary-General to bring it to the attention of Members, inviting them to report on the outcome of their tests to the Secretary-General prior to CSM-IV if possible.

Recommendation 7 - Locust reports from ships

(a) Approves this recommendation,

(b) Directs the Secretary-General to bring it to the attention of Members and include the substance of the recommendation in Publication No. 9, Volume D.

Recommendation 8 - Guidance on reporting precipitation at sea

(a) Approves this recommendation,

(b) Directs the Secretary-General to bring it to the attention of Members.

Recommendation 9 - Coded meteorological messages for international exchanges

(a) Notes this recommendation,

(b) Requests the president of CSM to examine, as a matter of urgency, the possibility and desirability of introducing a code table for wind speeds reported under the symbolic letters "ff" in present WMO codes.

Recommendation 10 - Use of "METEO" as first word of the address in ships' weather messages

(a) Approves this recommendation,

(b) Directs the Secretary-General to bring it to the attention of Members.

Recommendation 11 - Collection and dissemination of ships' reports

(a) Approves this recommendation for introduction on 1 January 1966, or as soon as possible thereafter, on the understanding that in zones situated along the border line between two Regions, the order of the procedures for the transmission of ships' weather reports to coastal stations, as laid down in sub-paragraphs (a), (b), (c) and (d), paragraph 2 of the annex to this recommendation, can be interchanged subject to agreement between the two regional associations involved. Any agreement reached on this matter shall specify the limits of the area concerned.

(b) Directs the Secretary-General :

(i) To secure urgent action by presidents of regional associations regarding the final delineation of the zones for the collection of ships' reports and also the responsible subregional broadcast centres (or centres with similar functions) responsible for the international retransmission and to confirm that coastal radio stations for receiving ships' reports meet the minimum regional requirements,

(ii) To make the necessary changes to Publication No. 9, Volume D,

(iii) To inquire about the quantitative needs of Members for the publication referred to in paragraph (3) under "REQUESTS the Secretary-General", and to proceed with the project if it can be run on a self-financing basis,

(iv) To bring the recommendation to the attention of Members.

Recommendation 12 - Additional procedures for the transmission of weather messages by "single operator" ships

(a) Approves this recommendation,

(b) Directs the Secretary-General to bring it to the attention of Members and to include the substance of the annex to the recommendation in Publication No. 9, Volume D.

Recommendation 13 - Reports from selected, supplementary and auxiliary ships

(a) Approves this recommendation,

(b) Directs the Secretary-General :

(i) To bring it to the attention of Members,

(ii) To publish a new map "Ocean areas where the number of meteorological observations is inadequate" for inclusion in Volume D as well as for distribution to Members on request,

(iii) To take the requested action with IMCO and other maritime organizations.

Recommendation 15 - Revised plan for the provision of shipping forecasts

(a) Approves this recommendation,

(b) Directs the Secretary-General :

(i) To bring it to the attention of Members and the presidents of the regional associations,

(ii) To make the required changes to Publication No. 9, Volume D.

Recommendation 16 - Facsimile broadcast of meteorological information for maritime purposes

(a) Approves this recommendation,

(b) Directs the Secretary-General :

(i) To bring it to the attention of Members and international organizations concerned,

(ii) To include the details of facsimile broadcasts of interest to shipping in Publication No. 9, Volume D.

Recommendation 17 - Forecast for shipping, FM 61.C - MAFOR

(a) Approves this recommendation,

(b) Requests the presidents of the regional associations and the convenor of the Executive Committee Working Group on Antarctic Meteorology to co-ordinate the allocations of indicators for maritime areas amongst the Members of their respective Regions.

Recommendation 18 - Amendments to special arrangements concerning storm warnings issued in regions where tropical cyclones may be encountered

(a) Approves this recommendation,

(b) Directs the Secretary-General to bring it to the attention of Members and introduce necessary amendments to WMO Publication No. 9, Volume D.

Recommendation 19 - International system of visual storm warning signals

(a) Approves this recommendation,

(b) Directs the Secretary-General to bring it to the attention of Members and to make the necessary changes to Publication No. 9, Volume D.

Recommendation 20 - Collection of data for the preparation of marine climatological summaries

(a) Approves this recommendation,

(b) Directs the Secretary-General to bring it to the attention of Members.

Recommendation 21 - Use of surface data from oceanic islands for the preparation of marine climatological summaries

(a) Notes this recommendation,

(b) Refers paragraph (1) of the operative part of this recommendation to the president of CCl for consideration,

(c) Directs the Secretary-General, after consultation with the president of CMM, to take necessary action on paragraph (2) of the operative part of the recommendation.

Recommendation 22 - WMO Technical Note on the preparation and use of weather maps by mariners

(a) Approves this recommendation,

(b) Directs the Secretary-General to publish the Technical Note in the four official languages.

Recommendation 23 - Collaboration with FAO in the preparation of booklets on "Fishermen and the Weather"

(a) Approves this recommendation,

(b) Directs the Secretary-General to bring it to the attention of FAO and to take necessary action towards establishing the proposed joint working group.

Recommendation 24 - Manual on port meteorological officer activities

(a) Approves this recommendation,

(b) Directs the Secretary-General :

(i) To publish the Manual in the four official languages,

(ii) To bring paragraphs (2) and (3) of the operative part of the recommendation to the attention of the Members.

Recommendation 25 - Manual on the value and use of the International Maritime Meteorological Punch-Card

(a) Approves this recommendation,

(b) Directs the Secretary-General to publish the Manual and distribute it to Members.

Recommendation 26 - Collaboration with IOC on studies regarding ocean-atmosphere interaction

(a) Approves this recommendation,

(b) Directs the Secretary-General to bring it to the attention of the IOC.

Recommendation 27 - Amendments to the Technical Regulations concerning manned stations on fixed platforms and automatic stations on unmanned platforms and anchored buoys

(a) Notes this recommendation,

(b) Directs the Secretary-General to incorporate the proposed amendments in his consolidated report on the Technical Regulations to Fifth Congress, taking into account subsequent proposals by CSM and CIMO.

Recommendation 28 - Amendments to the International Maritime Meteorological Punch-Card

(a) Approves this recommendation with effect from 1 January 1966,

(b) Directs the Secretary-General to inform urgently Members of the decision of the Executive Committee.

Recommendation 29 - Amendments to Technical Regulations - Supply of amendments to the list of coastal stations accepting ships' reports

(a) Notes this recommendation,

(b) Directs the Secretary-General :

(i) To incorporate the proposed amendments in his consolidated report on the Technical Regulations to Fifth Congress,

(ii) In the meantime to secure from Members periodically information regarding their lists of coastal stations.

Recommendation 30 - Use of abbreviation "OBS" in ships' weather messages

(a) Approves this recommendation with effect from 1 January 1966,

(b) Directs the Secretary-General to inform Members urgently of the decision of the Executive Committee, together with the decision on Recommendation 10 (CMM-IV).

Recommendation 31 - Incorporation of main principles of Resolution 35 (Cg-IV) into the text of Technical Regulations

(a) Notes this recommendation,

(b) Directs the Secretary-General to incorporate the proposed amendments in his consolidated report on the Technical Regulations to Fifth Congress.

Recommendation 32 - Amendments to the Technical Regulations - General

(a) Notes this recommendation,

(b) Directs the Secretary-General to incorporate the proposed amendments in his consolidated report on the Technical Regulations to Fifth Congress.

Recommendation 33 - Revision of resolutions of the Executive Committee based on previous recommendations of the Commission for Maritime Meteorology

(a) Notes this recommendation,

(b) Incorporates the substance of this recommendation, as necessary, in the Executive Committee resolution on revision of the past Executive Committee resolutions.*

DIRECTS the Secretary-General to inform all concerned.

NOTE : This resolution replaces Resolution 18 (EC-XIII) which is no longer in force.

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* See Resolution 26 (EC-XVII) attached.

Resolution 15 (EC-XVII) - PROGRAMMES OF RADIOSONDE OBSERVATIONS ABOARD MOBILE SHIPS

PROGRAMME OF RADIOSONDE OBSERVATIONS ABOARD MOBILE SHIPS

THE EXECUTIVE COMMITTEE

NOTING :

(1) Recommendation 14 (CMM-IV),

(2) The report of the Working Group on the Study of a World-Wide Network of Surface and Upper-Air Sea Stations and, in particular, its proposals for a programme of radiosonde observations aboard mobile ships,

(3) Resolution 22 (Cg-IV),

(4) Resolution 11 (EC-XVI),

CONSIDERING :

(1) That the oceans cover about three-quarters of the earth's surface and that no upper-air observations are made over much of this area,

(2) That the absence of upper-air data from the oceans frequently prevents Meteorological Services from providing timely advice for the protection of human life and property both at sea and on land,

(3) That data from the oceans are indispensible for research into large-scale meteorological phenomena,

(4) That the adoption of the working group's proposal for a world-wide programme of radiosonde observations aboard mobile ships would constitute a major step forward in present efforts to introduce the concept of the World Weather Watch,

URGES Members :

(1) To establish one or more mobile ship radiosonde programmes aboard ships travelling through sparse data areas, or to assist other Members to establish co-operative programmes;

(2) To start such programmes as soon as practicable;

(3) To make efforts to obtain winds aloft by visual or electronic means;

(4) To keep the Secretary-General informed if and when they plan such programmes;

INVITES the attention of Members participating in the scheme :

(1) To the map annexed* to this resolution which provides guidance material in the selection of routes traversing sparse data areas;

(2) To the particular value of augmenting the number of ships carrying out such programmes in sparse areas wholly or partly south of the equator.

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* Not reproduced here (see Annex XVI to Recommendation 14 (CMM-IV))

Resolution 26 (EC-XVII) - REVISION OF PREVIOUS EXECUTIVE COMMITTEE RESOLUTIONS

THE EXECUTIVE COMMITTEE,

NOTING :

(1) Regulation 128 of the General Regulations, concerning the revision of the Executive Committee resolutions,

(2) Rule 26 of the Rules of Procedure of the Executive Committee on the same subject,

(3) Reoommendations 16 (CHy-II) and 19 (CMM-IV),

(4) Resolution 29 (IV-RA VI),

HAVING EXAMINED its previous resolutions still in force;

DECIDES :

(1) To keep in force the following resolutions :

(EC-II)	7
(EC-III)	19
(EC-IV)	35, 38
(EC-VIII)	2, 3, 28
(EC-IX)	21, 22, 23, 25, 26, 27, 45
(EC-X)	2, 29, 31
(EC-XI)	1, 8, 12
(EC-XII)	6, 12, 13, 25, 30
(EC-XIII)	6, 7, 14, 15, 28
(EC-XIV)	3, 7, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 33, 34, 37, 38
(EC-XV)	1, 2, 5, 6, 9, 10, 11, 12, 13, 14, 17
(EC-XVI)	1, 7, 8, 10, 11, 12, 13, 14, 16, 17, 18, 20, 21, 22, 23, 24, 25, 26, 29, 30, 31,

(2) To keep in force, but only until 31 December 1965, Resolutions 15 and 16 (EC-XV), 27 and 28 (EC-XVI),

(3) Not to keep in force the other resolutions adopted before its seventeenth session.

Note : This resolution replaces Resolution 32 (EC-XVI) which is no longer in force.