WORLD METEOROLOGICAL ORGANIZATION

COMMISSION FOR SYNOPTIC METEOROLOGY

ABRIDGED FINAL REPORT

OF THE

FIRST SESSION

Washington, 2nd - 29th April, 1953

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ATTENDING THE FIRST SESSION OF THE COMMISSION FOR SYNOPTIC METEOROLOGY

I - Delegates representing Members of WMO

W. Bleeker	principal delegate	President Netherlands
I.R. Tannehill	principal delegate	Vice-President U.S.A.
L.J. Dwyer	delegate	Australia
A. Van den Meerschaut	delegate	Belgian Congo
L. Dufour	principal delegate	Belgium
G. Doumont	delegate	Belgium
P.D. McTaggart-Cowan	principal delegate	Canada
F.W. Benum	delegate	Canada
E.A. Barks	delegate	Canada
J.S. Feijoo	principal delegate	Cuba
C. Castãneda	delegate	Cuba
R.F. Corredera	delegate	Cuba
K. Brus	delegate	Czechoslovakia
L.H. Lajara	delegate	Dominican Republic
M.F. Taha	delegate	Egypt
A. Viaut	principal delegate	France
J. Bessemoulin	delegate	France
P. Leclercq	delegate	France
R. Beaufils	delegate	France
A. Durget	delegate	France
E. Vourlakis	delegate	Greece
P. Kós	delegate	Hungary
H. Sigtryggsson	delegate	Iceland
P.R. Pisharoty	delegate	India
M. Doporto	delegate	Ireland
G. Steinitz	principal delegate	Israel
N. Rosenan	delegate	Israel
V. Salkind	delegate	Israel
C.G.C. Schütte	delegate	Netherlands
H.C. Bijvoet	delegate	Netherlands New Guinea
P. Thrane	delegate	Norway
R. Melchior	delegate	Poland
C. Dumitrachescu	delegate	Rumania
O. Lönnqvist	principal delegate	Sweden
T.H.P. Bergeron	delegate	Sweden
C.V. Bunnag	delegate	Thailand
M.P. van Rooy	delegate	Union of South Africa
K.T. Logvinov	principal delegate	U.S.S.R.
S.M. Prostyakov	delegate	U.S.S.R.
P.K. Evseev	delegate	U.S.S.R.
S.P. Peters	principal delegate	United Kingdom
C.V. Ockenden	delegate	United Kingdom
W.H. Bigg	delegate	United Kingdom

I - Delegates representing Members of WMO (continued)

P. Bracelin	delegate	United Kingdom
F.A. Berry	delegate	U.S.A.
R.D. Fletcher	delegate	U.S.A.
E. Beraldo	delegate	Uruguay
J.M. Sanchez Carrillo	delegate	Venezuela

II - Invited experts:

A.H. Nagle, President CAeM
C.F. Brooks
N.R. Hagen
B.C. Haynes
W.F. McDonald
R.O. Minter

III - Representatives of other organizations

S.H. Work	FAO
J.H. Heierman	ICAO
F.A. Harland	IANC
F. Wirth	IANC
J. Hardouin	IANC
W. Bridgeford	IANC
W.G. Osmun	IATA
S.G. Olhede	IATA
W.M. Masland	IFALPA
P. Thrane	IUGG

IV - Speakers, Guests and Advisers

F.W. Reichelderfer, President WMO; J.B. Koepfli, Science Adviser, U.S. Department of State; G. Cressman, U.S. Air Weather Service; F.E. Parker of Australia; members of District of Columbia Branch, American Meteorological Society; Messrs. Callahan, Hardin, Matson, Paulin, Reeves and Showalter of U.S.A.; Mrs. T.A.Dourkina of U.S.S.R.

V - Secretariat

N. Veranneman	Technical Division, WMO
A.H. Gordon	Technical Division, WMO
D.B. Eddy	Executive Secretary of the Session
R.L. Higgs	Assistant Executive Secretary of the Session

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1. General

The Government of the United States of America invited the Commission to hold its First Session in Washington D.C., during the spring of 1953. The invitation was accepted by the President of the Commission after consultation with the Secretary-General. The session took place during the period 2-29 April 1953 in the conference-suite of the State Department, where excellent facilities were placed at the disposal of officers and delegates.

Prof. Dr. W. Bleeker presided during the session;
Mr. I.R. Tannehill was elected Vice-President for the session.

At the first plenary meeting the members were welcomed by Dr. Koepfli (Science Adviser of the Department of State), Dr. F.W. Reichelderfer (President of WMO and Director of the US Weather Bureau) and the President. The addresses are recorded in the Minutes.

At the last plenary meeting the President thanked on behalf of the Commission the Government of the USA and those who had worked so hard to make the First Session of the CSM a complete success, particularly the Chairmen of the various committees, the staff of the Secretariat of the WMO and the staff of the State Department. Thanks were also expressed by Mr. Tannehill (USA) Dr. Dufour (Belgium) and Dr. Logvinov (USSR). Prof. W. Bleeker (Netherlands) was re-elected President, Captain Berry (USA) was elected Vice-President.

2. Attendance

Twenty eight (28) Members of the WMO sent delegations to the session. As 53 Members have representatives on the membership list of the Commission, the quorum was eighteen (18). Quorum difficulties were never encountered.

Invitations to experts were only sent by the President to those who had a task to fulfil in the CSWI of the IMO. Of these invited experts Messrs. Brooks and Haynes (both members of the former CCH), and Mr. Hagen (President of the former Working Group on Meteorological Telecommunications) attended the session. Mr. Nagle, President of the Commission for Aeronautical Meteorology, was also present; Messrs. MacDonald and Minter attended some meetings in their capacity of advisers to the President of the Commission for Maritime Meteorology.

Dr. Work of the Food and Agriculture Organization and Dr. Heïerman of the International Civil Aviation Organization represented their organizations.

Of the non-governmental organizations the following sent observers: International Air Line Navigators Council (Messrs. Bridgeford, Harland, Hardouin and Wirth), International Air Transport Association (Messrs. Osmun and Olhede), International Federation of Air Line Pilots (Mr. Masland), and International Union of Geodesy and Geophysics (Mr. Thrane).

Messrs. Veranneman and Gordon attended the session in their capacity of staff members of the Technical Division of the Secretariat WMO; Mr. Veranneman acted as technical secretary of the Commission.

A full list of all those present is given on p. 5

A list of titles of the documents of the session is given on p. 14

3. Procedures

The session adhered to the Rules of Procedure, established in General Regulations 56-71. No need was felt to set up new internal rules.

The working languages in the plenary meetings were English and French; statements in Russian were translated into both working languages. Documents were produced in English and French.

4. Work programme and results

The Commission embarked on a very ambitious Agenda, mainly composed of items on points discussed earlier in the CSWI (IMO Commission) and on points raised by other Technical Commissions, Regional Commissions and Associations of the IMO and WMO. During the session a few items were added to the original Agenda, at the request of the President of the Aerological Commission; one Agenda item was withdrawn. The final Agenda is given on p . All Agenda items were discussed. Fifty five (55) recommendations and twelve (12) resolutions were adopted.

A number of the discussed Agenda items did not lead to any recommendation or resolution, as the Commission decided to maintain the existing situation for the time being. The result of the study of these items was however recorded in the Minutes; Annex I gives a list of these "statements".

5. Establishment of committees at the Session

The Nomination Committee consisted of Messrs. Dwyer (Chairman), Lönnqvist, McTaggart-Cowan, Pisharoty and van Rooy.

The Drafting Committee consisted of Messrs. Schütte (Chairman), Doumont, Matson and Bessemoulin.

There was no need for the establishment of a Credentials Committee.

Three committees to examine and report on the various items of the Agenda formed, namely:

A. Codes, specifications and graphical representation;
Chairman: Mr. McTaggart-Cowan,

B. Communications;
Chairman: Mr. Ockenden,

C. Draft Provisional Technical Regulations, Cloud Atlas, etc.
Chairman: Mr. Berry.

The Co-ordination Committee consisted of the President, the Vice-President, the Chairmen of Committees A, B and C, the Technical Secretary of the CSM and Mr Eddy (State Department), who acted as Executive Secretary during the session.

6. Comments on individual Agenda items

Ag.Item 10 — 6.1 Report of the President of the Commission

The report was accepted

Ag.Item 11 — 6.2 Reports of the Presidents of working groups

The reports of the Presidents of the working groups on Graphical Presentation, on Key-stations, on Clouds and Hydrometeors and on Transmission of Weather Information were accepted.

The groups were dissolved.

The report of the President of the Working Group on Clouds and Hydrometeors, particularly with regard to the results of the 6th session, proved to be very useful in the discussion of Agenda Item 13.

Ag.Item 12 — 6.3 Preparation of Draft Provisional Technical Regulations

Preparatory work on the Draft Provisional Technical Regulations had been done by Mr. Bilham (UK), who studied all resolutions of the IMO and the WMO and submitted a draft, which was reproduced as a working paper. This draft formed the basis of the work in Committee C. In one of the early plenaries the Commission formed some idea of the task before it and noted some difficulties in the existing resolutions on the subject.

Congress Resolution 15(I) speaks of obligations to be respected by meteorological administrations; however Article 8 of the Convention leaves the door open for informing the Secretary-General of any requirement that cannot be fulfilled. The "shall" and "should" terminology was also studied and in the introduction to the submitted Draft Provisional Technical Regulations (Resolution 12), the Commission gives an explanation of the policy which was followed when developing the regulations.

In the discussions on the Draft Provisional Technical Regulations it was repeatedly necessary to remind members that the draft prepared by CSM would pass various other stages before being presented to Congress. In this respect, it was not clear to the Commission whether next Congress will adopt Provisional Technical Regulations or Technical Regulations and whether the ultimate regulations, mentioned in Article 7d of the Convention will contain both "shall" and "should"-regulations or only "shall"-regulations.

The Commission tried to avoid the fields of responsibility of other Commissions.

It was the general feeling of the Commission that Resolution 12 forms a sound basis for the future Technical Regulations in the synoptic field. In spite of this the resolution was not unanimously adopted, as certain members felt that paragraph III-2 on Specifications allowed the use of non-metric systems of units in meteorology.

Ag.Item 13

6.4 Atlas for Clouds and Hydrometeors

The CCH had met in its sixth session, just prior to the CSM session, and had studied the remarks received from various members. The main points considered by the CSM were the following: the texts of the proposed Fascicules I, III and the Reduced Atlas, the policy to be followed with regard to Fascicule IV (Physics of Clouds and Hydrometeors) and the album for aviators. The result of the discussions is expressed in Recommendations 50 and 49

6.4.1 The texts of Fascicules I and III

The Commission found that there existed considerable duplication of material between Fascicules I and III as proposed by CCH. It was therefore decided to place the texts of these volumes under one cover. The objection to doing this, liability of the cloud-codes to change, was not considered to be serious, as the present cloud-codes had already stood for 6 years and no proposals to alter the codes had been placed before the CSM. The Commission was also of the opinion that the combination of the proposed Fascicules I and III placed the Cloud Atlas project on a more sound financial basis. Committee C studied the English text of Fascicules I and III in detail. Owing to the fact that this text resulted from a translation, made by a non-meteorologist, it was rather poor. The Committee presented to the CSM a list of corrections, to be delivered to the working group, appointed for the final editing work. This group consists of Messrs. Bilham (UK) and Bessemoulin (France), who will work on the English and French texts, respectively.

The CSM was aware of Resolution 36 (E C - III), in which the President of the Commission of the Commission was requested to submit the final text of the Cloud Atlas not later than 15 May 1953 and the Commission realized that this target date could not be met. The President explained that he would contact the President of WMO on this matter.

6.4.2.The Reduced Atlas

In view of the fact that it was decided to combine Fascicules I and III, it was resolved that the Reduced Atlas should be complete in itself. Discussions took place on the general tenourof the language in which the Reduced Atlas should be written. It was stressed that this Atlas should be generally usuable for non-professional observers. Committee C prepared a few chapters to serve as a guide to Mr. Haynes, who was appointed to prepare the complete draft to be submitted to the President of the CSM, who can consult experts on the final form of the text, if necessary. The general outline

of the Reduced Atlas and the "test"-chapters were discussed in a plenary meeting.

6.4.3 Fascicule IV (Physics of Clouds and Hydrometeors)

The CSM noted the preparatory work done by the CCH. It could however not agree with CCH's suggestions to publish a book composed of papers written by various experts in the field although it recognized the desirability of the publication of a compendium on the Physics of Clouds and Hydrometeors. The CSM recommended that the Executive Committee should give further consideration to the problem of how a book of this kind might be prepared and published.

It should be mentioned that one of the members observed, that the Fascicules I and III, as originally prepared by the CCH and as now combined in one volume, were written under the assumption that there would be a Fascicule IV in which the "Physical Synoptics" of clouds should be treated. This would be a reason to maintain Fascicule IV.

The Executive Committee will be aware that the Aerological Commission is also interested in the Physics of Clouds and Hydrometeors.

6.4.4. Album for aviators

It was decided that the parts of the texts prepared by CCH (Fascicules I and III) and selected clouds photographs should be placed at the disposal of the Commission for Aeronautical Meteorology.

Ag. Items 14, 9A, 11A, 13A

6.5 Codes

Ag. Item 14.1

6.5.1 Synoptic code forms

Discussions centered around the basic synoptic code form (SYNOP) as a result of the comments and proposals placed before the CSM during the course of several years by various bodies. The main problem was to reconcile existing divergent practices, where one group of countries considers it essential to have the five-figure station index-number, while others are satisfied to work with a three figure index-number. In the first case dew-point is coded in the group $T_dT_d$app, in the second dew-point is given in iiiT_dT_d with app in a drop-out group 6japp, which drop-out group is an essential requirement of the tropics. The solution found and unanimously adopted (Recommendation 1) involves some change for all Meteorological Services. Countries are called upon to make some sacrifice and some compromise in accepting the new form. These demands are however only justified if complete uniformity is obtained, that is if the code form is introduced on a world-wide basis. The tropics in particular are being asked to undertake an additional burden (the estimate average increase of the length of a report in the tropics is 6-15%), but with a compensating gain of additional data. Regional agreements on

the use of certain code figures are necessary and the date of introduction should permit mature regional consideration.

The code form for reports from light-vessels was also considered. It was decided that the code form for landstations as well as that for ship stations could be used (Recommendation 8) without confusion. The necessary corrections to Fascicule IV, (Publication No. 9) are given in this recommendation.

Ag.Item 14.2 6.5.2 Aeronautical codes

The AERO code form remained unchanged, in spite of strong representations for a change in the second group made by aeronautical advisers. The CSM realized that a change in AERO logically should be followed by a change in SYNOP and SHIP and noted the strong objections to this of CCl and CMM. Nevertheless it was possible to develop a revised logical system of forecasts code forms, which will facilitate the work of aeronautical forecasters and pilots. This system and extensive carefully written explanations and instructions are given in Recommendation 5. This revision of the existing aeronautical code forms was made possible by the development of a new two-figure height-code with sufficient "steps" in the middle altitudes to permit its use in place of the previous three-figure height specifications. As a result of this and other considerations regarding the limits of reporting visibility, new codes for VV were also developed. In the discussion of the code tables the divergence between those in favour of the English and those supporting the metric system of units became very apparent. Reservations to Recommendation 5 were made as a matter of principle by some of those who object to the English units.

It should further be noted that CSM refers to CAeM for its attention the matter of a separate code form for high level forecasts (Resolution 2).

The POMAR code was revised as a result of strong representation of President of CAeM (Recommendation 7).

The Commission decided not to recommend new instructions for the existing aeronautical meteorological codes (cf Annex I, Minutes of 13th meeting).

The Commission considered the so-called ALDIF code for D-values.The consensus of opinion was that it was unnecessary to adopt the ALDIF code for international use at this time (cf Annex I, Minutes of 4th meeting).

The Commission also studied the possibility of coding plain language in flight reports for ground communications. The opinion of the Commission, that these reports should be transmitted as they are logged, is reflected in Recommendation 23. The Commission was aware that the effect of this decision might be a reduction in the number of reports that can be re-issued in sub-continental and national broadcasts.

Ag.Item 14.3 6.5.3 Upper air code forms

The code form for radiosonde observations was carefully considered in the light of proposals received prior to the session. The new code form TEMP contains 8 sections (Recommendation 2); it leaves a certain freedom to Meteorological Services and can also be used for aircraft ascents. It was felt however, that the complexety is only apparent, as in international exchange messages will appear in a simple form that will reflect no substantial change from present practice. The new TEMP form will also facilitate the preparation of MESRAN messages, for which a final form is recommended (Recommendation 3). Various Regional Associations had commented on the code form for upper winds and the Commission tried hard to improve on this code form. This Agenda item proved, however, one of the most difficult to solve. A solution was ultimately found, which is however not very elegant. In fact the recommended code form (Recommendation 4) embodies two codes that can be recognized one from the other by use of an indicator L_h. Attention is drawn to the first note stating "The use of code figures i_h = 4 and 9 is recommended, when the information is needed for synoptic and aviation purposes simultaneously." The note means that preference is given to reporting in steps of 300 m. A new code form for Reconnaissance Flight was developed (Recommendation 6).

Ag.Item 14.4 6.5.4 International analysis codes

The Commission studied suggestions to improve on the IAC. Its final conclusion was however that there is no international requirement for the substitution of letters for group 9NNSS in analysis codes and such a procedure is not recommended for adoption.

It is furthermore stated that there is no international requirement for a section in FM 61 to code cross-sections and to add details relative to coding of isallobaric maps at the present time. However States may wish to study the proposals put forward by the US and UK on this matter.

The CSM concurred however with the wishes of the CMM for expansion of IAC FLEET (Recommendation 10).

Ag.Item 14.5 6.5.5 Instructions for the use of certain codes

Instruction for reporting the 8-groups ($8N_sC_sh_sh_s$) were very carefully considered. There were differing views. The rules finally adopted (cf Recommendation 5) cover a wide variety of cases and were considered as a substantial improvement by a great majority.

Under this Agenda item there was a number of less important problems which were solved by simply giving improved and more precise definitions (in Recommendation 15): term layer, meaning of D_s and v_s, reporting h and

N_h, when no C_L clouds exist, reporting of waves. The Commission decided not to change the meaning of $v_r v_r$ in the NEPH-Code, the radian being retained because of its non-dimensional nature.

Considerable discussion centered around the problem of formulating instructions for reporting h and N_h in cases where C_L indicates clouds at various levels (action reported in Recommendation 15).

Discussion on instructions to be given for reporting VV, when visibility is not uniform in all directions brought to light a number of difficulties with regard to the requirements stated by various aeronautical authorities. Action is reported in Recommendation 24. Representatives of aviation were disappointed and the subject cannot be considered as finalized. It is important that Members give further study to the problem and that the matter again appears on the CSM Agenda at the next session.

Discussion of the meaning of N brought to light that a substantial number of Services was still observing cloud amounts in tenths and had every intention of continuing to do so. These Services did not object to coding N in the present code for international exchange, but they felt that to produce the necessary uniformity a method of transposing tenths into the present N code should be provided.

This was done and in the interest of clarity a slight change in the definition of N was given (Recommendation 15).

Ag.Item 14.6 6.5.6 Specifications

Many minor points under this Agenda item were solved without much discussion, such as improved specifications for state of ground (Recommendation 15), cloud heights for mountain stations (Recommendation 15), height of waves (Recommendation 16 and Resolution 1), standardization of 0, 00, 9, 99, in "direction codes" (Recommendation 15), visibility at sea (Recommendation 15), ICE code (Recommendation 15), use of solidus and x in codes (Recommendations 27 and 26), pressure values in CLIMAT (Recommendation 15), and instructions for reporting hh and vv. (Recommendation 15).

The codes for ww and W were carefully scrutinized and clarified (Recommendation 15). The problem of the tolerance in forecasts was disposed of in the recommendation on aeronautical code-forms (Recommendation 5). The decode-table for ww to be used in ground-air transmissions as submitted by ICAO was examined. The President of CAeM stressed that CSM was only asked to correct the errors; this action is reported in Recommendation 22. It should be mentioned that the incompleteness of the ICAO tables was discussed in plenary meeting.

After a roll-call-vote (18 for, 4 against and 5 abstentions) the Commission decided that the knot would remain the unit of wind speed for code reports.

Degrees Celsius were recommended (Recommendation 17) for world-wide use in the international exchange of data for coding surface and upper air temperatures.

In its recommendation the Commission expressed as its view that the change-over to Celsius for surface reports might involve difficulties for certain Members and that the realization could be postponed for such a period of time as would enable those Members to prepare for a smooth translation; U.S.A., Canada, Australia and India lodged strongly expressed reservations.

Ag.Item 14.7 6.5.7 Various code problems

Considerable difficulty was encountered in resolving the problem of the consistent use of the terms "height", "elevation" and "altitude", particularly with regard to a satisfactory translation into the French language.

The French translation used by ICAO was made available and a satisfactory solution found, which did not require the use of these terms, but merely agreed that, when the terms were used, they would be used in the same sense as defined by ICAO (Recommendation 47).

Instructions were laid down for the use of block numbers in meteorological messages (Recommendation 25).

6.5.7.1 The Commission decided (Recommendation 12), that there is no longer a requirement for reports of "observations particulières", and that these code forms should be officially abolished. It was furthermore decided that the system of numbering code forms as used at present in Fascicule I of Publication 9 is satisfactory and that there is no international requirement for a system of key-figure groups. Recommendation 19 reports some instructions with regard to the indication of drop-out groups in Fascicule I; no further action on the Agenda item on improvement of symbolic presentation of code forms was considered necessary.

Ag.Item 9A 6.5.8 Indication of height of constant pressure surface in synoptic codes

It was necessary to establish some rules for reporting the geopotential of constant pressure surfaces in the SYNOP code form for high level stations. The Commission made provision for the optional inclusion of constant pressure data, even when MSL pressure is reported. Clear and concise instructions are given for the use of an extra group (Recommendation 20).

Ag.Item 11A 6.5.9 Codes for SFERICS

The Commission decided with a small majority (10-8) to use the word

"Atmospherics" and not the abbreviation SFERICS in descriptive texts. The President of the CAe had forwarded a proposal for the SFERIC code. Some minor corrections were introduced. Action is reported in Recommendation 9.

Ag.Item 13A 6.5.10 Introduction of $D_s v_s$xxx in FM 22 and 23

The original request by the SAR Division of ICAO had been misunderstood by CMM. The President of the CAeM had redocumented the matter and CSM now recommends (Recommendation 18) exactly what the SAR-Division wants. The apparent conflict between the CSM and CMM recommendation is a result of CMM's misinterpretation. CSM's recommendation gives detailed instructions on the changes to be made in Fascicule I of Publication No. 9.

Ag.Items 15, 3A, 4A, 14A 6.6 Graphical presentation

Some defects in the existing system of symbols were remedied. New symbols were developed. Recommendations 41 and 42 refer to this item. They deal with the station model for surface and upper air maps and with various subjects such as direction, period and height of waves, pressure tendency, cloud genera, surface and upper winds (after considerable discussions two methods were developed for indicating missing wind data and calm), and state of the ground. Recommendation 43 reports on the representation of SFERIC data; some editing corrections were made after the close of the session. The Commission felt that further studies with a view to improvement and standardization of weather analysis symbols was necessary and expressed this in Recommendation 46 requesting the assistance of the Secretariat for compilation of information on the "frontal" symbols. Resolution 7 reports that no uniformity could be created with regard to the intervals between isobars and isohypses, due to differing dimensional practices.

The time was not considered ripe yet to develop plotting models for POMAR- and RECCO-observations; the CSM however stressed that in national or regional models the standard station model should be adhered to (Recommendation 44).

Recommendation 45 reports on symbols for the indication of station character on maps and charts. A limited number of simple symbols has been developed to be used by Services that may feel a need to have these symbols on their maps and charts.

Ag.Items 16,23, 5A 6.7 Times and frequency of observations

These Agenda items embodied several problems.

In the first place it proved necessary to remove the existing confusion on a number of terms such as "time of observation","standard time", "filing time", "official time", etc. Related to different steps in the processing of weather reports. The Commission developed a consistent system of definitions (Recommendation 13). With regard to the problem of the launching time of radiosonde and pilot balloons and the time of aircraft ascent, the Commission decided that no action overriding Resolution 23 (IMC Paris) was necessary. The times fixed by WMO are standard times; the official time should lie as near as practicable to the standard time, and the actual time for these observations is the time of release or take off. In the Draft Provisional Technical Regulations the Commission expressed also its view that an observation should not begin more than one hour from the standard time.

In the second place the Commission rediscussed the old problem of 3 basic synoptic observations with 8-hourly intervals versus 4 with 6-hourly intervals. It was realized that the 3 x 8-system would lead to a necessity of 3 upper air reports a day and in spite of the fact that technically many members were in favour of changing to the 3 x 8-system, no recommendation to that effect was made for practical reasons. The Commission will continue to study the problem however.

Discussion on the frequency of observations also brought to light that in some parts of the world intermediate synoptic observations are taken every 2 hours. Although the times of 03, 09, 15 and 21 GMT satisfied the majority, it appeared that USSR and some other countries, for practical reasons, had to continue their existing practice of taking these observations at 02, 04 etc. GMT.

A compromise solution which satisfied the great majority was found; it placed emphasis on 03, 09, 15 and 21 GMT as the preferred intermediate hours (Recommendation 14).

The third very important problem before CSM was to decide whether the upper air observations should be maintained at 03 and 15 GMT or should be made synchronous with the main synoptic observations. The Commission debated the question seriously; it finally decided to maintain the status quo and expressed its view in the following statement that was adopted in a roll call vote (7-5, 8 abstentions).

"It was noted that certain scientific advantages might be obtained by having the upper air observations synchronous with the primary surface synoptic observations, but that the practical aspects of the existing situation requires that this realization be postponed for the present.

The Standard times of primary upper air observations in use remain at 0300 and 1500 GMT for the present. The Commission therefore considers that regions should continue to study the problem in order to provide recommendations regarding the standard hours for the guidance of the CSM at its next Session".

Ag.Items
17, 7A
10A 6.8 Telecommunication problems

Ag.Item
17.1 6.8.1 Use of various digits

There was much debate in plenaries on the final form of Recommendation 28. The various difficulties with regard to the use of the letter x, the solidus and the plus-sign were realized. The Commission felt however that its recommendation to standardize the plus (+) on teleprinters and to obtain a morse-sign for the plus (+) had to be worded carefully, as another international agency (ITU) had to be approached.

Ag.Item
17.2 6.8.2 Abbreviated headings

The Commission devoted much time also to this point.

The format for abbreviated headings proposed in Recommendation 17 (CAeM Paris 1950) was accepted as suitable for use in meteorological bulletins. Geographical designators were prepared and it was decided that the data designator should begin with either S, F, U, A or W to indicate synoptic reports, forecasts, upper air bulletins etc. In order to facilitate distribution of messages in forecast offices. Action is reported in Recommendation 33.

Ag.Item
17.3 6.8.3 Call signs ships

This item was easily settled (Recommendation 29). The Commission felt that indicators were useful and that call signs should be utilized rather than full names or nationally allocated figure identifiers.

Ag.Item
17.4 6.8.4 Order of priority in collective transmissions

The Commission was of the opinion that the CSM can only very broadly recommend the order of priority of messages in collective transmissions. It realized that in Regions which have radio-teleprinter exchanges operating, the Regions themselves must agree on schedules, depending upon the availability of data. Resolution 40 (IMC Paris 1946) was modified slightly in order to permit more elasticity. Action is reported in Recommendation 37.

Ag.Items 17.5 and 17.7

6.8.5 Review of international exchange and re-organization of meteorological broadcasts

Resolution 20 (IMC Paris 1946) formed the basis of the discussions. Certain deficiencies are known to exist; however, the time was not considered ripe for a radical change. Recommendation 38 emphasizes that the Regional Associations should take action and formulate plans to be integrated by the CSM. The Commission expressed its view on the responsibilities of the Regions with respect to telecommunications; its opinion resulted from the bitter experience that the during the session, it was impossible to obtain sufficient background information on the regional situation.

Ag.Item 17.6

6.8.6 Co-ordination of telecommunication working groups in various Regions

The discussion of this item brought the Commission to the problem of the establishment of a working group on telecommunication in which the necessary co-ordination between Regions would take place automatically, when there existed sufficient representation from each Region. The working group was established by Resolution 10; it was however impossible to elect a chairman during the first session, due to the fact that the appointment of members is left to Regional Associations and Members of WMO. Terms of reference of the group were also given in Resolution 10; furthermore Resolution 11 mentions some problems for further study in the field of meteorological telecommunication.

Ag.Item 17.8

6.8.7 Facsimile transmissions

This item was studied on the basis of a Recommendation of Regional Association VI. The Commission felt that it was not yet the proper time to go so far as RA VI in laying down certain specifications, which might tie the hands of technical bodies and prejudice development. Recommendation 39 requests that Members communicate progress in this field to the Secretary-General who should be requested to issue consolidated reports at least once per year.

Ag.Item 17.9

6.8.8 Relations with ITU

In Recommendation 40 the Commission recommended action to ensure that the WMO is constantly aware of what is going on in the field of Telecommunications. It is also stressed that Directors of Meteorological Services should maintain contact with the national representatives at these ITU meetings so that these representatives may be aware of the meteorological requirements.

This recommendation is important, as experience has shown that many telecommunication problems arise, which turn out to have a vital bearing on meteorological interests, although the title of the problem as set out in a list of Agenda items of ITU bodies may give no clue to the non-expert that they are in a category, important to meteorology.

Ag.Item 7A 6.8.9 Monitoring of broadcasts

Recommendation 34 needs no comments.

Ag.Item 10A 6.8.10 Discontinuance of WSY broadcasts

This item was placed on the Agenda as a result of the announcement made in 1952, that the WSY broadcast would be discontinued. The Commission found, that a need for this Morse broadcast still exists. Recommendation 36 recommends that the broadcast be continued until such time that requirements for it do no longer exist.

Ag.Item 18 6.9 Networks

Ag.Items 18.1 and 18.2 6.9.1 Synoptic and aerological stations

The Commission realized that the problem of developing a criterion for the spatial distribution of stations was very important, in particular with regard to the need for providing aeronautical circles with straightforward estimates. On the other hand it was also realized from the beginning, that the problem could not be solved easily during the session. Although some attempts were made to initiate a solution, the CSM decided that for the moment nothing more could be done than to set up a working group (Resolution 8), consisting of Messrs. Bessemoulin, Gibbs, Nagle and Roy. It was considered desirable that also a member of the staff of the Secretariat should assist in the technical work. The Commission expressed the desire that some tentative conclusions should be attached to the President's General Summary, (cf Annex II).

Ag.Item 18.3 6.9.2 Establishment of key-stations

The Commission recommends (Recommendation 54), that key stations be established and a study be made on the value of their reports on a trial basis by a Member in order to find out whether such a procedure is desirable on an international basis. The representative of USA stated that his Service would give this idea serious consideration.

Ag.Item 19

6.10 Publication No. 9

6.10.1 Issue of amendments

The Commission carefully considered the "frequency" of issue of amendments to Fascicules II, III and IV. (Recommendation 51, gives certain "upper limits"(once every three months for Fascicule II and once a month for FasciculesIII and IV). It should be realized that no need exists to issue "Nil"- amendments and that the Secretariat still has a certain liberty.

6.10.2 Entries in WMO Publications

Recommendation 52 gives rules on the entries in WMO Publications, such as Fascicule III of Publication 9 so that difficulties such as have arisen in the past will be avoided. Facilities provided in a given country should only be mentioned under the information related to that country, when they are provided by the Member concerned. Other facilities may be included however with prior concurrence of the Member.

6.10.3 Publication of an international list of selected and supplementary ships

The CSM concurs with CMM's suggestions and recommends that information on types of instruments be also included in the list (Recommendation 53).

6.10.4 Various other points were discussed under Agenda item 19. As they did not imply important changes, but as they refer to the existing situation, no recommendations were formulated, but statements were included in the Minutes,(see Annex II, Minutes of 14th Meeting).

Finally it was stated in the plenary that the word "Volume" would be preferable to "Fascicule".

Ag.Item 20

6.11 Co-ordination in the field of exchange of analysis and forecast maps

The world plan for master analysis areas and (tentatively) indicated centres, as laid down in Recommendation 31, does not give an ideal solution. As was pointed out during the session, the areas in which the world has been divided are of peculiar form near the poles. Special attention is drawn to point (2) of the recommendation and the Executive Committee may want to decide whether the CSM or the Regional Associations should have the last word in this matter.

Ag.Item 21 6.12 Publication of methods of pressure reduction

Recommendation 48 requests that various pressure reduction methods be published in Fascicule II. This would be more useful than just having such information published in national instructions.

Ag.Item 22 6.13 Universal Time

Recommendation 32 expressed that there is no need for any action to secure designation and international use of one agreed term to denote time reckoned from midnight on the meridian of Greenwich.

6.14 Ocean Weather Ships

The Commission had no opportunity to review the problem of cost and maintenance of ocean weather stations. As it was, however, concerned about a certain lack of efficiency in distribution of the reports of OWS in the western part of the North Atlantic, it studied the special telecommunication-problems thoroughly. Recommendation 30 proposes an interim plan for the transmission of reports of OW stations A, B and C.

Ag.Item 25 6.15 Study of IMO Publication No. 78

The Commission studied this publication and made some minor comments which will be transmitted to the President of the CIMO (Resolution 5).

Ag.Items 26, 27, 6A 6.16 Questions arising from recent sessions of other constituant bodies of WMO

Ag.Item 26 6.16.1 Regional Association I

The recommendations and resolutions of interest to CSM were studied and taken into consideration.

Ag.Item 27 6.16.2 Climatological Commission

The recommendations and resolutions of interest to CSM were taken into consideration. With regard to CCl's suggestions on the setting up of mixed working groups between sessions, the CSM does not believe in the effectiveness of such groups.

Ag.Item
6A 6.16.3 Regional Association VI

Various recommendations of RA VI were studied and a few of them led to recommendations, already mentioned elsewhere. Recommendation 35 deals with procedures for radiotelegraphic meteorological broadcasts; the rules set out stem almost entirely from decisions of RA VI.

6.17 Scientific Meetings

The Commission devoted two plenary meetings to scientific matters. The following papers were presented:

"A trial of Fjørtøft's Graphical Forecast Method" by Dr. G.Cressman.

"The application of synoptic resilience patterns to forecasting" by Mr. A.H. Gordon.

"The meteorological aspects of the recent floods in the Netherlands (1 February 1953)" by Dr. H.C. Bijvoet.

"Weather systems and weather forecasting", by Dr. T. Bergeron.

"Recent advances in extending the time range of weather forecasts" by Mr. J. Namias.

"The influence of heating and cooling the surface pressure field of the Mediterranean" by Dr. W. Bleeker.

There were interesting discussions after the lectures and all members felt that it was an excellent idea to interrupt the discussions on technical and administrative matters by an exchange of views in the more scientific synoptic field.

Ag.Item
29 6.18 Election of Standing Sub-committees

Experience in the past has shown that large working groups do not accomplish very much. It was also mentioned in plenary that problems of working groups may already be so important from an economic point of view that they should be treated at Commission level right away.

The Commission therefore decided (Resolution 9) to establish two working groups only (Telecommunications and Networks). It was realized that the President could always set up panels between sessions for the purpose of studying clearly defined problems and that matters requiring continuing attention, could be referred to the Secretary-General for study by the Technical Division of the WMO Secretariat.

Ag.Item
1A 6.19 Third Geophysical Year

The Commission studied the proposals made by CSM Members.

No new ideas were developed. The Commission expressed its opinion (Recommendation 55), that Members should be informed about the plans sufficiently far in advance.

Ag.Item 8A 6.20 Problems of Chart Projection

Various proposals on the use of chart projections deviating from Resolutions 26 and 27 (CD Washington 1947) were considered. The Commission did not feel however that the problem had been sufficiently studied and it noted in the Minutes that the present situation should be maintained.

Ag.Item 12A 6.21 Times of observation and transmission of SFERIC data

Action is reported in Recommendation 9 (cf also paragraph 6.5.9)

7. Supplementary discussions arising out of the Agenda

7.1 Date of introduction of new code forms and codes

Important discussions took place on the date of introduction of new code forms and codes (SYNOP, TEMP, PILOT and aeronautical code forms and code tables). It was felt that in view of the interlocking of various code tables (particularly those for hh and VV), all above mentioned new code forms should be introduced at one and the same date. A target of January 1, 1956 was recommended to the plenary by Committee A. The President of CAeM was, however, of the opinion that this was too late, in view of the fact that the aviation world had been waiting for revised code forms for many years already. Others were of the opinion that the introduction of new code forms should be world-wide without exception and it was feared that new instructions could not reach isolated stations before January 1, 1956. It was also stressed that the Regional Associations should have ample time to discuss the SYNOP code form. When an amendment to change January 1, 1956 into January 1, 1955 was carried (9-7), a roll-call vote on the adoption of the recommendation in principle was held with the result 9 for, 7 against and 7 abstentions. It should be noted that amongst the protagonists for an early date were 6 European countries. When the final version of Recommendation 11 was voted upon there was no roll-call vote and the result was 11 for and 4 against (abstentions not counted). RECCO and POMAR may be considered apart from the main set of codes and also the SFERIC (USA plans to introduce the SFERIC form January 1, 1954). Furthermore attention should be drawn to the fact that the introduction of new symbols to be plotted on weathermaps is also independent of the introduction of the basic code form.

7.2 Technique of code-making

Members felt that certain rules for the construction of codes should be assembled by the Secretariat (Rec. 21). It was also decided that a number of attractive solutions for code problems should not go into oblivion (Resolution 3).

7.3 Station Altitude

Resolution 4 refers the matter of finding a definition for "station altitude" to the CIMO.

7.4 Glossary of Meteor terminology

In order to assist in the preparation of national versions of the Cloud Atlas, Resolution 6 requests the CBP to provide a glossary of meteor terminology.

8. Action on various decisions

Recommendations 36 (WSY broadcast), 30 (reports OWS) and 49 (Cloud Atlas 1953) were immediately brought to the attention of the President of the WMO; furthermore the President's attention was drawn to Recommendation 22 (ww table Ground-Air Transmissions).

All the other recommendations are submitted directly to the Executive Committee.

9. Concluding Remarks

That the complete Agenda could be discussed within the period planned for the conference was due to the extremely good conference spirit, which had already developed a few days after the beginning of the session. All members worked extremely hard and one of the Committees met almost for three weeks, morning, afternoon and night. There existed also a spirit of co-operation and members were willing to appreciate difficulties of others.

The organization of the conference behind the scenes was such that progress was never impeded by lack of documentation. Messrs. Eddy and Hunt (State Department) did an extremely efficient job. Tribute should also be paid to the interpreters and the language staff.

De Bilt, 26 June 1953.

(Sgd) Wouter Bleeker, President
Commission for Synoptic Meteorology.

ANNEX I

STATEMENTS RECORDED IN THE MINUTES

regarding important questions studied by the Commission which did not lead to any recommendation or resolution.

Minutes 4th meeting

ALDIF code: (a) It was the consensus that it was unnecessary to adopt the ALDIF code for international use at this time. Application of D-value data to aviation meteorology is still in a state of flux and it would be premature to standardize the code at this time.

(b) It was noted, however, that the French Meteorological Service had used the code with success, and it was felt that the attention of other Meteorological Services should be drawn to the French experience.

NEPH code: It was agreed that the radian should be retained as the basic unit because of its non-dimensional nature.

Minutes 5th meeting

Numbering code forms: The system of numbering code forms as presently used in Fascicule I of Publication 9 is satisfactory.

Group indicators: There is no international requirement for a system of key figure groups. However, Meteorological Services may wish to take note of U.S. developments in this field.

Map projections: No change is proposed in the present governing Resolutions 26 and 27 (CD Washington 1947).

Minutes 6th meeting

Corrections WMO publications: It was agreed that corrections to WMO publications which will result from recommendations or resolutions, adopted at the session, will be made by the Secretariat in consultation with the President of the CSM.

Direction (D)- codes: It was agreed that the Secretary-General be requested to contact Presidents of Regional Associations asking them also to create uniformity in this matter.

Symbolic forms: No change in the symbolism for codes is required.

Minutes 9th meeting

Knot as unit of wind speed: Provision of IMC Resolution 8, Paris 1946, will be retained. The knot will thus remain the unit of wind speed.

Minutes 13th meeting

International Analysis Code: There is no international requirement for the substitution of letters for group 9NNSS in analysis codes, and such a procedure is not recommended for adoption.

There is no international requirement for a section in FM 61 to code cross sections and to add details relative to coding of isallobaric maps at the present time. However, States may wish to study the proposals put forward by the U.S. and the U.K. on this matter. Cf: Res. 5 (CMM-I) (London 1952).

Instructions for Aeronautical Codes: Due to the forthcoming introduction of the new aeronautical meteorological codes, it is not considered necessary to amend the instruction for the codes at present in use.

Minutes 14th meeting

Amendments to Fascicule III of Publication 9:

(1) The present arrangements by which countries give advance notification of changes by circular letters to known recepients of their broadcasts should continue as far as practicable. The practice is also endorsed of announcing impeding changes by broadcasting the change 24 to 36 hours prior to its coming into effect in addition to any previous announcements which may have been made.

(2) The instructions regarding notification of changes as laid down in Section 6 of the instruction to Fascicule III should be rigidly adhered to.

Form of Publication of Fascicule III of Publication 9:

(1) Information for each Region should be contained in one part. Each part should be in 3 sections, totaling 18 sections, any one of which would be purchasable separately.

(2) Several delegates are in favour of the information relating to the 3 types of broadcast for any particular country appearing on consecutive pages as is the case at present rather than having to refer to

3 different sections. Since various such combinations will be possible to meet national requirements, a scheme of pagination for amendments may present difficulty and sheets might have to be printed on one side only.

(3) Cross-references may also be required in certain circumstances.

(4) The Commission considers that schedules for the International Meteorological Teleprinter Networks should be kept together in a separate section for each Region as is the case now for Region VI.

(5) It is agreed that only the frequency of radio transmitters need be given in the headings to schedules, since the equivalent wave-length in metres is no longer required.

(6) It is decided that particulars of radio facsimile transmissions be published in Publication No. 9, Fascicule III, for the benefit of all countries wishing to intercept them.

(7) The term "Previ" is now out of date and WMO Secretariat is asked to check that throughout the publication only currently accepted terms or code words be used.

Times of upper air observations: It was noted that certain scientific advantages might be obtained by having the upper air observations synchronous with the primary surface observations, but that the practical aspect of the existing situation required that this realization be postponed for the present. The Standard Times of primary air observations in use remain at 03.00 and 15.00 GMT for the present. The Commission therefore considers that Regions should continue to study the problem in order to provide recommendations regarding the Standard hours for the guidance of the CSM at its next session.

Minutes of the 15th meeting

Weather Analysis Symbols:

(1) In view of the possible controversy that may develop if important changes in frontal designators are adopted by the Commission, no changes are recommended at this time.

(2) The question of intervals for isobars and contour lines was studied. It was agreed that there does not appear to be a solution to the problem at this time due to differing dimensional practices. It is recommended that for the time being metric countries continue to use intervals of 40 gpm and countries using English units continue to use intervals of 200 gpft.

Minutes of the 17th meeting

Regional Association I: The Commission examined the undermentioned recommendations and recommendations of RA I and the following comments are submitted:

Recommendation 5 (Retard reports in national broadcasts). Recommendation ~~38~~ 37 (CSM-I) refers.

Recommendation 6 (World broadcasts). The plan was considered; further study is necessary.

Recommendation 7 (Reception of synoptic reports from RA III and RA V). Noted that regional action is required. This is in line with Recommendation ~~46~~ 38 (CSM-I).

Resolution 19 (Working Group on Telecommunications). Noted with satisfaction.

Resolution 20 (Master analysis areas). Dealt with in Recommendation ~~39~~ 31 (CSM-I).

Resolution 16 (Upper wind code). Dealt with in Recommendation ~~10~~ 5 (CSM-I) and ~~19~~ 28 (CSM-I).

Resolution 18 (Broadcasts) 2. Noted, Recommendation ~~46~~ 38 (CSM-I) refers.

GENERAL SUMMARY

ANNEX II

TENTATIVE CONCLUSIONS OF A PRELIMINARY STUDY OF THE NETWORK PROBLEM, REACHED DURING CSM-I.

(1) The problem should be approached on the basis of ensuring that each Meteorological Service has prompt access to the information required for broad-scale analyses. This basis should be accepted because the collection and exchange of a large number of closely spaced reports, which could be usefully employed for detailed analysis of weather phenomena, will be prohibited by limiting factors such as budget, manpower and communication facilities. Thus, the problem becomes that of networks of basic land and ship stations to be established and maintained for synoptic and aerological purposes within each Region and to be disseminated in long-distance broadcasts.

(2) Within the limits indicated above the first phase in the study should be the discussion of the network of stations reporting

pressure or the height of isobaric levels necessary for identification of significant large-scale features, in the surface pressure field and upper air "contour field", and for identification of major weather systems.

(3) In order to define further the subject of the spatial distribution within workable limits, the following working assumptions can be made:

(a) The time interval between these observations will be 6 hours;

(b) Charts with scales not larger than 1/10,000,000 will be used;

(c) The accuracy of observations and reports is limited by the techniques used and technical skill;

(d) Regional or national analysis may complete the analysis which can be obtained by using the basic network only;

(e) Instrumental and personal errors may be taken as being of a quasi Gaussian distribution with zero mean and constant standard deviation for a definite element;

(f) Systematic errors in observational data have to be taken into account;

(g) The density of stations should be related to the variability of the element taken as being most significant (e.g. pressure).

(4) Taking paragraph 3 into account determination of the spacing of stations can be resolved either:

(a) Empiracally, by accepting a network, recognized by experience as being adequate for analyses in a certain Region, or

(b) From a statistical study of the efficacy of relative networks of different density and order of accuracy.

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LIST OF RESOLUTIONS

Page

Resolutions:

Res.1 (CSM-I) - SPECIFICATIONS FOR MARITIME CODE FORMS

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that several aspects of the descriptive terms for wave height need further consideration;

REQUESTS the President of the Commission for Synoptic Meteorology to invite the President of the Commission for Maritime Meteorology to reconsider Resolution 64 (CD Washington 1947) in the light of the following:

(a) In synoptic meteorology waves one foot in height are not universally considered as "ripples";

(b) In the opinion of the Commission for Synoptic Meteorology, equivalents for metric and English units of height which are more accurate (arithmetically) could be developed in the higher ranges;

(c) The descriptions of the Commission for Maritime Meteorology should be identical with Code 75 for S;

(d) Code specifications embodying (a) and (c) above and taking into account the desire to have those specifications convenient in both metric and English units could be developed.

* *

Cf: (1) Res. 9 (CMM-I) (London 1952), Publ.WMO No.10.RP.2
(2) Res. 64 (CD Washington 1947), Publ. OMI No. 71

Res.2 (CSM-I) - CODE FORM FOR HIGH LEVEL FORECASTS

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that a symbolic form for high level forecast messages needs to be developed,

REQUESTS that the President of the Commission for Synoptic Meteorology invite the President of the Commission for Aeronautical Meteorology to take note of Recommendation 5 (CSM-I) and to establish the detailed requirements for a code form for high level forecast messages (HIFOR).

Res. 3 (CSM-I) - PROPOSED CODE FORMS AND SPECIFICATIONS FOR FURTHER STUDY

THE COMMISSION FOR SYNOPTIC METEOROLOGY,

NOTING,

(a) That there exist many proposals for alternative solutions to the problem of code specifications which, while having considerable merit, did not justify adoption at this time, and

(b) That, unless some positive action is taken to place these proposals on record, they would be unavailable to members for continuing study;

CONSIDERING the great complexity of the many coding problems brought about by scientific advances and changing area requirements;

RECOMMENDS that the code specification proposals given in the Annex hereto, while not recommended for adoption at this time, have merit and should be kept in mind by the Secretariat and members as possibly indicating solutions to various problems which may arise.

A N N E X

PROPOSED CORD FORMS AND SPECIFICATIONS FOR FURTHER STUDY

I. Section IV in French proposal for code for radiosonde reports (See CSM I/Doc. 103).

II. Codes for thermal winds:

U.S.S.R;	44hhh	2ddff etc.
Canada	iiiGG	7ddff 5ddff etc.

III. Analysis codes for cross sections:

United States	CSM I/Doc. 18, Annex III
United Kingdom	CSM I/Doc. 127

IV. Aeronautical codes:

1. The Working Group on Aeronautical Codes of Committee A, CSM-I in reviewing the subject matter of Agenda Item 14.2.2 and bearing in mind the comments submitted by Member States in Document 105, have developed two proposals relating to the family of aeronautical codes which the Working Group believed should be brought to the attention of Committee A for resolution in order that the Working Group can continue its development of the aeronautical codes.

2. In keeping with the spirit of Recommendation 26 of the joint ICAO MET Division-CAeM Meeting (Paris, 1950), the Working Group believes that in order to most adequately meet existing aeronautical MET needs, the family of codes indicated in paragraph 3 is most desirable. The major considerations leading to this family of codes are as follows:

The following are the main arguments, from the aeronautical point of view, for the preference for the first set of codes:

(a) Each group would carry the same indicator figure in all codes; all groups would carry such an indicator.

(b) Thus, all groups would be easily identifiable. In case some groups are lost in transmission or through garbling, errors in Interpretation would be reduced to a minimum.

(c) When indicating variations, the system permits the message to be completed in its normal sequence and for variations to be given in the second half of the message.

(d) Further, the forecaster would be enabled to state his forecasts in fewer groups.

To provide all groups with an identifier would, however, require modification of the group VVwwW, to make space for such an indicator in place of W in forecast codes. The group (W)wwVV has the additional advantage in that the elements "past" and "present" weather follow in logical orders. The visibility associated with the reported weather, follows in logical sequence. Similar advantages would be obtained for plotting purposes as normally ww is plotted first and VV thereafter. In addition VV is nearer to that part of the message referring to cloud.

With regard to the sequence of indicator figures, the ascending order is preferred, as being the most natural one. Finally, the system further enables complete elimination of unnumbered groups.

3. The Working Group considered that the Synoptic Code (SYNOP) shown below could be used as the basic code from which the family of aeronautical codes might be developed. The Codes AERO, TAFOR, ROFOR, FIFOR, and ARFOR are logical derivations therefrom.

SYNOP (II)iii Nddff WwwVV PPPTT

$N_hC_LhC_MC_H$ T_dT_djjj (2RRjj) $(3N_sCh_sh_s)$ 4----

AERO (999II)iii Nddff WwwVV

$3N_sCh_sh_s$ $(0TTT_dT_d)$

TAFOR $G_1G_1G_2G_2G_3$ (II)iii 1ddff 2wwVV

$3N_sCh_bh_b$ $(4h_th_th_fh_f)$ $(5I_ch_Ih_It_L)$ $(6Bh_Bh_Bt_L)$

$(7h_xh_xT_hT_h$ $8d_hd_hf_hf_h)$ $9n_1n_2n_3n_4$

ROFOR $i_di_di_dG_dG_d$ $i_ai_ai_aG_aG_a$ i_1ttt

$0i_2ZZZ$ (1ddff) $(2w_1w_1VV)$ $3N_sCh_bh_b$ $4h_th_th_fh_f$

$5I_ch_ih_it_L$ $6Bh_Bh_Bt_L$ $7h_xh_xT_hT_h$ $8d_hd_hf_hf_h$ $9n_1n_2n_3n_4$

FIFOR $G_dG_dG_aG_aG_3$ (II) $i_di_di_d$

$QL_aL_aL_oL_o$ (II) $i_ai_ai_a$ $0i_2zzz$ (1ddff)

(w_1w_12VV) $3N_sCh_bh_b$ $4h_th_th_fh_f$ $5I_ch_Ih_It_L$

$6Bh_Bh_Bt_L$ $7h_xh_xT_hT_h$ $8d_hd_hf_hf_h$ $9n_1n_2n_3n_4$

$0i_2zzz$ (1ddff) (w_1w_12VV) $3N_sCh_bh_b$ $4h_th_th_fh_f$ etc.

ARFOR $G_1G_1G_2G_2G_3$ AAAAA (area-designator)

1ddff w_1w_12VV $3N_sCh_bh_b$ $4h_th_th_fh_f$

$5I_ch_Ih_It_L$ $6Bh_Bh_Bt_L$ $7h_xh_xT_hT_h$ $8d_hd_hf_hf_h$

$9n_1n_2n_3n_4$

4. Notwithstanding the preference of the Working Group for the above family of codes, in view of its considerable advantages for aeronautical application, the Working Group, in recognition of the fact that its terms of reference limited its degree of freedom regarding the possible modifications of the synoptic code, also prepared a family of codes, based upon the modified form of the synoptic code as given in Committee A working paper No. 34. This alternative set of codes is presented for consideration by Committee A so as to enable the Committee to weigh its merits and demerits against the first set of codes which involve a further modification of the basic code form. The alternative set of code forms is as follows:

SYNOP (II)iii Nddff VVwwW PPPTT

$N_hC_LhC_MC_H$ $T_dT_dj_aj_pj_p$ (7RRjj) $(8N_sCh_sh_s)$

9----

AERO (II) iii Nddff 2VVww

$8N_sCh_sh_s$ $(OTTT_dT_d)$

TAFOR $G_1G_1G_2G_2G_3$ (II)iii 9ddff

2VVww $8N_sCh_bh_b$ $(7h_th_th_fh_f)$ $(6I_ch_ih_it_L)$

$(5Bh_Bh_Bt_L)$ $(4h_xh_xT_hT_h)$ $(3d_hd_hf_hf_h)$ $2n_1n_2n_3n_4$

ROFOR $G_1G_1G_2G_2G_3$ (II)iii /$QL_aL_aL_oL_o$/

(II)iii $0i_2zzz$ (9ddff) (VVwwx) $8N_sCh_bh_b$

$7h_th_th_fh_f$ $6I_ch_Ih_It_L$ $5Bh_Bh_Bt_L$ $4h_xh_xT_hT_h$

$3d_hd_hf_hf_h$ $2n_1n_2n_3n_4$ $0i_2zzz$ (9ddff) (VVwwx) etc.

FIFOR $G_dG_dG_aG_aG_3$ (II)$i_di_di_d$ /$QL_aL_aL_oL_o$/

/999II/ $i_ai_ai_a$ $0i_2zzz$ (9ddff) (VVwwx)

$8N_sCh_bh_b$ $7h_th_th_fh_f$ $6I_ch_Ih_It_L$ $5Bh_Bh_Bt_L$

$4h_xh_xT_hT_h$ $3d_hd_hf_hf_h$ $2n_1n_2n_3n_4$ $0i_2zzz$ (9ddff)

(VVwwx) $8N_sCh_bh_b$ $7h_th_th_fh_f$ etc.

ARFOR $G_1G_1G_2G_2G_3$ AAAAA (9ddff) (VVwwx)

$8N_sCh_bh_b$ $7h_th_th_fh_f$ $6I_ch_Ih_It_L$ $5Bh_Bh_Bt_L$

$4h_xh_xT_hT_h$ $3d_hd_hf_hf_h$ $2n_1n_2n_3n_4$

5. It should be recognized that in developing a family of aeronautical codes, successive development is contingent upon progressive steps that are taken and that such development of these codes must be considered as an entity in order to preserve uniformity and simplicity in their utilization.

V. Considering Recommendation 2A of the First Session of Regional Association I and especially the inadequacy of the actual ww code for the description of significantly different types of weather involving thunderstorms and dust haze in tropical Africa, it is suggested that RA I provide the Secretariat of WMO a full statement of requirements and possible solutions to include those different weather types in the ww code.

VI. Indication of station character.

(Cf: CSM I/Doc. 18, 103, 125, 127)

Res. 4 (CSM-I) - STATION ELEVATION

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that the requirements of synoptic meteorology regarding the knowledge of station elevation do not differ from those for instrumental observation;

REQUESTS the President of the Commission for Synoptic Meteorology to notify the President of the Commission for Instruments and Methods of Observation that the definition of station elevation, to be adopted by the Commission for Instruments and Methods of Observation for the purposes of instrumental observation, will be satisfactory for the purposes of synoptic meteorology.

Res.5 (CSM-I) - STUDY OF PUBLICATION NO. 8 OF THE WORLD METEOROLOGICAL ORGANIZATION(*)

The COMMISSION FOR SYNOPTIC METEOROLOGY,

NOTING,

(1) That Publication No. 8 of the World Meteorological Organization does not include any instructions as to how to determine $v_r v_r$ in radians per hour; and

(2) That Publication No. 8 of the World Meteorological Organization refers to Resolution 7 of the International Meteorological Committee, Salzburg, 1937, for descriptions of hydrometeors; and

CONSIDERING,

(1) That most nephoscopes do not measure in units of angular velocity but in linear units in units of time, which must be converted into radians per hour; and

(2) That the descriptions of hydrometeors in the International Cloud Atlas of 1953 differ in some particulars from those of Salzburg 1937;

REQUESTS the President of the Commission for Synoptic Meteorology to invite the President of the Commission for Instruments and Methods of Observation:

(1) To indicate in Publication No. 8 of the World Meteorological Organization how radians per hour for $v_r v_r$ are to be obtained from observations of cloud movement, and

(2) To change the reference to descriptions of hydrometeors in Publication No. 8 of the World Meteorological Organization from "Resolution 7 Salzburg, 1937" to "International Cloud Atlas of 1953".

(*) Former IMO Publication No. 78.

Res. 6 (CSM-I) - GLOSSARY OF METEOR TERMINOLOGY

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING,

(1) That a glossary of meteor terminology would be very helpful to the various Members in preparing their versions of the International Cloud Atlas - 1953; and

(2) That uniformity in nomenclature of meteors is highly desirable;

INVITES the President of the Commission for Synoptic Meteorology to request the President of the Commission for Bibliography and Publications to provide a glossary of meteor terminology as used in the International Cloud Atlas - 1953, in at least the four official languages of the World Meteorological Organization.

Res. 7 (CSM-I) - INTERVALS BETWEEN ISOBARS ON SURFACE CHARTS AND BETWEEN ISOHYPSES OF CONSTANT PRESSURE SURFACES

The COMMISSION FOR SYNOPTIC METEOROLOGY,

NOTING existing differences in dimensional practices between countries;

CONCLUDES,

(1) That because of these differences in dimensional practices, there is no immediate possibility of securing international uniformity in intervals for isobars on surface charts and for isohypses of constant pressure surfaces (contour lines) as recommended by the Commission for Aeronautical Meteorology in its Fifth Session.

(2) That the continued use of intervals of 40 gpm by metric countries would permit those countries to provide to pilots upper air charts with isohypses at 60 gpm intervals, by simple interpolation and that countries using English units could continue to use intervals of 200 gpft.

REQUESTS the President of the Commission for Synoptic Meteorology to inform the President of the Commission for Aeronautical Meteorology of the foregoing conclusions:

* *

Cf : Rec. 27 (CAeM Paris 1950)

Res. 8 (CSM-I) - NETWORKS

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that the question concerning networks referred to the

Commission for Synoptic Meteorology by the Executive Committee in its Third Session (Resolution 4 (EC-III) requires further study;

DECIDES,

(1) To establish a Working Group on Networks to develop, insofar as practicable, for presentation to the Commission for Synoptic Meteorology before its next session, quantitative criteria for determining the desirable spatial distribution of and time interval between observations for various purposes based on general and scientific considerations and on practical considerations of the accuracy of both instrumental and non-instrumental observations;

(2) To invite the following to serve on the Working Group:

Mr. Bersemoulin
Mr. A.K. Roy
Mr. W.J. Gibbs
Mr. A.H. Nagle

(3) To invite the Secretary-General to designate a suitably qualified member of his staff to participate and assist in the technical work of the Working Group on Networks.

* *

Cf : Res. 4 and 35 (EC-III), (Geneva 1952)

Note: In compliance with paragraph (3) above, the Secretary-General has designated Mr. Veranneman to participate in the technical work of the Working Group on Networks.

Res. 9 (CSM-I) - ESTABLISHMENT OF WORKING GROUPS

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING,

(1) That working groups should be established to serve between sessions of the Commission only for the purpose of studying clearly defined major problems;

(2) That the Technical Division of the Secretariat will be able to assist with the President of the Commission in dealing with most of the routine technical matters which may arise between sessions;

DECIDES that it is unnecessary to establish more than two working groups, viz. a Working Group on Telecommunications and a Working Group on Networks;

RECOMMENDS that matters requiring continuing attention be referred by the Commission to the Secretary-General for study by the Technical Division. As and when required the Secretariat will seek further directives from the President of the Commission for Synoptic Meteorology.

Res.10 (CSM-I)- ESTABLISHMENT OF WORKING GROUP ON TELECOMMUNICATIONS

The COMMISSION FOR SYNOPTIC METEOROLOGY,

NOTING that a number of matters in the field of meteorological telecommunications require further study;

DECIDES,

(1) That there be established a Working Group on Telecommunications to serve until the next session of the Commission for Synoptic Meteorology;

(2) That this Working Group on Telecommunications consist of the following members:

2.1 The Chairmen of the different Regional Working Groups on Telecommunications,

2.2 Representatives of Members of the World Meteorological Organization;

(3) That the Chairman of the Working Group on Telecommunications should, if possible, be elected at the First Session of the Commission for Synoptic Meteorology;

(4) That the terms of reference of the Working Group on Telecommunications shall be as follows:

(a) To formulate recommendations relating to international meteorological telecommunication services, including the standardization of operating practices and facilities, and the organization, procedures, contents and schedules of meteorological broadcasts and other meteorological transmissions.

(b) To keep abreast of the activities of the International Civil Aviation Organization, the International Telecommunications Union, and other international organizations relating to meteorological telecommunications.

(5) That the Working Group will be guided on questions of content of continental and sub-continental broadcasts, by the principles of Resolution 20, IMC Paris 1946.

* *

Cf : (1) Res. 20 (IMC Paris 1946);

(2) Res. 6 (EC-II), (Lausanne 1951).

Res. 11 (CSM-I) - PROBLEMS FOR STUDY IN THE FIELD OF METEOROLOGICAL TELECOMMUNICATIONS

The COMMISSION FOR SYNOPTIC METEOROLOGY,

NOTING that study of meteorological telecommunications problems during its First Session, while not productive of final solutions in many cases, resulted in a further definition of these problems and some suggestions for additional work thereon;

DECIDES to request the President of the Commission for Synoptic Meteorology, in developing the work programme for the Working Group on Telecommunications, to take into account the suggestions contained in the annex hereto.

A N N E X

LIST OF SUGGESTED TELECOMMUNICATIONS PROBLEMS REQUIRING FURTHER STUDY IN THE COMMISSION FOR SYNOPTIC METEOROLOGY

1. Methods leading to a greater efficiency of operation and a wider utilization of meteorological telecommunications personnel and facilities engaged in present and proposed networks of continental and sub-continental broadcasts. The above study may lead to better time schedules of parts within a single broadcast, and better time scheduling of broadcasts within the same reception area, more effective monitoring arrangements, prompt system of alternate transmission following major transmission interruptions and better division of "data collective areas" assigned to the respective continental and sub-continental broadcast centres.

2. The extent to which and the areas where point-to-point transmission or teleprinter networks may supplement, or substitute for, specific continental or sub-continental broadcasts.

3. The extent to which and the areas where facsimile may supplement, or substitute for, international and inter-regional exchange of meteorological information.

4. The extent to which and the areas where data from one region are transmitted to a second region via high speed point-to-point transmission in the reception region, and then are disseminated by a radio broadcast (e.g., Paris) or teleprinter system (e.g., New York).

5. The contents of the sections in the WMO Technical Regulations relating to telecommunications.

RESOLUTION 12

Res. 12 (CSM-I) - DRAFT PROVISIONAL TECHNICAL REGULATIONS

The COMMISSION FOR SYNOPTIC METEOROLOGY,

NOTING Congress Resolution 15 (I) and Executive Committee Resolutions 3 (EC-II) and 14 (EC-III) on the preparation of Provisional Technical Regulations of the World Meteorological Organization;

INVITES the President of the Commission for Synoptic Meteorology to forward the Draft Provisional Technical Regulations covering the field of synoptic meteorology and which are contained in the Annex to this Resolution to the Secretariat of the World Meteorological Organization for further action in accordance with the resolutions noted above.

A N N E X

INTRODUCTION

Noting that the recommendations developed during the First Session of the CSM will have no official status before the Executive Committee has acted upon them at its Fourth Session, the CSM adopted the following policy in the compilation of this document:

1. Only those resolutions existing at the closing date of the Third Session of the Executive Committee were considered to be in force. It was understood that the Secretariat would make such amendments as were necessary after the Executive Committee has acted upon the recommendations of the CSM at its First Session.

2. In those cases where no resolution existed and a new regulation was proposed, it was understood that the Secretariat would make such amendments as necessary after the Fourth Session of the Executive Committee.

3. In the drafting of this document, the word "shall" has been used in each case where an existing resolution or proposed regulation was considered to be of an "obligatory" nature and where non-compliance by a Member would adversely affect other Members. The word "should" has been used in those regulations which were considered to be in the nature of recommended practices.

4. Those matters which were considered to be the primary responsibility of another Technical Commission, were referred to that commission in order to avoid divergent or duplicate action.

DRAFT PROVISIONAL TECHNICAL REGULATIONS - PART I

STATIONS OF METEOROLOGICAL OBSERVATIONS

I.1 Definitions

(1) Meteorological observation — WMO Publication No. 72

The evaluation of one or more meteorological elements by visual and/or instrumental means or both.

(2) Meteorological report — " (Amended)

A statement of past or present meteorological conditions at the earth's surface or in the upper air as observed at a specific time and place, presented in plain language or in code, either orally, in written form, or by telecommunication.

(3) Meteorological observing station — " (Amended)

A station approved by a Meteorological Service for the purpose of making meteorological observations and reports.

(4) Basic land station — New

A surface land station equipped and staffed to observe and report the elements specified in II (1)1. (i) for international exchange in accordance with III and IV.

(5) Supplementary land station — New

A surface land station other than a basic land station.

(6) Ocean weather station — New

A fixed maritime location occupied by a ship equipped and staffed to observe and report the elements specified in II (1)1.(i) and (iv) for international exchange in accordance with III and IV. An ocean weather station is also a ship radiosounding and radiowind station.

(7) Selected ship — CMM

A ship supplied with a full set of certified instruments and closely supervised for maintaining a high degree of accuracy in its weather reporting service, which will be requested by the parent National Service to report in the standard form of message for reports from ships, at least at the main synoptic hours, whenever practicable, and also as required by the International Convention for Safety of Life at Sea.

(8) Supplementary ship

A ship supplied with a modified set of certified instruments which will be requested to report in areas where shipping is relatively sparse, or as instructed by the parent National Service, using an abridged form of message for reports from ships at least at the main synoptic hours, whenever practicable, or more frequently as required when storm conditions threaten or prevail, and also as required by the International Convention for Safety of Life at Sea. CMM

(9) Other voluntary observing ship

A ship not supplied with certified instruments which will be requested to report in areas where shipping is relatively sparse, or as instructed by the parent National Service, or on request and especially when storm conditions threaten or prevail, or as required by the International Convention for Safety of Life at Sea, using a special abridged form of message for reports from ships or in plain language if use of code is impracticable. CMM

(10) Other ship

A ship which makes and reports meteorological observations and is not included in the above ship categories. New

(11) Upper air station

A station equipped and staffed to observe and report some or all of the elements specified in II (2) 1 for international exchange in accordance with III and IV. New

(12) Surface observations New

(a) Observations of weather phenomena, wind, clouds and visibility made by an observer at ground level or from a view-point not higher above the ground than is necessary to clear neighbouring obstructions, or by an observer in a ship;

(b) Measurements made by instruments exposed and installed in such a way as to measure the pressure, temperature, humidity and wind in the lowest few metres of the atmosphere;

(c) Observations of ground phenomena (snow cover, state of the ground, radiation temperature, soil temperature, dew, hoar-frost, etc.) or maritime phenomena.

(13) Meteorological observer

A member of a Meteorological Service or a person approved by a Meteorological Service, designated to make and report meteorological observations. — WMO Pub. 72 (Amended)

(14) Radio-wind

A sequence of instrumental observations of upper winds by electronic means. — New

(15) Radiosounding

A sequence of instrumental observations of meteorological elements in the vertical, automatically transmitted by electronic means.

(16) Pilot balloon observation

A determination of upper winds by optical tracking of a free balloon.

(17) Meteorological reconnaissance flight

An aircraft sortie for the specific purpose of making meteorological observations.

(18) Meteorological message — WMO Pub. 72

A message containing only reports of meteorological observations, analyses and/or forecasts.

(19) Continental broadcast

A broadcast of the data specified in IV.3.1(ii), covering a continent and part of adjoining oceans and, exceptionally, limited portions of adjacent continents and capable of world-wide interception. — CD Washington 1947 : 103

(20) Sub-continental broadcast

A broadcast of data covering a portion of a continent and adjoining oceans and capable of interception anywhere in that continent and, exceptionally, in other continents. These broadcasts may, where necessary, include data from neighbouring countries in other continents.

(21) National or territorial broadcast

A broadcast of data normally covering the area of one Meteorological Service and capable of interception at one or more sub-continental broadcasting centres, and if possible, at the appropriate continental broadcast centre.

(22) Broadcast for aviation

(Définition, if required, to be supplied by CAeM).

(23) Broadcast for shipping

(Définition, if required, to be supplied by CMM).

(24) Forecast
A statement of meteorological conditions expected to exist for a specified period of time at the earth's surface or in the upper air. — WMO 72

(25) Forecaster
A meteorologist designated by a Meteorological Service to prepare forecasts. — WMO 72

(26) Weather chart
A geographical outline chart on which meteorological conditions or elements at a given time are displayed in the form of figures, isopleths or other symbols. — New

(27) Surface chart
A weather chart on which meteorological conditions or elements as observed from the earth's surface are displayed. — New

(28) Upper air chart
A weather chart on which meteorological conditions or elements at some specified level or other surface or within a specified layer in the upper air are displayed. — New

(29) Aerological diagram — CAe to supply

I.2 Classification of station

For the purposes of synoptic meteorology, stations SHALL be classified under the following categories: — New

(a) Surface station

(1) Land
- (i) Basic
- (ii) Supplementary

(2) Ship
- (i) Ocean weather station
- (ii) Selected
- (iii) Supplementary
- (iv) Other voluntary observing
- (v) Other

(b) Upper air station

(1) Land
- (i) Radiosounding and radio-wind
- (ii) Radiosounding
- (iii) Radio-wind
- (iv) Pilot balloon

(2) Ship
- (i) Radiosounding and radio-wind
- (ii) Radiosounding
- (iii) Radio-wind
- (iv) Pilot balloon

(3) Aircraft
- (i) Reconnaissance
- (ii) Other

N o t e : One and the same station may fall in two or more of the above categories.

I.3 Establishment of stations — See WMO General Regulations, Regulation 4

I.3.1 Location and site

(a) Location — New

Surface and upper air station SHOULD be located so as to give an adequate knowledge of the distribution of meteorological elements. For this purpose, their number and spacing SHOULD be as prescribed in 1.4.(iii).

(b) Site and exposure
(To be drafted by CIMO)

I.3.2 Geographical co-ordinates and height above mean sea level

The location of each station SHALL be specified as follows: — EC-III : 38

(a) Latitude and longitude to the nearest minute of arc.

(b) Height above mean sea level in whole metre or feet; metre being recommended.

I.3.3 Promulgation of information relating to the station — New

(i) When a land station, the reports of which are intended for regional or inter-regional exchange, or an ocean weather station is established or dis-established or a change is made in its location, observational or reporting programme, the Member concerned SHALL forward the following to the WMO Secretariat for promulgation to Members:

(a) Name of the station and station index number.

(b) Geographical co-ordinates and height above mean sea level.

(c) Altitude of the fixed level to which pressure is reduced (or the reference isobaric surface whose altitude is given by the station).

(d) Times at which reports will be made.

(e) Times at which observations will be made.

(f) Information regarding any special activities.

(ii) The information specified in paragraph (i) SHOULD be furnished to the WMO Secretariat at least two months before the new station becomes operative or changes are implemented in the case of existing stations (see, however, Regulation 1.5 (ii) as regards changes of index numbers). CD Utrecht 1923 : 41

(iii) A description of the meteorological stations used in its international exchanges SHOULD be published by each Member.

I.4 Networks of stations for the purposes of synoptic meteorology

(i) Every Member SHALL establish a network of stations on land and SHOULD ensure that their number and location and the frequency with which observations are made and disseminated are in accordance with WMO requirements as set out in these Regulations and with regional requirements. New

(ii) Members SHOULD enroll merchant ships of their nationality as observing ships and provide facilities for the reception and dissemination of reports made by radio, not only by ships of their own nationality but also by ships of other nationalities which are scheduled to make reports by radio when in the area of responsibility assigned to that Member under Regulation VII.2. *) CD Washington 1947 : 37, 38

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*) See Resolution 15(I) Appendix, WMO Publication No. 1/I

(iii) (a) In principle, basic land surface stations SHOULD be spaced at intervals of not more than 100 - 150 km apart. Supplementary stations will be necessary for special or national purposes. IMC Paris 1946 : Part of Res. 45

(b) Land upper air stations SHOULD be spaced at intervals not exceeding 300 km.

(c) If in certain desert regions and in other sparsely populated areas it is not possible to establish networks with the densities recommended in sub-paragraphs (a) and (b), densities as near as possible to the recommended densities SHOULD be provided. Observations from stations more widely separated are still of great value but they SHOULD not be at greater distances than 500 km for surface stations and of 1000 km for upper air stations making observations of temperature, humidity and wind. Special efforts SHOULD be made to establish an adequate network in such regions when:
(1) Bordering populated areas, or
(2) On regular air routes.

(d) The distance between ship surface stations SHOULD in general not exceed 500 km. If the density of shipping permits a greater density of observations, additional observations SHOULD be provided with the object of securing a density of at least one report per 300 km for each main synoptic hour. (The observations from ships SHOULD be supplemented where necessary and possible by observations from automatic stations, particularly in those areas not provided with ocean weather stations).

(e) The same density of upper air stations is necessary over the sea as over the land for an adequate synoptic representation. There are, however, practical difficulties in achieving such a dense network over the sea. Therefore in general the distance between ship upper air stations SHOULD not exceed 1000 km.

(iv) Members SHOULD co-operate in the establishment and maintenance of stations for special purposes in compliance with recommendations adopted by Congress or by Regional Associations.

I.5 Identification of stations

(i) Members SHALL assign station index numbers in compliance with the scheme set out in Publication No. 9, Fascicule I, Chapter I-A-2, and Fascicule II, and include them in the information relating to the station to be forwarded by the Member to the WMO Secretariat for promulgation in accordance with Regulation I.3.3.

CD Washington 1947 : 162
Partly new

(ii) Changes in index numbers of stations whose reports are included in continental and sub-continental broadcasts and in broadcasts for shipping may be made twice yearly on 1 January and on 1 July and they SHOULD be announced six months earlier.

Publ. No. 9 Fasc. I.

METEOROLOGICAL OBSERVATIONS

PART (1) Surface observations

II(1)1. Elements to be observed at surface stations — New

(i) Observations of the following elements SHALL be made by basic land stations at synoptic hours :

Present weather

Wind direction and speed

Amount of cloud
Forms of cloud
Height of cloud base above station level

Visibility

Temperature

Humidity

Atmospheric pressure
Barometric tendency *)
Characteristic of barometric tendency *)

Past weather

(ii) The observations listed in paragraph (i) above SHALL be supplemented by such other observations as are agreed for each WMO Region by resolutions of the appropriate Regional Association, e.g. : — New

Extreme temperatures
Rainfall (amount of precipitation)
State of ground
Direction of cloud movement
Special phenomena.

(iii) Observations SHALL be made by supplementary land stations to meet the special purpose for which the stations have been established. — New

(iv) Observations made by ocean weather stations SHALL include those listed in paragraph (i) together with : — New

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*) These elements may be omitted by Regional agreement.

Ship's course and speed
Sea temperature
Direction from which waves come
Period of waves
Height of waves
Special phenomena

(v) Observations made by selected ships SHOULD include the observations listed in paragraphs (i) and (iv) above. — New

(vi) Observations made by supplementary ships SHALL include: — New
Present weather
Past weather
Wind direction and speed
Amount of cloud
Forms of cloud
Height of cloud base above station level
Visibility
Atmospheric pressure
Temperature

(vii) Observations made by other voluntary observing ships SHALL include:

Present weather
Past weather
Wind direction and speed
Amount of cloud
Visibility

II(1)2. Times of observation

(i) For the purposes of synoptic meteorology, observations SHALL be made throughout the world according to universal time, i.e., at the fixed standard hours - GMT, and not local or zone time. — IMC Paris 1946 : 17

(ii) For purposes of synoptic meteorology the main meteorological observations SHOULD be taken throughout the world at the following standard times of observations: 0000, 0600, 1200, and 1800 GMT. — New Replaces IMC Paris 1946 : 18

(iii) Intermediate observations may be taken at 0300, 0900, 1500, and 2100 GMT or at 0200, 0400, 0800, 10.00, 14.00, 16.00, 20.00 and 22.00 GMT. Preference SHOULD be given to 0300, 0900, 1500 and 2100 GMT. — New

(iv) Pressure observations SHOULD be made at the exact synoptic hour; the observations of other elements SHOULD be carried out within the ten minutes preceding the observation of pressure. — New IMC Paris 1946 : 18 paragraphs (2), (3).

(v) When practical difficulties on board ship make it impossible to comply with paragraph (iii), the times of observation SHOULD be as near as possible to the main synoptic hours. — CD Washington 1947: 112

(vi) At basic land stations observations SHOULD be made and reported at all synoptic hours. When this full programme cannot be carried out, priority SHOULD be given to the making of observations at main synoptic hours. — New

(vii) At supplementary land stations the times at which observations are made and reported SHOULD be fixed nationally or regionally in accordance with the purpose for which the station has been established. — New

(viii) In ocean weather stations surface observations SHALL be made and reported at all synoptic hours. — New

(ix) In selected and supplementary ships, observations SHALL be made and reported at main synoptic hours (subject to the provision of paragraph (v). — IMC Berlin 1939 : 2

(x) In other voluntary observing ships, observations SHOULD be made and reported at main synoptic hours or as requested (subject to the provision of paragraph (v). — New

II(1)3. General requirements — Instrumental requirements to be drafted by CIMO

II(1)3.1. Observers

II(1)3.2. Instruments

For the purposes of synoptic meteorology, stations SHOULD be equipped with instruments complying with the standards of accuracy and general principles of design set out in WMO Publication No. 8(Guide to International Meteorological Instrument and Observing Practice). — New

II(1)3.3. Recording and preservation of observations

(i) Observations made for the purposes of synoptic meteorology SHALL be recorded and preserved so that they may be available for climatological and other studies (see Section V1*) of the Regulations. — New

*) See Resolution 15(1),Appendix.

II(1)3.4. Inspection of stations

Stations SHOULD be inspected at least once every two years. The purpose of the inspection shall be to ensure (a) that all instruments are in good order; (b) that the observers understand and carry out correctly the standard procedures and practices for making, reporting, and recording the observations.

CD Washington 1947: 95

II(1)4. Methods of observation

(To be drafted by CIMO)

II(1)4.1. Clouds

(i) The system of classification, definitions, and specifications set out in the International Atlas of Clouds SHALL be used throughout the world for cloud observations for the purposes of synoptic meteorology.

New

II(1)4.2. Weather

(To be drafted by CIMO)

II(1)4.3. Atmospheric pressure and barometric tendency

(i) For stations at an altitude of less than 500 metres the pressure SHALL be reduced to mean sea level.

(ii) For stations at altitudes exceeding 500 metres the standard level to which the readings are to be reduced SHALL be decided regionally in accordance with the procedure set out in Publication No. 9, Fascicule I, page I-A-3-43.

Publ.No. 9 Fasc.I, p.I-A-3-43

II(1)4.4. Temperature

II(1)4.5. Humidity

II(1)4.6. Wind

II(1)4.7. Precipitation

II(1)4.8. Visibility

(Wording left to CIMO)

PART (2) Upper Air Observations

II(2)1. Elements to be observed

The following elements SHALL be observed at fully equipped upper air stations including ocean weather stations: — New

(a) Atmospheric pressure
(b) Air temperature
(c) Humidity
(d) Wind speed and direction

II(2)2. Times of observation

(i) The standard times of upper air observation for purposes of synoptic meteorology SHALL be 0300, 0900, 1500 and 2100 GMT. Services which cannot provide observations at all four of the standard hours SHOULD provide observations at 0300 and 1500 GMT as a minimum. — CD Washington 1947 : 173

(ii) Upper air soundings of temperature and wind which require a substantial period of time to complete, (e.g. radiosoundings or vertical soundings by aircraft), SHOULD begin as near as practicable to the synoptic hour to which they refer, in order to use the results with the synoptic messages of those hours to which they refer. — IMC Paris 1946 : 23

(iii) In no case SHOULD an observation commence more than one hour from the synoptic hour to which it refers. — New

(iv) Upper air observation which can be made in a short time, e.g., shell burst observation of wind, SHOULD be made in the period of 10 minutes before the synoptic hour.

II(2)3. General requirements

II(2)3.1. Observers

II(2)3.2. Instruments and equipment

(To be drafted by CIMO in consultation with CAe).

II(2)3.3. Recording and preservation of observations

(i) Observations made for the purposes of synoptic meteorology SHALL be recorded and preserved so that they may be available for climatological and other studies. — New

II(2)4. Methods of observation

(Refer to CIMO)

II(2)4.1. Upper winds

Measurements of upper winds SHOULD be made by radio methods. New

II(2)4.1.1. Pilot Balloon observations

(i) When for any reason a scheduled radio-wind observation cannot be made, a pilot balloon observation SHOULD be made in its place. New

(ii) Pilot balloon observations SHOULD also be made at stations and at time supplementary to the basic upper air station network, so as to provide as full information as possible about upper winds.

II(2)4.1.2. Radio or radar observations
(To be drafted by CIMO)

II(2)4.2. Temperatures, pressure and humidity (radiosounding)
(To be drafted by CIMO)

II(2)4.3. Aircraft observations

(i) Routine meteorological reconnaissance flights SHOULD be planned so as to normally include:

(a) A horizontal flight at low level with observations at frequent intervals. New

(b) Flights at higher levels as near as possible to standard isobaric surfaces.

(c) Verical soundings either by the aircraft or by dropsonde.

(ii) The elements to be observed during meteorological reconnaissance flights SHALL include those approved for the purpose by WMO.

(iii) Each Member SHOULD ensure the prompt dissemination of meteorological reconnaissance reports and arrange for in-flight reports to be provided.

II(2)4.4. Other elements

PART (3) Observations of special character

II(3)1. Atmospherics

The equipment, procedures and codes for observing and reporting the loci of sources of atmospherics (SFERICS) have not yet been standardized by the WMO. New

II(3)2. Microseismic observations

The equipment, procedures and codes for observing and reporting microseisms have not yet been standardized by the WMO. New

DRAFT PROVISIONAL TECHNICAL REGULATIONS - PART III

METEOROLOGICAL CODES

III.1. Forms of messages

III.1.1. Meteorological messages exchanged internationally SHALL be in the code forms approved for this purpose by the WMO. New

III.1.2. The form of the group or groups in an international code form which are left for determination by regional decision, SHALL be established by resolutions of the Regional Associations.

III.1.3. Additional code forms in messages required solely for the exchange of information within a Region SHALL be established by resolutions of the appropriate Regional Association. New

III.1.4. Additional code forms in messages required solely for the exchange of information between one Region and another SHALL be established by Resolutions of both the Regional Associations concerned. New

III.1.5. Information relating to regional decisions under articles III.1.2, III.1.3, and III.1.4 SHALL be communicated by the President(s) of the Regional Association(s) concerned to the WMO Secretariat for promulgation to all WMO Members. New

III.1.6. Other forms of messages required for purely national purposes, or (by bilateral agreement) for the exchange of information between one Service and another, may be adopted without reference to the Regional Association provided such messages are not promulgated on international telecommunication channels. New

III.2. Specifications

III.2.1. The specifications employed in international codes SHALL be those approved for the purpose by the WMO. New

III.2.2. In forms of messages adopted regionally in accordance with articles III.1.2, III.1.3 and III.1.4. WMO specifications SHALL be adopted for all elements for which WMO specifications exist. In the case of an element for which no WMO table of specifications New

exists, a table SHALL be adopted by resolution of the Regional Association and forwarded by the President to the WMO Secretariat for promulgation.

III.3. Symbols

III.3.1. The symbolic words, groups and letters used in connection with international forms of message SHALL be those approved for the purpose by WMO. New

III.3.2. Other symbolic words, groups and letters required for regional or national purposes SHALL be selected so as not to duplicate those used in international messages. New

DRAFT PROVISIONAL TECHNICAL REGULATIONS - PART IV

METEOROLOGICAL TELECOMMUNICATIONS

IV.1.	General conditions	
IV.1.1.	Every Member SHALL make available for international dissemination either by radio or teleprinter in compliance with regional arrangements, the synoptic weather reports furnished by stations in the basic synoptic network.	New
IV.1.2.	Every Member SHOULD maintain the highest possible standard of reliability, regularity and promptitude in the dissemination of weather messages to meet international requirements as laid down by the appropriate WMO body.	New
IV.1.3.	National or territorial transmissions SHALL be capable of satisfactory reception by the centre responsible for the sub-continental broadcast covering the area concerned [see Definitions, paragraph (21)].	New
IV.1.4.	Transmissions SHOULD be made by an automatic keying device to ensure correct speed as well as uniformity of transmission. The speed should be between 18 and 20 five-figure groups per minute (24 to 28 bauds). In areas where transmission and reception is still accomplished by hand, the average speed of transmission may be 15 five-figure groups per minute if agreed regionally.	New
IV.1.5.	The acceptance by a Member of responsibility for the issue of a continental broadcast, a sub-continental broadcast, or for any other communications commitments extending beyond that included in IV.1.1. SHALL be entirely voluntary.	New
IV.1.6.	Details of all meteorological transmissions made in the territory of a Member and intended for the use of other Meteorological Services SHALL be communicated by the Member to the WMO Secretariat for promulgation. The information provided SHALL include the names and call-signs of transmitting stations, power employed, type of modulation, frequencies, contents detailed time schedules and category of the transmissions.	Based on Publ. No. 9 Fasc. III (Introduction)

IV.1.7. (i) The Secretariat of the WMO SHALL be notified, if possible at least two months in advance, of the details of new meteorological transmission services (hours and contents of broadcasts, call signs and power of transmitting stations etc.) as well as of changes in existing services, whenever those modifications will affect other nations. — Publ.No.9, Fasc.III, Introduction, paragraph 6.

(ii) Index numbers of new stations figuring in broadcasts SHOULD be announced to the Secretariat of the WMO two months in advance.

(iii) Changes in index numbers of stations, reports from which are included in continental and subcontinental broadcasts and in broadcasts for shipping, may be made twice yearly, as on 1 January and on 1 July. They SHOULD be announced six months in advance.

IV.1.8. Meteorological broadcasts SHOULD not include additional information unless (1) its inclusion is approved by WMO and (2) the information is placed at the end of the meteorological broadcast. The additional information SHOULD not be included, when its inclusion would entail the omission or delay of routine weather information. — Based on Publ.No.9, Fasc.III, page 11.

Collection of reports

IV.2. Members SHALL establish collecting centres charged with the duty of assembling individual station reports for dissemination collectively on international teleprinter circuits or by radio. Subject to regional decision, the reports from two or more countries or territories may be transmitted from one centre. — Based on Publ.No.9, Fasc.III, Introduction, paragraph 2.6.

IV.2.2. Internationally or regionally agreed procedures as appropriate, SHALL be followed at collecting centres, as regards message headings, priorities and time schedules. — New

IV.3. Broadcasts for the purposes of synoptic meteorology

These broadcasts are classified as continental, subcontinental and national or territorial as defined in Definitions, paragraphs (20), (21), (22).

IV.3.1. Continental broadcasts

(i) There SHOULD be eight (8) continental broadcasts, viz: — IMC Paris, 1946: 20

1 for Northern and Central America,
1 for South America,
1 for Europe and Asia Minor,
1 for Africa,
3 for Asia,
1 for Oceania, New Zealand and Australia,

(ii) Continental broadcasts SHALL include:

A. A representative selection of reports of the observations specified in I.(1)(12) and I.(1)(14) in accordance with the principles laid down in I.4.(iii), from:

(a) Basic land stations
(b) Supplementary land stations
(c) Ocean weather stations
(d) Selected and supplementary ships
(e) Upper air stations

B. Surface and upper air analyses

(iii) The time schedules and order of contents in continental broadcasts SHOULD follow the plan set out in Publication No. 9, Fascicule III, Introduction, Section 3.

IV.3.2. Sub-continental broadcasts

(i) The number of sub-continental broadcasting centres in each Region and their areas of responsibility shall be determined by the appropriate Regional Association. — New

(ii) The time schedules in the sub-continental broadcasts covering a particular Region shall be so planned that Services which rely on the sub-continental broadcasts for the reception of the reports required to establish synoptic charts covering the entire Region shall be able to do so with a minimum number of receivers and operators.

IV.3.3. National or territorial broadcasts

The data in national or territorial broadcasts SHALL include all data required for re-broadcast in sub-continental broadcasts. — New

IV.4.	Broadcasts for aviation	CAeM to supply
IV.5.	Broadcasts for shipping	CMM to supply
IV.6.	Broadcasts for other special interests	WMO Secretariat to supply in consultation with CSM Working Group for Telecommunications as necessary
IV.7.	Broadcasts for general public purposes	
IV.8.	Point-to-point transmission	
IV.9.	Teleprinter transmissions	New
IV.9.1.	Teleprinter networks may be established regionally for the international exchange of weather information. A radio transmission SHALL in no case be suppressed as a result thereof until some reasonable alternative means have been developed for providing to any Service essential information of which it in such case would be deprived. If a radio broadcast was originally set up to meet an international obligation, then the above rule applies. If the radio broadcast was originally set up for purposes of internal collection and distribution but has been copied by other Services unofficially, then there is no implied obligation in the above rule to maintain this broadcast.	
IV.9.2.	Time schedules and operational procedures relating to teleprinter networks SHOULD be established regionally to the satisfaction of the Services concerned.	New
IV.9.3.	Particulars of time schedules, call-signs, circuits and contents of messages for regional and inter-regional exchanges SHALL be furnished to the WMO Secretariat for promulgation in Publication No. 9, Fascicule III. Paragraph IV.1.6. SHALL apply as regards these particulars, whilst paragraph IV.1.7. SHALL apply as regards notifications of changes affecting other Services.	

IV.10 Facsimile transmissions

Services maintaining regular transmissions by radio of meteorological charts, etc., by facsimile (picture transmission) SHOULD furnish the following information to the WMO Secretariat for promulgation. New

(a) Index of co-operation and drum speed(s) of facsimile transmitter.

(b) Frequencies and call sign(s) (or identifications) of radio transmitters.

(c) Type of modulation.

(d) Details of the programme of transmissions.

SYNOPTIC AND FORECASTING SERVICES

V.1. General

V.1.1. Members SHALL establish a forecasting organization adequate to meet the following requirements: — New

(a) Services for aviation as specified in VII.1.*)
(b) Services for shipping as specified in VII.2.*)
(c) Any additional requirements agreed regionally.

V.2. Weather charts and diagrams

V.2.1. Scales and projections

(i) The following projections SHOULD be used for charts: — CD Washington 1947 : 26

(a) The stereographic projection for the polar regions on a plane cutting the sphere at latitude 60°;

(b) The Lambert conformal conic projection for middle latitudes, the cone cutting the sphere at 30° and 60° in the northern hemisphere and at 10° and 40° in the southern hemisphere;

(c) Mercator's projection for the equatorial regions, with true scale at $22\frac{1}{2}^{\circ}$. The stereographic polar projection may be extended to cover a hemisphere; Lambert's conformal conic projection may be extended poleward from 60° or equatorward from 30° as may be necessary to produce a continuous chart, and Mercator's projection may be extended to make a chart of the world or of any large part of the world when the region of primary interest is in the equatorial zone. — CD Washington Res. 32

(ii) The following scales SHOULD be used for charts: — CD Washington 1947 : 27

(a) For large area-charts of the world, a hemisphere, or a large part of a hemisphere, the scales along the standard parallels SHOULD be:

1 : 20,000,000 (large area)
1 : 30,000,000 (a hemisphere)
1 : 40,000,000 (world)

(b) For charts of a continent or an ocean or considerable parts of either or both on a single

*) See Resolution 15 (I)

chart, the scales along the standard parallels SHOULD be:

1 : 7,500,000
1 : 10,000,000
1 : 12,500,000
1 : 15,000,000

Preference SHOULD be given whenever possible to the following scales:

1 : 30,000,000 (for the hemisphere)
1 : 20,000,000 (for a large area)
1 : 10,000,000 (for a large continent or ocean)

(iii) Every chart SHOULD have printed on its face the name of the projection and the scale at the standard parallels of $22\frac{1}{2}^{\circ}$, 30° or 60° (both 30° and 60° in the case of the conic projection in the northern hemisphere and 10° and 40° in the southern hemisphere). The scales or conversion factors SHOULD also be printed on the charts for different latitudes. CD Washington 1947 : 28

(iv) The following system of colouring SHOULD be used for the printing of charts: CD Washington 1947 : 30

<u>Two-colour charts</u>

Brown or ochre SHOULD be the colour of:

(a) Frame, title, scale, remarks about projection etc.;
(b) Grid;
(c) Contour lines for surface and upper air charts;
(d) Shadings of layer tints for surface and as necessary for upper air charts;
(e) Stations circles;
(f) The figures of the station numbers.

Blue SHOULD be the colour of:

(a) Outlines of land areas;
(b) Shading of water areas;
(c) Shading of inland areas covered by eternal snow or ice;
(d) River courses.

N o t e : The colour of the shadings on two-colour charts SHOULD be as light as practicable. Contours may be shown as broken lines, but the contour tints SHOULD not be bounded by a line. The number of tints SHOULD be as small as possible. The subdivision of layer tints SHOULD be in accordance

with the levels of the reduction of barometric readings. For instance, shadings may be used for the layers 0-1000 m, 1000-3000 m, above 3000 m, with a dotted contour line for 200 m (for aeronautical purposes) and dashed contour lines for 500, 2000 and 4000 m.

One-colour chart

Brown or ochre SHOULD be used.

V.2.2. Preparation of weather charts

The procedures and practices set out in Publication No. 9, Fascicule I, Chapter III SHOULD be followed in preparing weather charts for the surface and upper air.

V.2.3. Aerological diagrams

(To be drafted by CAe)

CD Washington 1947 : 20

V.3. Graphical representation of data

The symbols used for the graphical representation of data and analyses on weather charts SHOULD be those recommended by WMO.

V.4. Analyses

V.4.1. The principle type of reference surface for representing and analysing the conditions in the atmosphere over large areas SHOULD be isobaric. The use of auxiliary types of reference surfaces is permissible.

CD Washington 1947 : 24

V.4.2. The standard isobaric surfaces for representing and analysing the conditions in the atmosphere SHALL be 1000 mb, 850 mb, 700 mb, 500 mb, 400 mb, 300 mb and 200 mb.
If in any Meteorological Service it is not practicable to prepare charts for all of these surfaces the 850 mb, 700 mb and 500 mb surfaces are recommended. The use of auxiliary surfaces for special purposes such as aviation is permissible.

CD Washington 1947 : 168 amended by CD Paris 1951 : 26

V.4.3. The upper air analyses:

(a) In continental broadcasts SHALL include those for the 700 mb, 500 mb, and 300 mb isobaric surfaces.
(b) In sub-continental broadcasts SHALL be determined by regional decision.

V.4.4. The acceptance by any Service of responsibility for the provision of analyses to be disseminated to other Services SHALL imply no acceptance of responsibility for the accuracy of forecasts issued by other Services on the basis of such analyses. — New

V.4.5. The provision of analyses from selected centres SHALL not preclude any Service from making and using its own analyses.

V.5. Forecasts

All Members SHOULD maintain and improve the efficiency of their forecasting services: — New

(a) By the employment of competent and fully trained forecasters and auxiliary personnel;
(b) By prosecuting research work, with special attention to problems peculiar to their own territory and publishing the results;
(c) By keeping abreast of advances in forecasting made in other countries and reported in recognized scientific publications.

V.6. Warnings

(To be written by CMM, CAeM)

V.7. Daily bulletins and charts

V.7.1. Each Service SHOULD publish, with as little delay as possible, a daily bulletin including: — This replaces CD Warsaw 1935 : 107 which is out of date and unrealistic

(a) Observations made at main synoptic hours by stations in the basic synoptic network, this section may, if desired, consist simply of a reproduction of the coded reports, (a selection if the number of stations is large).
(b) Upper air observations.
(c) Ships observations (a selection if the number of reports received is large)

V.7.2. Copies of the daily bulletin SHOULD be furnished to other Services on an exchange basis.

LIST OF RECOMMENDATIONS

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L I S T O F R E C O M M E N D A T I O N S

Rec. 1 (CSM-I) - CODE FORMS FOR SURFACE REPORTS FROM LAND STATIONS (FM 11).

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that it is highly desirable to obtain wide uniformity in the basic code for surface reports from land stations;

RECOMMENDS,

(1) That the basic synoptic code form for land stations shall be :

(II)iii Nddff VVwwW PPPTT $N_hC_LhC_MC_H$

$T_dT_dj_aj_pj_p$ (7RRjj) (8$N_sCh_sh_s$) (9$S_pS_ps_ps_p$)

Note : Elements or groups in brackets are drop-out items.

(2) That the specification for j_a be as follows :

j_a - 0 - 8 designates a - the characteristic of pressure tendency during the three hours preceding the time of observation; in this case the two following figures j_pj_p give pp the value of the pressure change during the preceding three hours expressed in units and tenths of millibars.

j_a - 9 indicates that the information given under j_pj_p refers to elements included by Regional agreement; information concerning those Regional agreements will be published in Fascicule I of Publication No. 9.

Note: The intention is that Members use in all reports the same combination $j_aj_pj_p$; using either a from 0 - 8 with pp, or a = 9 with jp jp information determined by Regional agreement. A Regional Association can also decide to use app for Members whose networks lie in temperate regions and 9jpjp for Members whose networks lie in equctorial regions.

tende

2	Increasing (steadily or unsteadily)	atmospheric pressure now higher than 3 hours ago
3	Decreasing or steady, then increasing; or increasing, then increasing more rapidly	atmospheric pressure now higher than 3 hours ago
4	Steady, atmospheric pressure the same as 3 hours ago	

5	Decreasing, then increasing; atmospheric pressure the same or lower than 3 hours ago	Atmospheric pressure now lower than 3 hours ago
6	Decreasing, then steady; or decreasing then decreasing more slowly	
7	Decreasing (steadily or unsteadily)	
8	Steady or increasing, then decreasing; or decreasing, then decreasing more rapidly	

(4) That other specifications be as given in Fascicule I of Publication No. 9, with amendments adopted at the First Session of the Commission for Synoptic Meteorology;

(5) That the optional group (999II) be retained for use in collective messages;

(6) That all Members should notify the Secretary-General to which period RR refers in synoptic messages and that this information be included in Fascicule I of Publication No. 9.

Rec. 2 (CSM-I) - CODE FORM FOR PRESSURE, TEMPERATURE, HUMIDITY (AND WIND) SOUNDINGS. (FM 35 AND FM 36).

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that it is highly desirable to obtain for world-wide use an improved code for TEMP and TEMP SHIP reports;

RECOMMENDS,

(1) That the code form for TEMP reports from land stations (FM 35) be:

TEMP (II)iii	$(99P_oP_oP_o$	$T_oT_oT_{do}T_{do}T_{xo})$	
1st Section	$GGh_1h_1h_1$	$(T_1T_1T_{d1}T_{d1}T_{x1})$	(Oddff)
	$P_2P_2h_2h_2h_2$	$T_2T_2T_{d2}T_{d2}T_{x2}$	(Oddff)
	etc.		

2nd Section 55555	($00P_oP_oP_o$	$T_oT_oT_{do}T_{do}T_{xo}$)	(Oddff)	
	$h_1h_1P_1P_1P_1$	$T_1T_1T_{d1}T_{d1}T_{x1}$	(Oddff)	
	n_1n_1			
	etc.			
3rd Section 66666	$P_1P_1P_1T_1T_1$	(Oddff)		
	etc.			
4th Section 77777	$h_1h_1P_1P_1P_1$	$Od_1d_1f_1f_1$		
	$h_2h_2P_2P_2P_2$	$Od_2d_2f_2f_2$		
	etc.			
5th Section 88888	$00P_oP_oP_o$	$T_oT_oT_{do}T_{do}T_{xo}$	Oddff	
	$h_1h_1P_1P_1P_1$	$T_1T_1T_{d1}T_{d1}T_{x1}$	Oddff	
	n_1n_1			
	etc.			
6th Section 22222	22233	ChhHH	22244	$w_p$hhHH
	22255	B_1hhHH	22266	$I_i$hhHH
	22277	$w_f$hhHH		
7th Section 33333	Reserved for regional codes for the transmission of observed wind differences between selected standard levels and thickness layers.			
8th Section 44444	P_s,P_s,h_s,h_s,h_s	$Od_s,d_s,f_s,f_s,$		
	P_s,P_s,h_s,h_s,h_s	$Od_s,d_s,f_s,f_s,$	etc.	
	etc.			

(2) That the code form for TEMP SHIP reports (FM 36) be :

TEMP SHIP $YQL_aL_aL_a$ $L_oL_oL_oGG$ $(99P_oP_oP_o\ T_oT_oT_{do}T_{do}T_{xo})$

00
~~GG~~$h_1h_1h_1$ $(T_1T_1T_{d1}T_{d1}T_{x1})$ (Oddff)

$P_2P_2h_2h_2h_2$ $T_2T_2T_{d2}T_{d2}T_{x2}$ (Oddff)

etc.

Sections 2,3,4,5,6,7 and 8 are the same as in FM 35.

(3) That the following notes replace the notes to FM 35 and 36 in Fascicule I of Publication No. 9.

(a) The words TEMP or TEMP SHIP, prefixed to the reports, indicate that a message for upper air reports follows.

(b) The form of message is divided into eight sections to provide for a selection of the various sections as may be required for national or regional needs.

(c) Text of present note (4), Fascicule I, page I-A-1-27.

(d) The recommended constant pressure surfaces (levels) for which data should be transmitted in Section I are the standard reference surfaces for 1,000 mb, 850 mb, 700 mb, 500 mb, 400 mb, 300 mb and 200 mb, sometimes referred to as "mandatory levels". The code symbol of $h_1h_1h_1$ refers to the geopotential of the 1,000 mb surface.

(e) Sections 2,3,4,5,6,7 and 8 are preceded by the indicator groups 55555, 66666, 77777, 88888, 22222, 33333 and 44444, which mean that data for additional levels follow in the form given in Sections 2,3,4,5,6,7 and 8 respectively.

(f) Sections 2,3,4,5 and 8, when included in a message, should contain data for enough selected levels to provide sufficient information to plot a sounding for local forecast requirements. These levels are sometimes referred to as "significant levels".

(g) Section 2 provides an alternate choice between h_nh_n and n_nn_n of the $\begin{matrix}h_nh_n\\ n_nn_n\end{matrix}P_nP_nP_n$ group. The use of h_nh_n permits reporting the geopotentials of the selected levels. When these data are not required, the use of n_nn_n permits the identification by number of the selected levels. The code figure nn = 00 is used to refer to surface data only; the successive levels will be numbered 11, 22 - - - 99, 11, 22 - - etc.

(h) Text of present note (12), Fascicule I, page I-A-1-28.

(i) Text of present note (14), Fascicule I, page I-A-1-28.

(j) Only wind data obtained, either by visual or electronic means, from an ascent in which the pressure is observed and from which temperature and other data are computed, should be included in the message for upper air report; PILOT or wind data obtained by means other than the radiosonde ascent should not be included.

(k) Text of present note (16), Fascicule I, page I-A-1-28.

(l) The term "surface" refers to a horizontal plane whose height above MSL is the same as that of the floor of the instrument shelter. Data reported for symbols $P_oP_oP_o$, T_oT_o, $T_{do}T_{do}$ and T_{xo}, are observed with reference to this plane.

(m) Additional information for local use not reported in Section 6 may be added in accordance with national or regional needs.

(n) It may be found desirable, due to communication arrangements or for other reasons, to divide the report into two parts for transmission over national teleprinter lines. In these instances, the second transmission will be identified by the group iiiGG. The group 999II may be prefixed to collective messages when required.

(o) In any one section of the message, winds must either be included for all levels or omitted for all levels.

(p) The surface data (i.e., $99P_oP_oP_o$ $T_oT_oT_{do}T_{do}T_{xo}$ or $00P_oP_oP_o$ $T_oT_oT_{do}T_{do}T_{xo}$) shall be reported either in Section 1 or Section 2.

(q) Section 5 is used to report significant points on the wind ascent curve; i.e., the levels of wind singularity or points of inflection.

(r) Section 6 is used to report visual observations of clouds, precipitation, turbulence, icing and fog, made during aerometeorograph soundings. The groups may be repeated as many times as required. If a particular element is not observed at any time during the ascent, the indicator group and the data group are omitted from the message.

(s) Section 8 is used to report wind data at the standard pressure levels.

(t) In the event that a station shifts from its normal use of English units to Metric units (or the reverse) for a short period, the word METRES or FEET, as appropriate, will be inserted after the (II)iii group.

(4) That the following specifications will be applicable to groups and symbols used in Section 6 :

hh - Height of the lower limits of the phenomena (i.e., cloud, precipitation, turbulence, icing or haze) being reported in the group in hundreds of metres above sea level
HH - Height of the upper limits of the phenomena (i.e., cloud, precipitation, turbulence, icing or haze) being reported in the group in hundreds of metres above sea level

Cloud Groups 22233 ChhHH

22233 - Indicator group indicating that cloud information follows
C - Genus (type) of cloud penetrated by the aircraft

Precipitation Groups 22244 $w_p$hhHH

22244 - Indicator group indicating precipitation information follows
w_p - Type of precipitation falling in the flight zone

Code Figure	Meaning
0	Undefined precipitation
1	Drizzle
2	Rain
3	Snow
4	Wet snow
5	Rain showers
6	Snow showers
7	Soft hail, hail
8	Rain and thunder
9	Hail (soft hail, snow) and thunder

Turbulence Groups 22255 B_1hhHH

22255 - Indicator group indicating turbulence data follows
B_1 - Intensity of the turbulence encountered by the aircraft on the following scale :

Code Figure	Characteristic	Effect on aircraft
1	Light uneasiness of flight	Separate light jolts with pitching
2	Moderate uneasiness of flight	Rather hard and frequent rolling of the aircraft
3	Strong uneasiness of flight	Aircraft tosses
4	Very strong uneasiness of flight	Aircraft tosses 50-100 m to the side, up and down. Control of the aircraft is difficult

Icing Groups 22266 $I_i$hhHH

22266 - Indicator group indicating icing data follows
I_i - Intensity of the icing on the following scale :

Code Figure	Characteristic	Effect on aircraft
1	Light icing	No influence on flight regime
2	Average icing	Burdens the aircraft but does not impede the flight
3	Significant icing	Flight very difficult
4	Heavy icing	Flight impossible

Fog or Haze Groups 22277 $w_f$hhHH

22277 - Indicator group indicating fog or haze data follows
w_f - Character of the fog or haze :

Code Figure	Meaning
0	Light mist or light haze
1	Moderate mist or moderate haze
2	Thick mist or thick haze
3	Light fog, not increasing
4	Light fog, increasing
5	Moderate fog, decreasing
6	Moderate fog, without change
7	Moderate fog, increasing
8	Thick fog, decreasing
9	Thick fog, without change

N o t e : The increase or decrease of the fog or haze is determined by comparison of the observations made during the ascent and descent of the aircraft.

(5) That Members notify the Secretariat of the units used in their reports so that this information may be disseminated to all concerned.

* *

Cf : Res. 10 (IMC Paris 1946), Publ. OMI, No. 55
Res. 180 (CD Washington 1947), Publ. OMI, No. 71
Res. III (RC VI London 1949), Publ. OMI, No. 77

Rec. 3 (CSM-I) - SUMMARIES OF UPPER AIR OBSERVATIONS (MESRAN).

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that it is necessary to establish for world-wide use an abridged form of message for summaries of upper air reports;

RECOMMENDS that the MESRAN message shall include Section 1 of the TEMP Code from which the surface data groups ($99P_oP_oP_o \quad T_oT_oT_{do}T_{do}T_{xo}$) will be omitted and that Section 7 (indicator 33333) and Section 8 (indicator 44444) may be included.

* *

Cf : Rec. 14 (CAeM Paris 1950), Publ. OMI, No. 80
Rec. 5 (I-52) (RA VI Zurich 1952), Publ. WMO, No. 11. RP.3

Rec. 4 (CSM-I) - FORM OF MESSAGE AND SPECIFICATIONS FOR UPPER WIND REPORTS.

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that improvement and standardization of the code forms and specifications for upper wind reports is necessary;

RECOMMENDS that the code form for upper wind reports from land stations should be :

Section 1

(II)iii GGi_hDf_a Hddff ..... 9999n Hddff

Symbols are as given in Fascicule I, Publication No. 9, except as below :

D - Surface wind direction to 8 points (Code 20)
f_a - Surface wind speed in units of 10 knots or 5 metres per second. When the wind speed is 90 knots or more, or 45 metres per second or more, f_a is coded as 9
i_h - Interval indicator

0	PILOT BALLOON	Intervals of H: 1000 metres above MSL and x for intermediate 500 metre intervals	No supplementary groups
1			one " group *)
2			two " groups *)
3			three " groups *)
4		Intervals of H : 300 metres (1000 feet) above MSL	no " group
5	RADIO WIND	Intervals of H : 1000 metres above MSL and x for intermediate 500 metre intervals	no " group
6			one " group *)
7			two " groups *)
8			three " groups *)
9		Intervals of H : 300 metres (1000 feet) above MSL	no " group

*) In supplementary groups (to be inserted after the group GGi_hDf_a), H refers to levels of hundred metres above ground level.

Section 2 (Optional)

(88888 $1d_td_tf_tf_t$ $2d_td_tf_tf_t$ $3d_td_tf_tf_t$)

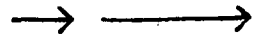
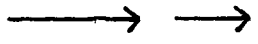
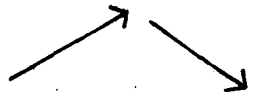
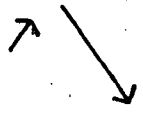
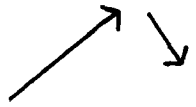
where

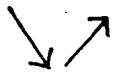
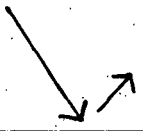
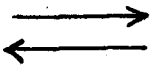
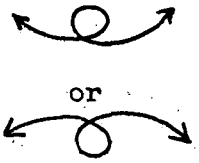
88888 - Indicator, computed wind vector differences between selected standard levels follow (i.e. higher level minus lower level)
1,2,3 - Indicators
1 - Computed wind vector difference between the 700 mb and 1000 mb levels
2 - Same between 500 mb and 1000 mb levels
3 - Same between 300 mb and 500 mb levels
d_td_t - Direction of the wind vector difference (Code 23)
f_tf_t - Speed of the wind vector difference (knots)

Section 3 (Optional)

(55555) / (66666) $H_zH_zH_zH_zZ$ ....

55555 - Indicator, data on significant point follows; heights are in tens of metres
66666 - Same, heights are in hundreds of feet
$H_zH_zH_zH_z$ - Height of significant point
Z - Character of the change of the wind in the vertical at the significant point

Code Fig.	Meaning	Graphical Descriptions
0	Wind has sharply increased in speed, no change in direction	
1	Wind has sharply decreased in speed, no change in direction	
2	Wind has shifted to right, speed has not changed	
3	Wind has shifted to right, with a sharp increase in wind speed	
4	Wind has shifted to right, with a sharp decrease in wind speed	

Code Fig.	Meaning	Graphical Descriptions
5	Wind has shifted to left, no change in wind speed	
6	Wind has shifted to left, with a sharp increase in wind speed	
7	Wind has shifted to left, with a sharp decrease in wind speed	
8	Wind has shifted almost 180° in direction	
9	Wind has described a complete loop, either to the right or to the left	

Section 4 (Optional)

44444 8ddff 7ddff 5ddff 4ddff 3ddff 2ddff

where

44444 - Indicator, PIlot SELected (PISEL) data follows
8,7,5,4,3,2 - Indicators, wind data for best approximation to the 850, 700, 500, 400, 300 and 200 mb surfaces follow

N o t e s :

(1) The use of code figures i_h = 4 and 9 is recommended when the information is needed for synoptic purposes and the needs of international aviation simultaneously.

(2) The group 9999n will not be used when i_h = 0-3 or 5-8.

(3) In Section 1, winds for levels most closely approximating the standard pressure levels should be included. The levels comprising the best approximations should be determined nationally or regionally.

(4) In computing the wind vector differences (for transmission in Section 2) from pilot balloon ascents, the heights giving the best approximation to the standard pressure levels will be used.

(5) In Section 3, criteria for wind shifts, speed changes and the thickness of the layer through which these variations occur should be determined nationally or regionally and notified to the Secretariat of the World Meteorological Organization. Criteria which have been used are 30° (or more) wind shift, a speed change of 5 metres per second or more for a thickness of 500 metres.

(6) It will be noted that it is not necessary to report winds for each 300 metre (1000 foot) level.

(7) Sections 2, 3 and 4 will be preceded by the group iiiGG when sent as a separate message. In those cases the group 99911 will be used.

(8) Retain notes (2), (3), (5) on page I-A-1-25 of Fascicule I, Publication No. 9.

(9) FM 33 is to be amended to be in harmony with the new FM 32; i.e.,
PILOT SHIP $YQL_aL_aL_a$ $L_oL_oL_oGG$ OOi_hDF_a Hddff etc.

* *

Note :

(a) The Secretariat should note that the provisions for reporting missing data (e.g. MISDA) no longer apply to FM 32 and are to be delected from Fascicule I;

(b) that the meaning of H (Publication 9, Fascicule I, page I-A-3-9 and page I-A-3-32) be replaced by the following : "Height in units of 100, 300, 500 and 1000 metres".

Rec. 5 (CSM-I) - AERONAUTICAL METEOROLOGICAL CODE FORMS AND CODES

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING,

(1) That an urgent requirement exists for the development of a more adequate and logical system of aeronautical meteorological codes and code specifications;

(2) The desirability of applying the following principles for a system of aeronautical meteorological codes :

(a) All codes used should have the same structure.

(b) To make encoding simple, and to avoid confusion in the codes, especially when groups indicating variations are included, if possible, each group should have a separate indicator *.

(c) If possible, the same groups giving the same information should have the same indicator in all codes.

*) The AERO code needs no indicators because of its extreme simplicity.

(d) The code-tables should be devised in such a way that no separate unit systems are necessary.

(e) The same code symbol should have the same specifications for all codes.

(f) All codes should be as direct reading as possible.

RECOMMENDS,

(1) That the system of aeronautical meteorological codes and the corresponding indicator terms be :

AERO - Abbreviated form of synoptic report
MMMM / BBBBB - Reports of sudden changes
TAFOR - Aerodrome (Terminal or Alternate) forecast
TAF - Abbreviated TAFOR
ROFOR - Route forecast
FIFOR - Flight forecast
ARFOR - Area forecast
HIFOR - High level forecast

(2) That the symbolic form of the aeronautical meteorological codes be :

AERO (GGgg)
(II)iii Nddff VVwwW $8N_sCh_sh_s$ $(0TTT_dT_d)$

MMMM / BBBBB $GGggw_2$
(II)iii Nddff VVwwW $8N_sCh_sh_s$ $(0TTT_dT_d)$

TAFOR $G_1G_1G_2G_2G_3$
(II)iii Nddff VVw_1w_1x $8N_sCh_sh_s$
$(7h_th_th_fh_f)$ $(6I_ch_ih_it_L)$ $(5Bh_Bh_Bt_L)$
$(4h_xh_xT_hT_h$ $3d_hd_hf_hf_h)$
$9i_3nnn$

TAF $G_1G_1G_2G_2G_3$
(II)iii Nddff VVw_1w_1x $8N_sCh_sh_s$
$9i_3nnn$

ROFOR $G_1G_1G_2G_2G_3$

iii (QL$_a$L$_a$L$_o$L$_o$) iii Oi_2zzz

(Nddff) (VVw$_1$w$_1$x) 8N$_s$Ch$_s$h$_s$

7h$_t$h$_t$h$_f$h$_f$ 6I$_c$h$_i$h$_i$t$_L$ 5Bh$_B$h$_B$t$_L$

4h$_x$h$_x$T$_h$T$_h$ 3d$_h$d$_h$f$_h$f$_h$

9i$_3$nnn etc.

FIFOR $G_dG_dG_aG_aG_3$

i$_d$i$_d$i$_d$ (QL$_a$L$_a$L$_o$L$_o$) i$_a$i$_a$i$_a$ Oi_2zzz

(Nddff) (VVw$_1$w$_1$x) 8N$_s$Ch$_s$h$_s$

7h$_t$h$_t$h$_f$h$_f$ 6I$_c$h$_i$h$_i$t$_L$ 5Bh$_B$h$_B$t$_L$

4h$_x$h$_x$T$_h$T$_h$ 3d$_h$d$_h$f$_h$f$_h$

9i$_3$nnn etc.

ARFOR $G_1G_1G_2G_2G_3$

AAAAA - (Nddff) (VVw$_1$w$_1$x) 8N$_s$Ch$_s$h$_s$

7h$_t$h$_t$h$_f$h$_f$ 6I$_c$h$_i$h$_i$t$_L$ 5Bh$_B$h$_B$t$_L$

4h$_x$h$_x$T$_h$T$_h$ 3d$_h$d$_h$f$_h$f$_h$

9i$_3$nnn etc.

HIFOR high level forecast.

N o t e s :

(a) The groups enclosed in brackets are included in the standard forms in accordance with regional, bilateral or national arrangements unless otherwise specified in the instructions for the use of the codes.

(b) A group with an indicator figure can be omitted from a particular message whenever the elements specified in the group do not exist, or are forecast not to occur, or are not required, unless otherwise specified in the instructions for the use of the codes.

(c) The groups may be repeated in accordance with the detailed instructions for each group

(d) Owing to; (i) the unavoidable limitations in the definition of some of the elements e.g., VV, $h_s h_s$, $h_t h_t$, $h_f h_f$, $h_i h_i$, $h_B h_B$, t_L, ff, $f_h f_h$, and $T_h T_h$,

(ii) the variability of these elements over very short intervals of time and space, and

(iii) the present inadequacies of forecast techniques,

the specific value of any of the above elements given in forecasts should be understood to be necessarily approximate, and the value of the element in question should accordingly be interpreted as representing the most probable mean of a range of values which the element may assume during the period of the forecast concerned and over the area or in the airspace concerned.

Similarly when the time of occurrence or of change of an element is given in a forecast (as indicated by GG and G_p) this time should be interpreted as representing the most probable mean of a range of times.

(e) The abbreviated version of the TAFOR code form, i.e., TAF, is intended to be used primarily for ground/air transmission to aircraft, but may also be used, subject to regional agreement, for ground/ground transmission.

(3) That in the aeronautical meteorological codes the following symbolic letters and their meaning be used :

GGgg	-	Hour and minutes of the time* of observation in GMT
w_2	-	Indication of the element forming the principal object of a report of deterioration or improvement of the weather (Code 93)
II	-	Block number
iii	-	International station number
N	-	The fraction of the celestial dome covered by cloud (Code 60, as amended)
dd	-	True direction, in tens of degrees, from which wind (will blow) (is blowing) (Code 23)
ff	-	Wind speed in knots
W	-	Past weather (Code 90, as amended)
ww	-	Present weather (Code 92, as amended)
VV	-	Horizontal visibility at surface (Code 84, as amended)
N_s	-	Amount of individual cloud layer or mass, of genus (type) C, (Code 60, as amended)

*) See Instructions, note 1 (paragraph 4) for specification of "times of observation".

C	-	Genus (type) of cloud (Code 10, as amended)
$h_s h_s$	-	Height** of base of cloud layer or mass whose genus (type) is indicated by C (Code 40, as amended)
TT	-	The temperature in whole degrees Celsius or Fahrenheit
$T_d T_d$	-	Dew point temperature in whole degrees Celsius or Fahrenheit
$G_1 G_1$	-	Time of commencement of period of forecast in whole hours GMT
$G_2 G_2$	-	Time of ending of period of forecast in whole hours GMT N o t e : Add 50 when period is between 25 and 48 hours after $G_1 G_1$
G_3	-	Time of chart on which forecast is based (Code 36)
$w_1 w_1$	-	Forecast weather at surface (New code has been devised)
$h_t h_t$	-	Height** of top of cloud layer or mass whose genus (type) is indicated by C (Code 40, as amended) and base by $h_s h_s$
$h_f h_f$	-	Height** of the 0°C isotherm level (Code 40, as amended)
Ic	-	Type of ice accretion (Code 44, as amended)
$h_i h_i$	-	Height** of lowest level of icing (Code 40, as amended
t_L	-	Thickness of layer (Code 83)
B	-	Turbulence (Code 05, as amended)
$h_B h_B$	-	Height** of lowest level of turbulence (Code 40, as amended)
$h_x h_x$	-	Height** to which temperature and wind refers (Code 40, as amended)
$T_h T_h$	-	Temperature in whole degrees Celsius at the height indicated by $h_x h_x$
$d_h d_h$	-	True direction, in tens of degrees, from which wind will blow at the height indicated by $h_x h_x$
$f_h f_h$	-	Wind speed in knots at the height indicated by $h_x h_x$ N o t e : For wind speeds of 100 to 199 knots inclusive, delete hundreds figure and add 50 to $d_h d_h$; when over 199 knots, $d_h d_h$ will be indicated without adding 50, $f_h f_h$ will be coded as XX and plain language will be used after the 3-group e.G. "WIND 240"
D	-	Direction whence waves are coming (Code 20)

**) Heights are above ground level in AERO, TAF and TAFOR; and above mean sea level in ROFOR, FIFOR and ARFOR.

P_w - Period of the waves (Code 69)

H_w - Mean maximum height of the waves (Code 42, as amended)

F_t - Type of front (Code 33; the note to this code is not applicable in the aeronautical meteorological codes)

L_aL_a - Latitude to the nearest whole degree

L_oL_o - Longitude to the nearest whole degree

$P_2P_2P_2$ - Atmospheric MSL pressure in millibars (hundreds, tens and units)

GG - Time in whole hours GMT

G_p - Period of time in whole hours (special code developed - see paragraph 5 to this paper)

C_2 - Probability in tens of per cent

G_dG_d - Estimated time of departure, in GMT

G_aG_a - Estimated time of arrival, in GMT

$i_di_di_d$ - Station index number of aerodrome of departure

$i_ai_ai_a$ - Station index number of aerodrome of arrival

Q - Octant of the globe (Code 70)

i_2 - Zone type indicator (Code 49, as amended)

i_3 - Supplementary phenomena indicator (Code 50, as amended)

zzz - Zone specification (Code 49, as amended)

nnn - Specifications related to supplementary phenomena (Code 50, as amended)

ZZ - Meteorological Zone numbers by 5 degrees of longitude or latitude (Code -- to be inserted as formerly appeared in the IMO Publication No. 72, 1st Ed.)

AAAAA - Area indicator

N o t e to be above list of symbols and specifications : The Secretariat should delete those symbols and specifications which will be no longer required as a result of the above changes.

(4) That in using the aeronautical meteorological codes the following instructions be taken into account :

CLARIFICATION OF "TIME OF OBSERVATION"

There are 3 basic types of surface observations for aeronautical purposes : routine, MMMM/BBBBB, and "Others". The times to be reported for each of these are :

(a) Routine - official time of observation
(b) MMMM/BBBBB - actual time of observation of the element w_2
(c) In all "Others" - actual time of observation

REPORTS AND MESSAGES :

A. AERO REPORTS

NOTES :

1. In preparing AERO reports for broadcast in collectives the following rules apply :

(a) The word AERO should only be used in the heading of the collective.

(b) The group GGgg, will always be placed in the heading of a collective, indicating the time of observation of the report placed first in the collective.

(c) If the time of observation of any following report in the collective is not more than 30 minutes before the time given by GGgg in the heading, it will not be necessary to use GGgg in any such report.

(d) If the time of observation of any following report in the collective is more than 30 minutes before the time given by GGgg in the heading, it will always be necessary to use GGgg in any such report.

2. Instructions for the group (II)iii. The group IIiii should be used :

(a) When necessary to separate sections of the collective messages for international exchange, or

(b) When necessary to provide positive identification of individual station reports.

3. The 90-99 decade in the codes for VV and $h_s h_s$ should not be used for aeronautical purposes.

4. Instructions for the group $8N_sCh_sh_s$

(a) This group may be repeated to report a number of layers of cloud. The order of reporting the groups will always be from low to high levels. The selection of layers to be reported will be made in accordance with the following requirements.

1.1 the lowest individual layer (mass) of any amount (N_s equals 1 or more)
1.2 the next higher individual layer (mass) the amount of which is greater than $N_s = 2$ (N_s equals 3 or more)
1.3 the next higher individual layer (mass) the amount of which is greater than $N_s = 4$ (N_s equals 5 or more)

N o t e : In determining the cloud amounts to be reported for individual layers or masses in the 8-group, the observer will estimate, by taking into consideration the evolution of the sky, the cloud amounts of each layer or mass at the different levels, as if no other clouds were existing. Caution should be used, however, to avoid guessing as opposed to the best scientific estimate. (This will require elaboration in national instructions).

(b) When the sky is clear (N = 0) the 8-group should not be used.

(c) When $N_s = 9$, the 8-group should read $89xh_sh_s$ where h_sh_s is the vertical visibility.

5. Plain language or Q signals may be used in connection with AERO when necessary to give a more detailed description of the weather. Samples of supplementary information which may be reported, include but are not limited to : freezing rain, ice pellets, hail, small hail, soft hail, gustiness, rain and snow mixed, sand in air, heavy dust in air, drifting snow, etc. When such supplementary information applies to conditions not occuring at the time of observation, plain language words may be preceded by the word PAST and such other additions as may be desirable to describe the exact time of occurrence, extent and direction of movement. Other information may be added when the AERO report is used for landing, such as height of tops of cloud, height of freezing level, etc.

B. MMMM / BBBBB - REPORTS

NOTES :

1. MMMM is the symbolic prefix of a message indicating a deterioration of weather conditions*, ~~or a wind shift,~~

2. BBBBB is the symbolic prefix of a message indicating an improvement of weather conditions*,

3. When a deterioration of one weather element is accompanied by an improvement in another element (e.g. lowering of clouds and an improvement in visibility) a single MMMM report will be issued.

(Reference Spec. for Met. Ser. for International Air Navs) App. I

~~*) The question of whether a change of wind should be reported as a deterioration or an improvement should be referred to CAeM.~~

4. See AERO note 2

5. See AERO note 3

6. See AERO note 4

7. See AERO note 5

N o t e : The information in Fascicule I under FM 16 governing criteria for issuing MMMM/BBBBB reports should be replaced by a cross-reference to WMO Publication No. VII/1 wherein the governing criteria are specified.

C. TAFOR MESSAGES

NOTES :

1. In preparing TAFOR messages for broadcast the word TAFOR should precede only the first of a series of such messages in a collective.

2.

(a) See AERO note 2 (a)

(b) See AERO note 2 (b)

(c) When the same forecast applies to several aerodromes, more than one iii group may be inserted in the message.

3. See AERO note 3.

4. Instructions for the group $8N_sCh_sh_s$

(a) The group will be repeated as often as necessary to forecast the general cloud distribution. The order of the 8-groups will be such that the lowest base is given first, the next higher base second, etc.

(b) In any 8-group the N_s will be the total amount of cloud that the forecaster expects to be at that level given by h_sh_s.

(c) When clear sky is forecast (N = 0), the 8-group should not be used. 8-groups should be used whenever N = 1 to 9.

(d) When in the first 8-group N_s = 9 is forecast, that 8-group should read $89xh_sh_s$ where h_sh_s is the vertical visibility.

5. Instructions for the group $7h_th_th_fh_f$

(a) When it is desired to forecast a number of layers giving both bases and tops for the layers, then the 8- and 7-groups should be used in pairs for each layer, i.e., 8-7-8-7 etc.

(b) When the 0°C isotherm is forecast but no forecast is made for top of clouds, the 7-group will have the form $7xxh_fh_f$. If two 8-groups are given but only one 0°C isotherm is forecast the order of the groups should be 8-7-8-7 as indicated in (a) and the second 7-group will be given as $7h_th_txx$. If one 8-group is forecast and two 0°C isotherms, the groups shall be given as 8-7-7 with the second 7-group given as $7xxh_fh_f$.

6. Instructions for the group $6I_ch_ih_it_L$.

(a) The group will be repeated if more than one type or more than one layer of icing is forecast.

(b) If the thickness of the layer for any one type of icing is greater than 2700m (9000 ft) the group will be repeated and the base indicated in the second group will coincide with the top of the layer as given in the preceding group.

7. Instructions for the group $5Bh_Bh_Bt_L$

(a) The rules in Note 6 applying to icing are equally applicable to turbulence.

8. Instructions for the groups $4h_xh_xT_hT_h$ $3d_hd_hf_hf_h$.

(a) These groups will always be used together and will be repeated for each level for which temperature and wind are forecast.

9. Instructions for the group $9i_3nnn$

(a) The groups $90DP_wH_w$, $91P_2P_2P_2$, $92F_tL_aL_a$, $93F_tL_oL_o$, $94F_tGG$ are always placed at the end of the relevant part of the message. The groups $92F_tL_aL_a$, $93F_tL_oL_o$, $94F_tGG$ are only used to indicate the type of front, together with the position or time of passage. The type of weather during the frontal passage will be indicated separately, e.g., by separating the forecasts into different periods, or by using the groups $96GGG_p$, $97GGG_p$ and $98GGG_p$ or by a combination of both methods.

(b) The change groups ($96GGG_p$, $97GGG_p$, $98GGG_p$) may appear after any group in the forecast to indicate that the group (s) following give changed values of the elements given in some or all of the groups preceding, in accordance with the following rules:

(i) If it is desired to indicate a change in only the Nddff group, a change group will appear between the two Nddff groups.

(ii) If it is desired to indicate a change in the second group alone, or in both the first and second groups, it will always be necessary to repeat both groups after the change group.

(iii) If it is desired to indicate a change which involves only groups with indicators, then only those groups in which changes are desired need be given after the change group.

(iv) If it is desired to indicate a change in any element in the first two groups along with changes in groups carrying indicators then it will always be necessary to include the first two groups after the change group.

(c) The group $96GGG_p$ indicates a change which may be rapid or slow according to the period given by G_p.

(d) The group $97GGG_p$ (temporary variation(s)) should be used:

(i) When the condition is not expected in each instance to last more than one hour. (If the condition is expected to last more than one hour, the group $96GGG_p$ should be used or the forecast be divided into periods).

(ii) When the condition, if expected to recur, will not, in the aggregate, cover more than 1/2 of the forecast period during which the phenomena is expected to occur, i.e., the time indicated by G_p.

(e) The group $98GGG_p$ (intermittent variations) should be used:

(i) If the variations from the mail forecast conditions are expected to be more frequent than those which would be indicated by a $97GGG_p$ group.

(f) If there is a requirement for G_p greater than GG plus nine hours, then the forecast period should be divided.

(g) The group $9999C_2$ may appear after any group in the forecast. It may be used alone or in combination with a change group. If the latter, the $9999C_2$ group should precede the change group. The group indicates the probability of the occurrence of phenomena described in the group(s) which follow, in accordance with the rules which apply to change groups.

D. ROFOR MESSAGES

NOTES :

1. The forecast conditions may be described by one of two methods;

(a) By dividing the route into sections (i_2 = 0 to 5 inclusive) and giving the detail of conditions expected during the period over the extent of each section. Five degree zones (i_2 = 5) may be combined if weather elements are sufficiently uniform.

(b) By selecting a series of points along the route (i_2 = 6 - 9 inclusive) and forecasting the conditions at these points. Sufficient points must be selected to provide an adequate sampling of the various weather and wind conditions expected along the route. The forecasts for the points will be given as if a series of TAFOR were being prepared for such points.

2. Instructions for the group $G_1G_1G_2G_2G_3$
The forecast will be considered as valid between the hours G_1G_1 and G_2G_2 at all points or in all sections along the route.

3. Instructions for route designation - groups iii ($QL_aL_aL_oL_o$) iii

(a) It is considered that II is unnecessary since ROFOR will be prepared for routes between predetermined aerodromes. The use of the three figure station number avoids confusion with groups $QL_aL_aL_oL_o$.

(b) The route to which the forecast applies will be given by the index identifiers iii of the stations at either end of the route. Where it is desirable to specify the route in greater detail group(s) $QL_aL_aL_oL_o$ should be included between the iii groups to identify a sufficient number of additional points.

(c) The forecast detail will be given starting from the aerodrome of departure indicated by the first iii.

4. The $0i_2zzz$ group will be used at the start of the forecast for each section or point.

5. The groups in brackets are optional but the group VVw_1w_1x should be included whenever any of the following phenomena are forecast:
thunderstorm, hail, dust/sand storm, freezing rain.

6. See AERO note 3

7. See TAFOR note 4

8. See TAFOR note 5

9. See TAFOR note 6

10. See TAFOR note 7

11. See TAFOR note 8

12. See TAFOR note 9

E. FIFOR MESSAGES

NOTES :

1. The forecast is a flight forecast between the aerodromes indicated by $i_di_di_d$ and $i_ai_ai_a$. Where it is desirable to specify the route in greater detail, group(s) $QL_aL_aL_oL_o$ should be included between the $i_di_di_d$ and $i_ai_ai_a$ groups to identify a sufficient number of additional points.

2. See ROFOR note 3 (a)

3. The Oi_2zzz group will be used at the start of the forecast for each section of the route.

4. See ROFOR note 5

5. See AERO note 3

6. See TAFOR note 4

7. See TAFOR note 5

8. See TAFOR note 6

9. See TAFOR note 7

10. See TAFOR note 8

11. See TAFOR note 9

F. ARFOR MESSAGES

NOTES :

1. The code to be used for AAAAA will be agreed regionally. Alternatively, plain language will be used.

2. See ROFOR note 5

3. See AERO note 3

4. See TAFOR note 4

5. See TAFOR note 5

6. See TAFOR note 6

7. See TAFOR note 7

8. See TAFOR note 8

9. See TAFOR note 9

(5) That the specifications for various code forms which are used in aeronautical meteorological codes be as follows :

Code 10

C-Genus (type) of cloud

0 - Ci
1 - Cc
2 - Cs
3 - Ac
4 - As
5 - Ns
6 - Sc
7 - St
8 - Cu
9 - Cb
X - Cloud non-visible owing to darkness, fog, duststorm, sandstorm, or other analogous phenomena

N o t e : This code specification will also be used in FM 11 (new), FM 21, FM 31, FM 35 (new), FM 36 (new), FM 411, FM 412, FM 413

Code 50

$9i_3nnn$

$90DP_wH_w$ = Direction, period, and height of waves
Note : This group can only be used in TAFOR messages for water aerodromes

$91P_2P_2P_2$ - Forecast lowest mean sea level pressure in whole millibars during the period

$92F_tL_aL_a$ - Type of front and its position (Track of aircraft approximately N-S)

$93F_tL_oL_o$ - Type of front and its position (Track of aircraft approximately E-W)

$94F_tGG$ - Type of front and time of passage

95... - Not used

$96GGG_p$ - Change beginning at GG and continuing throughout the period indicated by G_p

$97GGG_p$ - Temporary variation at GG (when $G_p = 0$) or temporary variations beginning at GG and continuing during the period given by G_p (when G_p = 1 to 9)

$98GGG_p$ - Intermittent variations beginning at GG and continuing throughout the period indicated by G_p

.9999C_2 - Probability C_2 indicated in tens of per cent. C_2 cannot exceed 5 = 50 per cent. (If the probability of occurrence of an element exceeds 50 per cent then that occurrence should be the predominant feature of the forecast)

N o t e : Local variations in ROFOR, FIFOR and ARFOR may be described, if necessary, by the following expressions:

LOC - Locally
LAN - Inland
COT - At the coast
MAR - At sea
VAL - In valleys
CIT - Near or over large towns
MON - Above high ground or mountains

Code Table for Period of Time G_p (Code --)

0 At time indicated by GG

1 Between GG and GG + 1 hour

2 Between GG and GG + 2 hours

3 Between GG and GG + 3 hours

4 Between GG and GG + 4 hours

5 Between GG and GG + 5 hours

6 Between GG and GG + 6 hours

7 Between GG and GG + 7 hours

8 Between GG and GG + 8 hours

9 Between GG and GG + 9 hours

Plain language alternative terminology for the group 9$i_3$nnn (Code 50)

90DP_wH_w - The direction, period and height of waves should be given in plain language, e.g. "WAVES FROM NE FIVE TO SEVEN SECONDS TWO METRES (SIX AND ONE-HALF FEET)"

91$P_2P_2P_2$ - QNH in whole millibars, e.g. "QNH 1002"

92$F_tL_aL_a$ - The term FRONT should be used. The type will not normally be designated. Example - "FRONT 40 N"

93$F_tL_oL_o$ - As in 3. Example - "FRONT 30 E"

94F_tGG - As in 3. Example - "FRONT 1200 GMT"

96GGG_p - The form GRADU GGG_eG_e should be used for this type of change, where G_eG_e denotes the end of the period throughout which the change will extend.
Example - "GRADU 0204" indicates a gradual change between 0200 and 0400 GMT. If the period GG to G_eG_e is one hour or less, the term RAPID may be used in place of GRADU

$97GGG_p$ - The form TEMPO GGG_eG_e should be used for this type of change, where G_eG_e denotes the end of the period throughout which the temporary change(s) may occur.
Example - "TEMPO 1521" indicates a temporary change (or changes) between 1500 and 2100 GMT

$98GGG_p$ - The form INTER GGG_eG_e should be used for this type of change, where G_eG_e denotes the end of the period throughout which the intermittent changes will occur.
Example - "INTER 0913" indicates intermittent changes between 0900 and 1300 GMT

$9999C_2$ - The form PROB C_2 (in tens of per cent) should be used for this group, e.g. "PROB 20".

N o t e : The "Instructions for the group $9i_3nnn$" appearing as note 9 under the TAFOR code apply equally to the plain language alternates.

Code 49

i_2	Zone type indicator	zzz - Zone specification	
i_2		zzz	
0	Up to the turning point indicated by the first $QL_aL_aL_oL_o$ which appears between the index numbers at the beginning of the message	000	
1	Up to latitude L_aL_a	QL_aL_a	
2	Up to longitude L_oL_o	QL_oL_o	
3	Up to station iii	iii	
4	Up to a point at a distance of nnn nautical miles from preceding point	nnn	
5	For the area indicated in 5° zone numbers	0ZZ	
6	At latitude L_aL_a	QL_aL_a	ROFOR ONLY
7	At longitude L_oL_o	QL_oL_o	
8	At station iii	iii	
9	At a point at a distance of nnn nautical miles from preceding point.	nnn	

Code 42

The following note should be added :

"In aeronautical codes only the left-hand table should be used and code figure 9 will have the meaning 4 1/2 meters (14 feet) or more".

Code 33

Amend the existing note to read:

"Preferable to use tropical section of the message in FM 61 and FM 62".

Code 05

B - Turbulence

0	None
1	Light turbulence
2	Moderate turbulence in clear air, infrequent
3	Moderate turbulence in clear air, frequent
4	Moderate turbulence in cloud, infrequent
5	Moderate turbulence in cloud, frequent
6	Severe turbulence in clear air, infrequent
7	Severe turbulence in clear air, frequent
8	Severe turbulence in cloud, infrequent
9	Severe turbulence in cloud, frequent

Code 44

I_c - Aircraft Icing

0	No icing
1	Light icing
2	Light icing in cloud
3	Light icing in precipitation
4	Moderate icing
5	Moderate icing in cloud
6	Moderate icing in precipitation
7	Severe icing
8	Severe icing in cloud
9	Severe icing in precipitation

Code 83

t_L - Thickness of layer

		approximate
0	Up to top of cloud	
1	300 metres	(1000 feet)
2	600 "	(2000 ")
3	900 "	(3000 ")
4	1200 "	(4000 ")
5	1500 "	(5000 ")
6	1800 "	(6000 ")
7	2100 "	(7000 ")
8	2400 "	(8000 ")
9	2700 "	(9000 ")

Code --

w_1w_1 - Forecast weather (to be used in aeronautical forecast codes)

00	No cloud
01	Clouds dissipating
02	State of sky unchanged
03	Clouds increasing
04	Smoke
05	Haze
06	Widespread dust in suspension
07	Dust/Sand raised by wind
08	Well developed dust devils
09	---
10	Mist
11	Shallow fog (in patches)
12	Shallow fog (continuous)
13	Lightning
14	---
15	Precipitation within sight, distant from station
16	Precipitation within sight, near to station
17	Thunder, but no precipitation
18	Squall(s)
19	Funnel cloud(s)
20-29	---
30	---
31	Slight or moderate duststorm or sandstorm
32	---
33	---
34	Severe duststorm or sandstorm
35	---
36	Slight or moderate drifting snow } low (below eye level)
37	Heavy drifting snow } low (below eye level)
38	Slight or moderate drifting snow } high (above eye level)
39	Heavy drifting snow } high (above eye level)
40	Fog at distance
41	Fog in patches
42	Fog, sky visible } thinning
43	Fog, sky invisible } thinning
44	Fog, sky visible
45	Fog, sky invisible
46	Fog, sky visible } thickening
47	Fog, sky invisible } thickening
48	Fog, depositing rime, sky visible
49	Fog, depositing rime, sky invisible

50 Drizzle, slight, intermittent
51 Drizzle, slight, continuous
52 Drizzle, moderate, intermittent
53 Drizzle, moderate, continuous
54 Drizzle, thick, intermittent
55 Drizzle, thick, continuous
56 Drizzle, slight, freezing
57 Drizzle, moderate or thick, freezing
58 Drizzle and rain, slight
59 Drizzle and rain, moderate or heavy

60 Rain, slight, intermittent
61 Rain, slight, continuous
62 Rain, moderate, intermittent
63 Rain, moderate, continuous
64 Rain, heavy, intermittent
65 Rain, heavy, continuous
66 Rain, slight, freezing
67 Rain, moderate or heavy, freezing
68 Rain or drizzle and snow, slight
69 Rain or drizzle and snow, moderate or heavy

70 Snow, slight, intermittent
71 Snow, slight, continuous
72 Snow, moderate, intermittent
73 Snow, moderate, continuous
74 Snow, ~~thick~~ heavy, intermittent
75 Snow, ~~thick~~ heavy, continuous
76 Ice needles
77 Granular snow
78 ---
79 Ice pellets

80 Rain shower(s), slight
81 Rain shower(s), moderate or heavy
82 Rain shower(s), violent
83 Shower(s) of rain and snow, slight
84 Shower(s) of rain and snow, moderate or heavy
85 Snow shower(s), light
86 Snow shower(s), moderate or heavy
87, 88 Shower(s) of soft or small hail with or without rain or rain and snow mixed — -Slight, -Moderate or heavy
89, 90 Shower(s) of hail, with or without rain or rain and snow mixed, not associated with thunder — -Slight, -Moderate or heavy
91 ---
92 ---
93 ---
94 ---

95 Thunderstorm, slight or moderate, with rain or snow
96 Thunderstorm, slight or moderate, with hail
97 Thunderstorm, heavy, with rain or snow
98 Thunderstorm combined with duststorm or sandstorm
99 Thunderstorm, heavy, with hail

Code 93

w_2 - Indication of the element forming the principal object of a report of deterioration or improvement of the weather.

0 Gusts
1 Wind (either wind direction or speed or both)
2 Visibility
3 Cloud (amount or height)
4 Precipitation
5 (Not used)
6 State of sea or of swell; i.e. Waves
7 Duststorm, sandstorm, or drifting snow
8 Thunderstorm (with or without precipitation)
9 Squall or tornado

Codes 40 and 84

CODE FIGURE	METRES	APPROX. FEET	CODE FIGURE	KM	APPROX. YARDS	APPROX. STATUTE MILES
00	< 30	< 100	00	< 0.1	< 110	< 1/16
01	30	100	01	0.1	110	1/16
02	60	200	02	0.2	220	2/16
03	90	300	03	0.3	330	3/16
04	120	400	04	0.4	440	4/16
05	150	500	05	0.5	550	5/16
⋮	⋮	⋮	⋮	⋮	⋮	⋮
50	1500	5000	50	5	5500	3 2/16
51 to 55	NOT USED		51 to 55	NOT USED		
56	1800	6000	56	6	6600	3 3/4
57	2100	7000	57	7	7700	4 3/8
⋮	⋮	⋮	⋮	⋮	⋮	⋮
78	8400	28000	78	28	30800	17 1/2
79	8700	29000	79	29	31900	18 1/8
80	9000	30000	80	30	33000	18 3/4
81	10500	35000	81	35		21 7/8
82	12000	40000	82	40		25
83	13500	45000	83	45		28 1/8
⋮	⋮	⋮	⋮	⋮		⋮
89	> 21000	> 70000	89	> 70		> 43 3/4
90 to 99	as in present code		90 to 99	as in present code		

Notes on Codes 40 and 84

1. The codes are direct reading in units of 30 m (Code 40) and 100 m (Code 84) (or in approximate foot/yard/statute mile equivalents) from 0 to 50.

2. The code figures 51 to 55 are not used.

3. For code figures 56 to 80, 50 should be subtracted and the remaining figure has the following meaning :

   3.1. In Code 40 the figure is direct reading in units of 300 m (approx. 1000 ft)

   3.2. In Code 84 the figure is direct reading in units of km (approx. 1100 yds or 5/8 statute mile)

4. For code figures 81 to 89, the code reads in increments of 1500 m (5000 ft) in Code 40 or 5 km (3 1/8 miles) in Code 84 from the values given for code figure 80.

APPENDIX

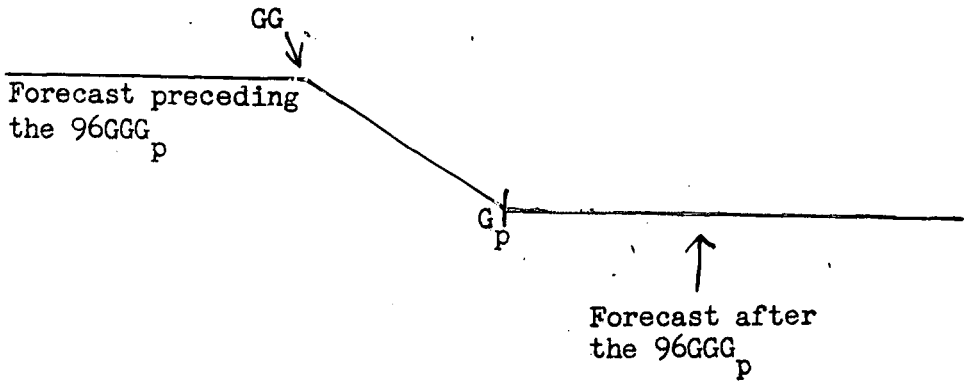
(For Reproduction in Fascicule I as Notes)

Pictorial Illustration of Variations

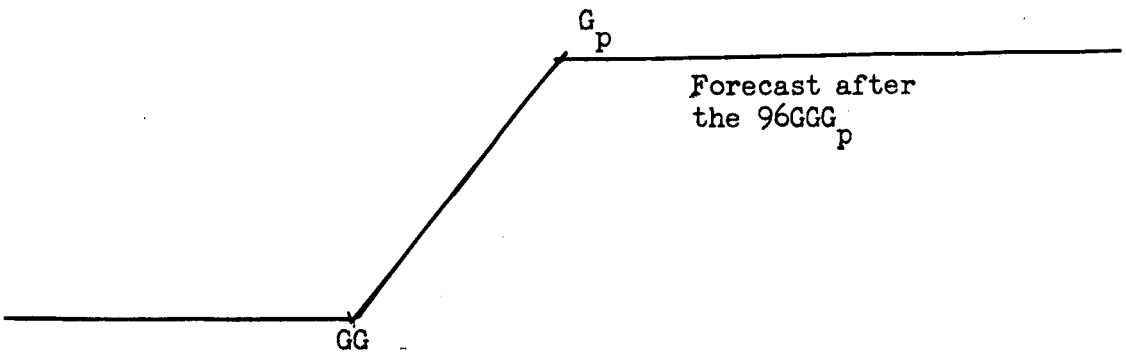
(with time as abscissa and for example with "hh" as ordinate in the diagrams)

$96GGG_p$ - (Change gradual or rapid)

Example (a)



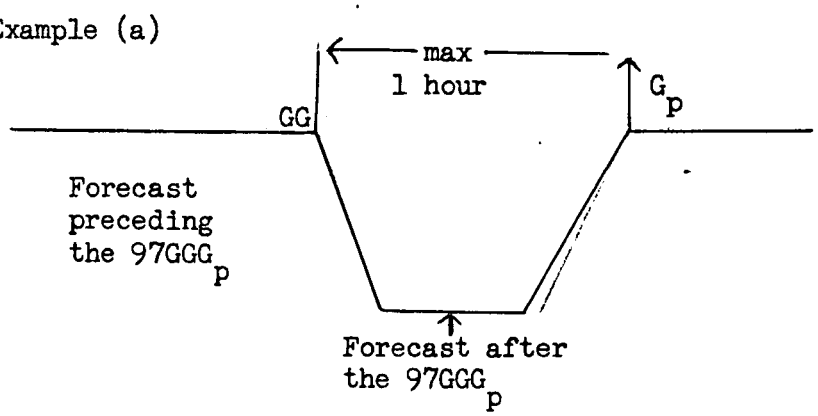
Example (b)



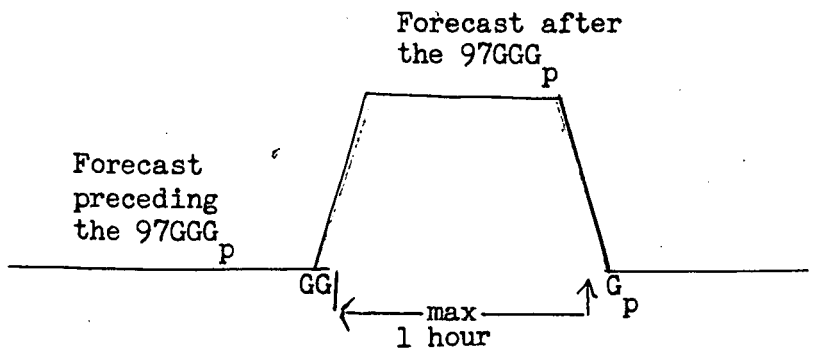
Forecast preceding the $96GGG_p$

$97GGG_p$ - (Temporary variation(s))

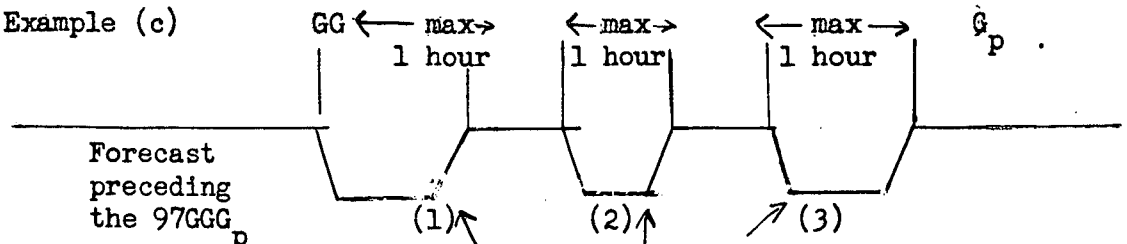
Example (a)



Example (b)

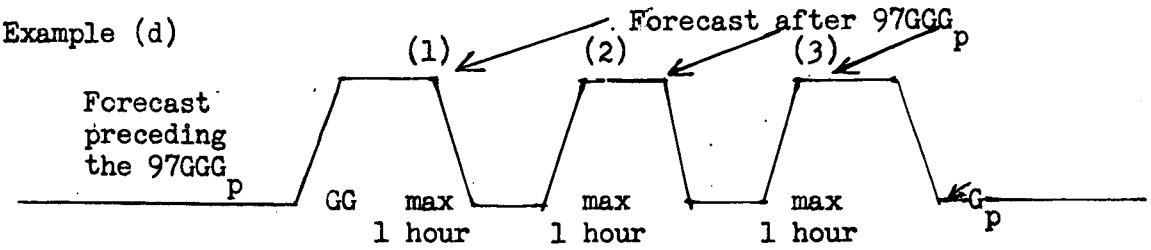


Example (c)



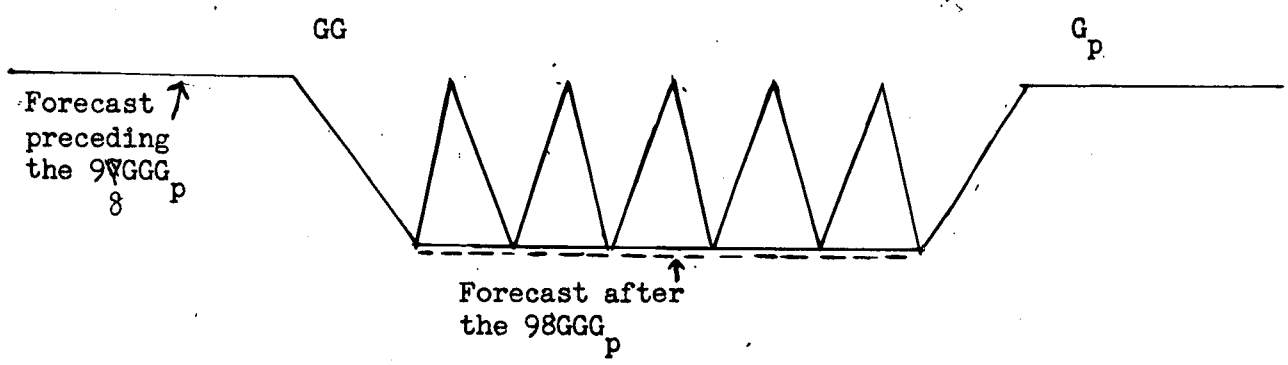
Note: 1+2+3 = cannot be more than half the time indicated by G_p

Example (d)

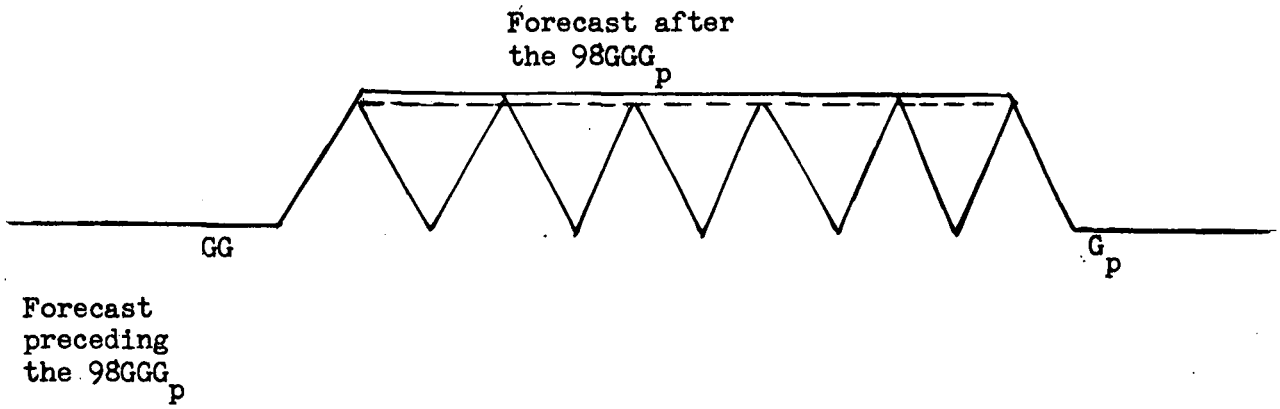


98GGG$_p$ - (Intermittent variations)

Example (a)



Example (b)



Cf : Rec. 26 (CAeM, Paris 1950), Publ. OMI No. 80

Rec. 6 (CSM-I) - CODE FORM AND CODES FOR REPORTS OF METEOROLOGICAL RECONNAISSANCE FLIGHTS

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that it is highly desirable to obtain world-wide uniformity in the code forms and specifications for reports made by meteorological reconnaissance flights;

RECOMMENDS that the reconnaissance code (FM--) as presented herein and the tables set forth as Appendix A be adopted as the international reconnaissance code form and that the existing models, CAW-C code, (FM 411, FM 412, and FM 413) be deleted from the Fascicule I of Publication No. 9.

PROPOSED RECONNAISSANCE CODE

1. Symbolic form of the Reconnaissance Code (FM --)

FM --	9xxx9	GGggi	$YQL_aL_aL_a$	$L_oL_oL_oV_EV_H$
	$hhhd_td_a$	ddfff	wmWMB	$f_cQ_NQ_EQ_SQ_W$
	$1k_nN_1N_2N_3$	ChhHH	ChhHH	ChhHH
	$2TTT_dT_d$	3jHHH	(4ddff)	$(5DFSD_K)$
	$6W_sS_sW_cD_w$	$7I_rI_tS_bS_e$	$7h_ih_iH_iH_i$	$8d_rd_rS_rO_e$
	$8w_ea_ec_ei_e$			

2. General remarks

(1) Present weather, cloud types and amounts, turbulence, and surface data will be reported for a cylindrical portion of the atmosphere approximately 30 nautical miles in radius with the aircraft being at the centre at the time of observation. Weather beyond the 30 nautical mile radius of the observation position will be reported as quadrant weather or off course weather.

(2) For use in this code a quadrant is defined as the area between 2 radii forming a 90° angle which is bisected by a cardinal direction and which begins 30 nautical miles from the centre and extends as far as the observer can see. The aircraft is always located at the centre at the time of observation.

(3) Groups not identified by group indicators are always included in the message except under special circumstances as explained herein.

(4) The self-identifying groups may be omitted from the message when data are not available or they may be repeated as required.

(5) Group within brackets (i.e., 4-and 5-indicator groups) are included in the message in accordance with regional, bilateral, or national arrangements; either group may be reported but not both in the same message.

(6) When icing is reported, two 7-groups will be used and may be repeated as necessary.

(7) When radar data is reported, two 8-groups will be used and may be repeated as necessary.

3. Symbolic letters and their meaning

9xxx9 - This group is always included in the message. When radar equipment is operating, an appropriate key group indicating RECCO report with radar data will always be included in the message even though no echoes are observed so that the recipient will know by the omission of the 8-groups that no echoes were observed (See Table 1)

GGgg - Time (GMT) of observation (hours and minutes) i.e., time the aircraft is at the observation position

i - Units index figure (See Table 2)

Y - Day of the week (Code 103)

Q - Octant of the globe (Code 70)

$L_aL_aL_a$ - Latitude (In tens, units and tenths of degrees)

$L_oL_oL_o$ - Longitude (In tens, units and tenths of degrees)

V_E - Oblique visibility (Table 3)

N o t e : Oblique visibility is defined as the horizontal distance from a point on the earth's surface immediately below the aircraft to the farthest point on the earth's surface which is visible from the aircraft.

V_H - Horizontal visibility (Table 3)

N o t e : The horizontal visibility is defined as the maximum visibility common to sectors comprising 1/2 or more of the horizontal circle on the plane of the flight level.

hhh - True altitude of aircraft in hundreds of feet or decametres

N o t e : The altitude of the aircraft is reported to the nearest hundred foot or 30 metre level.

d_t - Type of wind at flight altitude (Table 4)

d_a - Reliability of wind at flight level (Table 5)

dd - True direction, in tens of degrees, from which wind is blowing at the level given by hhh (Code 23)

fff - Wind speed at the level given by hhh in knots (direct reading)

w - Present weather (Table 6)

N o t e : w-code figure 2 is reported when the total amount of cloud above or below the aircraft is 7/8 or more.

m - Remarks on present weather (Code 55).

N o t e : The information which best amplifies the present weather reported for w will be reported for m.

W - Past weather (Table 6) (Code 90A)
N o t e : The most significant weather encountered since the last report or in the past hour, whichever time is shorter, will be reported for W.

M - Remarks on past weather (Code 55)

B - Turbulence (Code 05 as amended)

f'_c - Flight conditions (Table 7)
N o t e : f'_c - The average flight condition existing during the time required to make the flight level observation will be reported for f'_c.

Q_N - Weather in the North quadrant (Table 8)

Q_E - Weather in the East quadrant (Table 8)

Q_S - Weather in the South quadrant (Table 8)

Q_W - Weather in the West quadrant (Table 8)

k_n - Total number of cloud layers reported
N o t e : When clouds are present in indefinite layers (chaotic sky), code figure 9 will be reported for k_n. If it is impossible to determine that clouds exist (due to darkness or for other reasons) an x will be reported for k_n. When a cloud layer is present but data on the type, height, and the extent of coverage can not be observed, an x will be reported for N, C, hh and HH, as appropriate.

$N_1N_2N_3$ - Cloud amounts in layers in ascending order (Code 60 as amended)
N o t e 1: The amount of cloud reported for N_1, N_2, etc., is the amount in the individual layer as though no other cloud were present; i.e., the summation concept is not used.
N o t e 2: $1k_nN_1N_2N_3$ - If data on more than three cloud layers are reported, a second $1k_nN_1N_2N_3$ group plus the required number of ChhHH groups will be inserted in the message following the last of the first three ChhHH groups. The additional number of layers (i.e., exclusive of the first three layers) being reported will be given for k_n in the second $1k_nN_1N_2N_3$ group. The coverage of the additional cloud layer will be reported for N_1, N_2 and N_3 in the second group, as required.

C - Type of cloud (Code 10, as amended)
N o t e : The type of cloud predominating in the layer will be reported for C.

hh - Height above mean sea level of base of cloud reported by C (Code 40, as amended)

"Note 3: When code figure 9 (chaotic sky) is reported for k_n, the total amount of cloud covering the sky will be reported for N_1, and xx will be reported for N_2N_3. When x is reported for k_n, 999 will be reported for $N_1N_2N_3$."

HH - Height above mean sea level of tops of clouds reported by C (Code 40, as amended)
N o t e : hh and HH - The average height (above mean sea level) of cloud bases and tops will be reported for hh and HH, respectively.
ChhHH - This group will be included in the message for each layer of clouds reported by k_n and described by N_1, N_2, etc.

TT - The temperature in whole degrees Celsius or Fahrenheit
N o t e : Free air temperature at flight level (hhh) at the time of observation (corrected for calibration, installation, and dynamic heating effects) will be reported for TT in whole degrees Celsius.
When the temperature is below zero, 50 is added to the absolute value of the temperature and the sum is reported for TT. The hundreds figure, if any, resulting from this addition is disregarded. Code figure 99 is reserved for reporting unknown temperatures, hence, for reporting purposes a temperature of -49° C is considered to be -50° C and code figure 00 is reported for TT.

T_dT_d - Dew point-temperature in whole degrees Celsius or Fahrenheit
N o t e : T_dT_d - When the wet bulb temperature is below -35°C, 99 will be reported for T_dT_d . (See note under TT for dew point temperatures below zero).

j - Index pertaining to HHH (Table 9) (Code 52A)
HHH - Height data reported in tens, hundreds and thousand units
Example : Code 6093 metres as 609, or 18280 feet as 828.

dd - True direction in tens of degrees from which the surface wind is blowing (Code 23)
ff - Wind speed in knots of surface wind
N o t e : For wind speeds of 100 to 199 knots, inclusive, delete hundreds figure and add 50 to dd, when over 199 knots, dd will be indicated without adding 50, ff will be coded as xx and plain language will be used after the second 8-group e.g. "Wind 240".

D - Direction of surface wind (Code 20)
N o t e : The estimated direction (true) FROM which the surface wind is blowing will be reported for D.

F - Force of the surface wind (Code 30)
N o t e : F - When the surface wind exceeds Force 9, code figure 9 will be reported for F. When the actual speed exceeds Force 9, a plain language remark, inserted at the end of the flight level section of the message will give the actual Beaufort Force as GALE TEN, STORM ELEVEN, OR HURRICANE TWELVE.

S - State of sea (Code 75)

D_K - Direction of swell (Code 20)
N o t e : The true direction from which the swell is moving will be reported for D_K.

W_s - Significant weather changes (Code 95)
N o t e : Significant weather changes which have occurred since the last observation, or in the preceding hour (whichever period is shorter) along the track will be reported for W_s.

S_s - Distance of occurrence of W_s (Table 10)

W_c - Weather off course (Code 94)
N o t e : Any weather condition of importance which is not predominant and is not reported as quadrant weather, will be reported for W_c. The information reported for W_c is intended to supplement the quadrant weather.

D_w - Bearing of weather off course (Code 20)
N o t e : $4W_sS_sW_cD_w$ - Two 4-groups may be included in the message to report two significant weather changes, and/or two weather phenomena off course.

I_r - Rate of icing (Table 11)

I_t - Type of icing and contrails (Table 12)
N o t e : For this purpose a non-persistent contrail is defined as one which is 1/4 nautical mile or less in length and a persistent contrail is defined as one which is over 1/4 nautical mile in length.

S_b - Distance to beginning of icing (Table 10)
N o t e : Code figure 0 will be reported for S_b when the aircraft has completed an ascent or a descent, in which case the limits of icing will be reported in the $3h_ih_iH_iH_i$ group. Code figure 2 will be reported when the icing began at the time of observation during level flight and it will be an amplification of the wm entry in the wmWMB group.

S_e - Distance to ending of icing (Table 10)

h_ih_i - Height above mean sea level of the base of the stratum in which icing occurred (Code 40 as amended)
N o t e : When the aircraft encounters icing in level flight, the height at which icing occurred will be reported for h_ih_i.

H_iH_i - Height above mean sea level of the top of the stratum in which icing occurred (Code 4O as amended)
N o t e : H_iH_i - When the aircraft encounters icing in level flight, ~~99~~ XX will be reported for H_iH_i.

d_rd_r - Bearing of echo centre from aircraft in tens of degrees true (Code 23)

S_r - Distance to echo centre in tens of nautical miles
N o t e : When the distance to the centre of the echo is 100 nautical miles or more, 100 is subtracted from the distance and the tens value of the remainder is reported for S_r and 50 is added to the value normally reported for d_rd_r. When a line of echoes is observed, S_r is the distance to the midpoint of the line.

O_e - Orientation of ellipse (Table 13)

w_e - Ellipse width or echo diameter in tens of nautical miles

a_e - Length of major axis in tens of nautical miles

c_e - Character of echo (Table 14)
N o t e : The term solid is used when the individual echoes are not distinctly and widely separated.

i_e - Intensity of echo (Table 15).

Plain language remarks as appropriate, for example : Time of occurrence of significant weather (W_s).

Appendix A

T a b l e 1

9xxx9 - APPROPRIATE KEY GROUP

111, 222, 333	Recco report without radar data	English units - height in feet MSL Metric units - height in metres MSL Pressure (millibars)
444, 555	NOT USED	
666, 777, 888	Recco report with radar data	English units - height in feet MSL Metric units - height in metres MSL Pressure (millibars)
999	NOT USED	

Table 2

i - UNITS INDEX FIGURE

(Code 47 as amended below)

0	°C, No humidity reported
1	°C, Relative humidity
2	°C, Difference between dry bulb and wet bulb temperature
3	°C, Difference between dry bulb and dew point temperature
4	°C, Dew point
5	°F, No humidity reported
6	°F, Relative humidity
7	°F, Difference between dry bulb and wet bulb temperature
8	°F, Difference between dry bulb and dew point temperature
9	°F, Dew point

Table 3

V_E - OBLIQUE VISIBILITY
V_H - HORIZONTAL VISIBILITY

0	0 to 1/4 nautical mile
1	1/4 to 1/2 nautical mile
2	1/2 to 1 nautical mile
3	1 to 3 nautical miles
4	3 to 10 nautical miles
5	10 to 30 nautical miles
6	30 to 60 nautical miles
7	Over 60 nautical miles
8	No report due to darkness
9	No report, surface obscured

Table 4

d_t - TYPE OF WIND REPORT AT FLIGHT ALTITUDE

0 Spot wind

1 Winds averaged over 100 nautical miles preceding last fix; last fix 25 nautical miles prior to the reported position

2 Winds averaged over 200 nautical miles preceding last fix;

40-49 will be used when the obstruction to vision is predominantly water droplets.

age 197: Recommendation 39 (CSM-I):
Third line under NOTING read: Committee and has been discussed by the International Telegraph Consultative Committee.

ges 203/ Recommendation 42 (CSM-I), paragraphs (2), (3), (4), (5):
204 Replace by new pages.

Table 5

d_a - RELIABILITY OF WIND AT FLIGHT LEVEL

0 90% to 100% reliable. Multiple drift with closed wind star, or small open star when winds are 50 kts or greater. Short radar wind runs.
1 75% to 100% reliable. Multiple drift with small open star or double drift or single drift with average ground speed by timing. Short radar wind runs.
2 80% to 100% reliable. Fix to fix winds using the following pin point visual fixes, radar fixes or accurate loran fixes using good ground waves.
3 75% to 90% reliable. Fix to fix winds using two or three lines of positions (LOPs) either loran, celestial radio or sight bearings or any combination of the three above when all lines of position are considered reliable.
4 60% to 80% reliable. Winds obtained using single drift and single LOP (Speed Line), air-plot etc.
5 50% to 75% reliable. Fix to fix winds using two or three lines of position either loran, celestial, radio or sight bearings or any combination of the above when one of the lines is not considered reliable.
6 Less than 50% reliable. Winds obtained by any of the above methods which the navigator believes to be inaccurate or of questionable accuracy.
7 No reliability. Assumed or estimated winds.
8 No wind. Navigator unable to determine a wind.
9 Not used.

Table 6

(Code 90A as amended below)

w - PRESENT WEATHER
W - PAST WEATHER

0 Clear (no cloud at any level)
1 Partly cloudy (scattered or broken)
2 Continuous layer(s) of cloud(s)
3 Sandstorm, duststorm, or storm of drifting snow
4 Fog, thick dust, or haze
5 Drizzle
6 Rain
7 Snow or rain and snow mixed
8 Shower(s)
9 Thunderstorm(s)

Table 7

(Code 34A revised as indicated below)

f'_c - FLIGHT CONDITIONS

0 Total amount of cloud less than 1/8

1 Total cloud amount at least 1/8, with either 1/8 - 4/8 above or 1/8 - 4/8 below, or combinations thereof,

2 Cloud amount more than 4/8 above and 0 - 4/8 below,

3 Cloud amount 0 - 4/8 above and more than 4/8 below,

4 Cloud amount more than 4/8 above and more than 4/8 below.

9 In clouds all the time, continuous instrument flight

Table 8

Q_N - WEATHER IN THE NORTH QUADRANT
Q_E - WEATHER IN THE EAST QUADRANT
Q_S - WEATHER IN THE SOUTH QUADRANT
Q_W - WEATHER IN THE WEST QUADRANT

0 Not reported
1 No change from present weather
2 Clear
3 Scattered or broken clouds
4 Continuous layer of clouds
5 Duststorm or sandstorm
6 Fog, thick dust, or haze
7 Precipitation
8 Funnel clouds or waterspouts
9 Cb heads or thunderstorm

Table 9

(Code 52A, as amended)

j - INDEX PERTAINING TO HHH

0 Surface pressure in whole millibars. Thousands figure omitted
1 Height of 1000 mb surface in tens, hundreds and thousands metres or feet above MSL. If negative add 500
2 Height of 850 mb surface in tens, hundreds and thousands metres or feet above MSL. If negative add 500
3 Height of 700 mb surface in tens, hundreds and thousands metres or feet above MSL

4 Height of 500 mb surface in tens, hundreds and thousands metres or feet above MSL
5 Height of 300 mb surface in tens, hundreds and thousands metres or feet above MSL
6 Height of 200 mb surface in tens, hundreds and thousands metres or feet above MSL
7 Height of 100 mb surface in tens, hundreds and thousands metres or feet above MSL
8
9 True height (radio altimeter or other method) minus pressure altitude (set at 1013 mb) in tens of feet (if negative add 500 to absolute value; for example - 100 will be reported as 600).

Table 10

S_b - DISTANCE TO BEGINNING OF ICING
S_e - DISTANCE TO ENDING OF ICING
S_s - DISTANCE OF OCCURRENCE OF W_s

0 No report
1 Reported at previous position
2 Occurring at present position
3 20 nautical miles
4 40 nautical miles
5 60 nautical miles
6 80 nautical miles
7 100 nautical miles
8 150 nautical miles
9 More than 150 nautical miles

Table 11

I_r - RATE OF ICING

0 .1 in. or 2 mm
1 .1 - .2 in. or 2 - 5 mm
2 .3 - .4 in. or 6 - 10 mm
3 .5 - .6 in. or 11 - 15 mm
4 .7 - .8 in. or 16 - 20 mm
5 .9 - 1.0 in. or 21 - 25 mm
6 Over 1.0 in. or 25 mm
7 Light
8 Moderate
9 Heavy

Table 12

I_t - TYPE OF ICING AND CONTRAILS

0	None
1	Rime ice in clouds
2	Clear ice in clouds
3	Combination rime and clear ice in clouds
4	Rime ice in precipitation
5	Clear ice in precipitation
6	Combination rime and clear ice in precipitation
7	Frost (icing in clear air)
8	Non-persistent contrails
9	Persistent contrails

Table 13

O_e - ORIENTATION OF ELLIPSE

0	No report
1	NNE - SSW
2	NE - SW
3	ENE - WSW
4	E - W
5	ESE - WNW
6	SE - NW
7	SSE - NNW
8	S - N
9	Uncertain

Table 14

c_e - CHARACTER OF ECHO

0	Not reported or indeterminate
1	Scattered
2	Solid
3	Scattered line
4	Solid line
5	Scattered, all quadrants
6	Solid, all quadrants
7	
8	
9	

Table 15

i_e - INTENSITY OF ECHO

0	No report or unknown
1	Weak, decreasing
2	Weak, no change
3	Weak, increasing
4	Moderate, decreasing
5	Moderate, no change
6	Moderate, increasing
7	Strong, decreasing
8	Strong, no change
9	Strong, increasing

Appendix B

SOUNDING MESSAGES

(1) Sounding data are obtained during vertical ascents or descents of the aircraft or by releasing dropsondes from the aircraft. For transmission purposes these data may be added to the flight level message or sent as a separate message.

(2) The international form of message FM 35 (TEMP code) is used to report sounding data obtained during a vertical ascent or descent of the aircraft. A flight level observation, which contains position groups, is always taken before beginning the ascent or descent. When these data are added to the flight level message the following form is used.

..... (flight level message) 17171

$(99P_oP_oP_o \quad T_oT_oT_{do}T_{do}T_{xo}) \quad 00h_1h_1h_1 \quad (T_1T_1T_{d1}T_{d1}T_{x1})$

$P_2P_2h_2h_2h_2 \quad T_2T_2T_{d2}T_{d2}T_{x2}$ ..... etc. $55555(00P_oP_oP_o$

$T_oT_oT_{do}T_{do}T_{xo}) \quad 11P_1P_1P_1 \quad T_1T_1T_{d1}T_{d1}T_{x1} \quad 22P_2P_2P_2$

$T_2T_2T_{d2}T_{d2}T_{x2}$ ..... etc.

(3) The international form of message FM 36 (TEMP SHIP code) is used to report sounding data obtained when a dropsonde is released from the aircraft. When these data are added to the flight level message the following form is used.

..... (flight level message) 71717

$YQL_aL_aL_a$ $L_oL_oL_oGG$ $(99P_oP_oP_o$ $T_oT_oT_{do}T_{do}T_{xo})$ $GGh_1h_1h_1$

$(T_1T_1T_{d1}T_{d1}T_{x1})$ $P_2P_2h_2h_2h_2$ $T_2T_2T_{d2}T_{d2}T_{x2}$ ..... etc. 55555

$(00P_oP_oP_o$ $T_oT_oT_{do}T_{do}T_{xo})$ $11P_1P_1P_1$ $T_1T_1T_{d1}T_{d1}T_{x1}$ $22P_2P_2P_2$

$T_2T_2T_{d2}T_{d2}T_{x2}$ ..... etc.

(4) The specifications given in Fascicule I of Publication No. 9 for FM 35 and 36 are used in coding the messages.

(5) Following are general notes on the coding of sounding data obtained by aircraft :

(a) Whenever practicable extrapolated data are reported for $P_oP_oP_o$, T_oT_o, and $T_{do}T_{do}$. If extrapolated data are not available for these elements, the surface groups will be omitted from the message.

(b) If tenths values of air and dew point temperatures are not reported, a zero will be coded for T_{xo}, T_{x1}, T_{x2}, etc.

(c) Code figure 99 is reported for unknown temperatures.

(d) Missing data are reported by the appropriate number of x's.

(e) When sounding data obtained by vertical ascent or descent of the aircraft and coded in FM 35 are added to the flight level message, the time and position of ascent or descent is given in groups GGggi, $YQL_aL_aL_a$, and $L_oL_oL_oV_EV_H$ of the flight level report.

(f) The $YQL_aL_aL_a$ and $L_oL_oL_oGG$ groups in FM 36 always give the location and time (to the nearest quarter hour) the dropsonde was ejected from the aircraft.

(g) When vertical ascent or descent sounding data are sent as a separate message the first four groups of the flight level message and FM 35 are used as follows :

9xxx9 GGggi $YQL_aL_aL_a$ $L_oL_oL_oV_EV_H$ 17171 ...etc.

(h) When dropsonde data are sent in FM 36 as a separate message it is preceded by key groups 9xxx9 and 71717.

Rec. 7 (CSM-I) - CODE FORM AND CODES FOR REPORTS FROM TRANSPORT AIRCRAFT

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that the present code form for reports from transport aircraft (POMAR) needs to be revised in order to secure one uniform observing and reporting procedure to be used by aircraft, irrespective of the mode of air-to-ground communications employed, and to provide a means of coding all the elements now prescribed for routine position reports;

RECOMMENDS,

(1) That the symbolic form of the revised code for reports from transport aircraft (FM 42) shall be :

FM 42*

$I_aI_aI_aI_aI_a$ $QL_aL_aL_aL_a$ $L_oL_oL_oL_oP_d$ $YGGgg$

i_4HHHf_c $L'_aL'_aL'_aL'_oL'_o$ L'_oGGgg

$(9G_aG_ag_ag_a$ Place) $(8FFFF)$ $TTw_xI_xB_x$

$(7ddff)$ $(6L''_aL''_aL''_oL''_o)$

$(5s_tf_tf_tf_t)$ $(4/3\ H_dH_dH_dH_d)$

$(2C_eh_bh_bh_b)$ $(1C_eh_th_th_t)$ $(ODFSD_K)$

(2) That the symbolic letters and their meaning be :

$I_aI_aI_aI_aI_a$ - Aircraft identification

Q - Octant of the globe (Code 70)

$L_aL_aL_aL_a$ - Latitude (In tens and units of degrees and tens and units of minutes)

$L_oL_oL_oL_o$ - Longitude (In tens and units of degrees and tens and units of minutes)

P_d - How position determined (Code 67)

Y - Day of the week (Code 103)

GGgg - Time (GMT) of position report (hours and minutes)

*) POMAR is the approved abbreviation for FM 42; it is not employed as an indicator word in reports.

i_4 - Indicator for units system (Amended Code 51)

HHH - Indicated altitude of aircraft (hundreds of feet or decametres)

f_c - Flight conditions (Code 34 as amended)

$L'_aL'_aL'_a$ - Latitude in whole degrees and tens of minutes of the estimated next position of the aircraft

$L'_oL'_oL'_o$ - Longitude in whole degrees and tens of minutes of the estimated next position of the aircraft

GGgg - Time in hours and minutes GMT at which the aircraft is estimated at next position given by $L'_aL'_aL'_a$ - $L'_oL'_oL'_o$

$G_aG_ag_ag_a$ - Time in hours and minutes GMT of the estimated time of arrival of aircraft at destination

N o t e : This is followed by the place-name or designator of the destination.

FFFF - Endurance of aircraft

TT - Corrected air temperature in whole degrees Celsius at flight level

w_x - Present weather (New Code --)

I^x - Aircraft icing (Amended Code 45)

B_x - Turbulence (Code 05 A, as amended)

dd - True direction, in tens of degrees, from which wind is blowing at the level given by HHH (Code 23)

ff - Wind speed in knots

$L''_aL''_a$ - Latitude of the position to which the mean wind applies in whole degrees

$L''_oL''_o$ - Longitude of the position to which the mean wind applies in whole degrees

s_t - Indicator of sign (4 = plus; 3 = minus) of the equivalent tail wind given by $f_tf_tf_t$

$f_tf_tf_t$ - Equivalent tail wind in knots.

$H_dH_dH_dH_d$ - D -value

N o t e : 4 equals positive
3 equals negative

C_e - Cloud (Code 14, as amended)
$h_bh_bh_b$ - Altitude of base of cloud (C_e) in decametres or 100's of feet
$h_th_th_t$ - Altitude of tops of cloud (C_e) in decametres or 100's of feet

D - Direction of surface wind (Code 20)
F - Force of surface wind (Code 30)
S - State of sea (Code 75)
D_K - Direction of swell (Code 20)

N o t e s :

(1) The first 7 groups of the POMAR report constitute Section 1 (Position Report) and are mandatory, except that $L'_aL'_aL'_aL'_oL'_o$ and L'_oGGgg may be replaced by the place and time in plain language. The groups with indicators 9 and 8 constitute Section 2 (operational information) and are included only when specifically required by the competent aeronautical or operational authority. (Sections 1 and 2 are subject to modification by the International Civil Aviation Organization)
Section 3 constitutes the meteorological portion of the POMAR report and is included as required by the provisions of WMO Publication No. VII/1 and the ICAO Consolidated Regional Supplementary Procedures.

(2) In Section 3, the group $TTw_xI_xB_x$ is mandatory, x being inserted for any of the elements w_x, I_x and B_x when that element is not observed. The remaining groups are drop-out groups, included or omitted from the report in accordance with the instructions given in WMO Publication No. VII/1 and the ICAO Consolidated Regional Supplementary Procedures. In the groups $2C_eh_bh_bh_b$ and $1C_eh_th_th_t$ $h_bh_bh_b$ and $h_th_th_t$ should be reported as xxx when C_e is reported but the corresponding height cannot be given.

(3) Remarks may be added in plain language at the end of any report to amplify the information given in the coded sections of the report.

(4) Section 2 of POMAR reports, may be omitted in ground-to-ground retransmissions for meteorological purposes, provided the necessary amendment of i_4 is made.

(3) That the code specifications be amended as follows :

Delete g_w in Code 38.

Amend code for i_4 (Code 51) to read :

0 Altitude in English units; Section 2 follows Section 1
1 Altitude in English units; Section 3 follows Section 1
2 Flight level in English units; Section 2 follows Section 1
3 Flight level in English units; Section 3 follows Section 1
5 Altitude in metric units; Section 2 follows Section 1
6 Altitude in metric units; Section 3 follows Section 1
7 Flight level in metric units; Section 2 follows Section 1
8 Flight level in metric units; Section 3 follows Section 1

Amend code for I_x (Code 45) to read :

I_x - Aircraft icing

1 Light
2 Moderate
3 Severe

Amend code for C_e (Code 14) to read :

C_e - Cloud

1 Mainly stratiform - scattered
2 Mainly stratiform - broken
3 Mainly stratiform - continuous
4 Mainly cumuliform - scattered
5 Mainly cumuliform - broken
6 Mainly cumuliform - continuous
7, 8, 9 Towering Cu or Cb with extensive vertical development - scattered / - broken / - continuous

Insert new code for B_x (Code 05A, as amended) :

B_x - Turbulence

1 Light
2 Moderate
3 Severe

Insert new code for w_x

w_x - Present weather

5 Freezing rain
6 Rain
7 Snow
8 Hail
9 Thunderstorm

Amend code for f_c (Code 34) to read :

f_c -	Flight conditions
0	No cloud
1	Below cloud
2	On top
3	Between layers
4	In and out of cloud
5	In cloud

(4) That the date of introduction of the revised POMAR code should be the same as that on which the AIREP code will be introduced.

Rec. 8 (CSM-I) - METEOROLOGICAL REPORTS FROM LIGHT-VESSELS

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that at present various practices exist for reporting meteorological observations from light-vessels and ships;

RECOMMENDS,

(1) That those Members which consider light-vessels in the same category as land stations shall use land code forms with index numbers to be published in Volume A of Publication No. 9. The reports shall be included in land report collectives;

(2) That those Members which consider light-vessels in the category of ships shall use ship code forms and include the reports in ship collectives;

(3) That group (7RRjj) (in brackets) be added to FM 21;

(4) That note (7) on page I-A-1-16 of Fascicule I of Publication No. 9 be cancelled;

(5) That on page I-A-1-17 of Fascicule I of Publication No. 9 under FM 15 a new note (6) be inserted to read :

"National Services may require reports from light-vessels in the AERO form with special groups added (e.g. AERO form with group $3TTT_ST_S$)
In these cases each special group must have an indicator figure and the reports are not to be included in international exchanges".

(6) That on page I-A-1-23 of Fascicule I of Publication No. 9 under FM 21 a new note (14) be inserted to read :

"If the groups $N_hC_LhC_MC_H$ and $D_sv_s$app are not reported, 60 should be added to GG".

* *

Cf: (1) Res. 161, Note (g), (CD Washington 1947), Publ. OMI No. 71
(2) Res. 4 (CMM-1) (London 1952), Publ. WMO No. 10. RP.2

Rec. 9 (CSM-I) - REPORTS OF ATMOSPHERICS

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING the requirements for standard international codes and specifications for reporting "atmospherics";

RECOMMENDS,

(a) That the forms of message given below be used for international transmissions of "atmospherics" data :

(1) Code used for synoptic reports of "atmospherics" bearings :

SFAZI (999II) iiiGG

$F_1I_jD_1D_1D_1$ $F_2I_jD_2D_2D_2$

(2) Code used for detailed reports of the distribution of "atmospherics" by bearings for the preceding 24 hours (to be issued once daily) :

SFAZU IIiii $YG_1G_1G_2G_2$

999NI $g_1g_1D'_1D'_1D'_1$ $g_2g_2D'_2D'_2D'_2$

999NI $g_1g_1D'_1D'_1D'_1$ $g_2g_2D'_2D'_2D'_2$ etc.

(3) Code used for synoptic reports of "atmospherics" geographical locations :

SFLOC (66600) $GGx_4a_iA_i$ $L_aL_aL_oL_ok$ .....

(66655) $99x_4a_iA_i$ $L_aL_aL_oL_ok$ .....

(b) Symbols and specifications be as given in Publication No. 9, Fascicule I, with the addition of the following :

F_1, F_2, etc. - Intensity of points

1	dot	weak
2	dots and dashes	
3	dashes	
4	dots	moderate
5	dots and dashes	
6	dashes	
7	dots	strong
8	dots and dashes	
9	dashes	

I_j - Density of points

0	1, 2 or 3 dots	
1	Weak	spread of source 10° or less
2	Moderate	
3	Strong	
4	Weak	spread of source 10° to 20°
5	Moderate	
6	Strong	
7	Weak	spread of source 20° to 40°
8	Moderate	
9	Strong	

$D_1D_1D_1$, $D_2D_2D_2$, etc. - Direction in degrees of source (centre axis recorded to ± 1°).
$D'_1D'_1D'_1$, $D'_2D'_2D'_2$, etc. - Direction in degrees of the axis of the centre corresponding to g_1g_1, g_2g_2, etc.

G_1G_1 - Start of recording to nearest whole hour GMT

G_2G_2 - End of recording to nearest whole hour GMT

N - Number of centre

I - Density of points

1	Low
2	Medium
3	High

g_1g_1 - Time of appearance of centre to nearest whole hour GMT

g_2g_2 - Time of disappearance of centre to nearest whole hour GMT

(66600) - Indicator, location made by CRDF
(66655) - Indicator, location by narrow sector

x_4 - Hemisphere indicator :

0 Northern hemisphere
1 Southern hemisphere

a_i - Distribution of "atmospherics"

2 No "atmospherics"
0 Isolated point of activity
4 Sources of "atmospherics" activity located in the area enclosed by lines joining successive points $L_aL_aL_oL_ok$
6 Origin of "atmospherics" activity approximating a line joining successive points $L_aL_aL_oL_ok$
9 No report due to technical reasons

A_i - Repetition rate of "atmospherics"

0 Isolated point of activity
1 Low
3 Medium
5 High
7 Very high
9 No assessment

99 - Indicator, data on another source of "atmospherics" follow

(c) That stations should be grouped into appropriate networks, each network with a co-ordinating centre, by arrangements among the Members concerned;

(d) That reports should refer to observation periods terminating at the hours 00, 03, 06, 09, 12, 15, 18 and 21 GMT, and that data should be transmitted for as many of these periods as possible, in addition to any daily summary;

(e) That all Members making "atmospherics" observations should transmit their reports promptly; those in the SFAZI and SFLOC form should in no case be transmitted later than three hours after the time to which the observations refer.

* *

Cf: (1) Res. 22 (1-52) (RA VI Zurich 1952), Publ. WMO No. 11, RP. 3
(2) Report of Working Group on Radio-Electric Meteorology of CAe, Zurich, 1953.

Rec.10 (CSM-I) - INTERNATIONAL ANALYSIS CODE

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that there exists a need for coding prognostic analyses in code form FM 62 - IAC-FLEET,

RECOMMENDS,

(1) That FM 62 - IAC-FLEET be amended by adding the sections of FM 61 for coding prognostic analyses in the following form :

65556 33388 $0YYG_oG_o$ $000G_pG_p$

Cf: (1) Res. 156 (CD Washington 1947), Publ. OMI No. 71
(2) Res. 5 (CMM-I) (London 1952), Publ. WMO No. 10.RP. 2.

Rec.11 (CSM-I) - DATE OF INTRODUCTION OF NEW FORMS OF MESSAGE

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING,

(1) That there is an urgent aeronautical requirement for the introduction of the new forecast codes and instructions at the earliest possible time;

(2) That the observing and forecast codes are so closely linked together that, in order to cause the least disruption throughout the meteorological world, all the new codes and specifications should be introduced at the same time;

(3) That time will be required to prepare and distribute instructions, to train observers, and to complete other arrangements;

RECOMMENDS,

(1) That the new POMAR code should be introduced on a date to be co-ordinated between the International Civil Aviation Organization and the World Meteorological Organization;

(2) That any Member desiring to introduce the new RECCO code experimentally before the date of introduction of the basic codes give adequate advance notice to the Secretariat of the World Meteorological Organization so that Members concerned may be informed, and provide decode material for the use of all Services receiving the reports;

(3) That in view of the difficulties many Services will experience in introducing the new code forms and code specifications (except for POMAR and RECCO), it seems likely that January 1, 1955 (Standard time of observation 00.00 GMT) will be the earliest date practicable.

Rec.12 (CSM-I) - "OBSERVATIONS PARTICULIERES"

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that there is no further requirement for the code forms for "observations particulières";

RECOMMENDS that the code forms for "observations particulières" be cancelled.

* *

Cf: Rec. 27.2.6 (CAeM Paris 1950), Publ. OMI No. 80.

Rec.13 (CSM-I) - DEFINITIONS RELATING TO TIMES OF OBSERVATION

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that there is a need to establish consistent definitions of times of observations;

RECOMMENDS,

(1) That the following definitions relating to times of observation be adopted :

(a) Actual time of observation

(i) In case of a surface observation, the actual time of observation will be the time at which the barometer is read.

(ii) In the case of AERO observations, the actual time of observation is the time when the observing of all elements required is completed. Each national Service may decide the sequence of observing the elements appropriate to particular situations.

(iii) In the case of upper air observations, the actual time of observation is the time at which the balloon or rocket is actually released, or the time at which the aeroplane actually takes off from the ground.

(iv) In the case of an aircraft report, the actual time of observation is the time the observing of all elements is completed.

(v) The foregoing definitions do not preclude the use of the term "actual time of observation" with specific reference to an individual meteorological element but in such cases the individual meteorological element involved must be specifically named, e.g., "actual time of observation of maximum temperature".

(b) Standard time of observation

The term "standard time of observation" will mean the internationally agreed time as contained in resolutions of the World Meteorological Organization.

(c) Official time of observation

This will be the official time, as laid down by the Meteorological Service concerned. It is understood that this time will be as close as practicable to the standard time, but may deviate from the standard time for a variety of reasons.

(d) Filing time of meteorological report

Once the observation is completed it is put in a form for transmission, at which time it becomes a weather report. The report may be in the form of figure-groups, plain language or any other form approved for transmission. The time that this weather report is delivered to the communicator is the "filing time" of the weather report.

(e) Scheduled time of transmission of meteorological report

This is the advertised time at which the weather report will be transmitted on a communications system.

(f) Actual time of transmission of meteorological report

This is the time that the weather report is actually transmitted over a communications system.

(2) That, as a general principle, the estimation or measurement of the elements comprising a surface synoptic observation or AERO should be made in as short a period of time as possible. Any detailed calculations or observational routines associated with but not required to complete the SYNOP, SHIP or AERO report should be carried out subsequently or previously.

Rec.14 (CSM-I) - TIME OF INTERMEDIATE SYNOPTIC OBSERVATIONS

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING the need felt, in certain countries, for more frequent intermediate surface charts for aeronautical forecasting purposes,

RECOMMENDS,

(1) That intermediate observations may be taken at the following standard times :

(a) 0300, 0900, 1500 and 2100 GMT, or
(b) 0200, 0400, 0800, 1000, 1400, 1600, 2000 and 2200 GMT.

(2) That preference should be given to the standard times 0300, 0900, 1500 and 2100 GMT.

* *

Cf: Res. 18 (IMC Paris 1946).

Rec.15 (CSM-I) - SPECIFICATIONS FOR VARIOUS CODES

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that the specifications for various code need clarification and improvement in order to obtain world-wide uniformity,

RECOMMENDS,

(1) That

(a) h and N_h in the group $N_hC_LhC_MC_H$ shall also be used with reference to C_M regardless of the height of the clouds C_M, in cases where no C_L clouds exist.

(b) In cases where C_L indicates clouds at various levels,

(i) The fraction of the celestial dome covered by the cloud reported for C_L should be reported for N_h,

(ii) The height of the lowest cloud should be reported for h.

Cf: Rec. 27 (CAeM Paris 1950).

(2) That the following specifications for D_s and $\ddot{v}_s$ be adopted.

D_s Ships' course (true) made good during the 3 hours preceding the time of observation

v_s Ships' average speed made good during the 3 hours preceding the time of observation.

Cf: Res. 6 (CMM-I) (London 1952).

(3) That the code table for E, state of ground, should read :

0 Surface of ground dry (no appreciable amount of dust or loose sand)
1 Surface of ground moist
2 Surface of ground wet (standing water in small or large pools on surface)
3 Surface of ground frozen
4 Glaze on ground, but no snow or melting snow
5 Ice, snow or melting snow covering less than one-half of ground
6 Ice, snow or melting snow covering more than one-half of ground (but not completely)
7 Ice, snow or melting snow covering ground completely
8 Loose dry snow, dust or sand, covering more than one-half of ground (but not completely)
9 Loose dry snow, dust or sand covering ground completely

N o t e s :

(a) Where dust or sand is reported and the temperature is below 0°C, the word DUST or SAND will be added at the end of the message.

(b) The definitions in the code for E for numbers 0 to 3 apply to representative bare ground and numbers 4 to 9 to an open representative area.

(c) In all instances the highest code figures applicable will be reported.

Cf: Res. 113 (CD Washington 1947).

(4) That the following specifications for H'H' be adopted.

(a) H'H' altitude of the upper surface of clouds reported by C' in hectometres.
H'H'= 98 The upper surface of clouds is at altitude 9800 m or higher.
H'H'= 99 Station in cloud.

(b) That the MONT - Code be not used for clouds of which the bases are above the mountain station.

Cf: Rec. 12 (I-52) (RA-VI Zurich 1952).

(5) That with respect to the monthly mean pressure at surface stations, i.e. PP in CLIMAT and CLIMAT SHIP.

(a) For zones between latitude 20°N and 20°S, the pressure be given in units and tenths of millibars;

(b) For the other zones, the pressure be given in tens and units of millibars.

Cf: (1) Res. 71 (CD Washington 1947)
(2) Rec. XII (RC-II New Delhi 1948).

(6) That in certain Code Specifications for direction and bearing, the code figures 0, 00, 000, 9, 99, 999 have the meanings indicated in the following table.

Symbol	Code figure 0, 00, 000	Code figure 9, 99, 999
D (wind)	calm	variable
D (waves)	calm	confused
D_c	-	in all directions
D_K	calm	confused
D_s	stationary	unknown
D_w	-	in all directions
D_l	at the station	-
D_i	no limit can be stated	ice limit in several directions
dd	calm	variable
$d_r d_r$	-	in all directions
$d_s d_s$	calm (no motion)	unknown

Symbol	Code figure 0, 00, 000	Code figure 9, 99, 999
d_0d_c d_1d_1 ... d_nd_n	calm	variable
d_wd_w	calm (no waves)	99 (and 49) confused direction indeterminate
$d_0d_0d_0$ $d_1d_1d_1$ ... $d_nd_nd_n$	calm	variable

Cf: (1) Res. 27 (CD Paris 1951)
(2) Res. 27 (CAeM Paris 1950).

(7) That note 4) on page I-A-3-57, Fascicule I, Publication No. 9, be amended to read :

"If, using the principle of note 2), more than one code figure may be given to W, with regard to the past weather, the higher code figure should be reported".

(8) That wherever the word "Sleet" appears in Fascicule I of Publication 9, it should be replaced by the words "rain and snow mixed".

Cf: Rec. 27 (CAeM Paris 1950).

(9) That the following modified specifications be adopted for past weather (W) and present weather (w) in Code 90.

0 Cloud covering 1/2 or less of the sky throughout the appropriate period
1 Cloud covering more than 1/2 the sky during part of the appropriate period and covering 1/2 or less during part of the period
2 Cloud covering more than 1/2 of the sky throughout the appropriate period
3 Sandstorm, duststorm or drifting snow
4 Fog or thick haze
5 Drizzle
6 Rain
7 Snow, or rain and snow mixed
8 Shower(s)
9 Thunderstorm(s) with or without precipitation

Cf: Rec. 27 (CAeM Paris 1950).

(10) That

(a) The note 3) under P_w (Fascicule I, Publication 9, page I-A-3-41) be deleted;

(b) The note 8) under FM 21 (Fascicule I, Publication 9, page I-A-1-22) be replaced by the following : "It will be noted that the wave group ($1d_wd_wP_wH_w$) is optional. Members may instruct individual ships not to include this group. When wave observations are to be reported and more than one wave system is present, two or more ($1d_wd_wP_wH_w$)groups should be included in the message.

Cf: Rec. 12 (CMM-I) (London 1952).

(11) That certain specifications in Code 92 (ww - Present weather) be amended to read as follows :

05 Haze
14 Precipitation within sight, not reaching the ground or the surface of the sea
15 Precipitation within sight, reaching the ground or the surface of the sea, but distant (i.e., estimated to be more than 5 km) from the station
16 Precipitation within sight, reaching the ground or the surface of the sea, near to, but not at station

Cf: Rec. 2 (RC-VI London 1949).

(12) That the following additional notes be included under "ww - Present weather", page I-A-3-58, Fascicule I, Publication No. 9 :

(a) In coding 01, 02 and 03, there is no limitation on the magnitude of the change of the cloud amount. ww = 00, 01 and 02 can each be used when the sky is clear at the time of observation. In this case the following interpretations of the specifications will apply :
00 is used when the preceding conditions are not known,
01 is used when the clouds have dissolved during the past hour,
02 is used when the sky has been continuously clear during the past hour;

(b) The specifications for code figures 04, 05, and 06 do not require visibility restrictions.

(c) The code figure 05 will be used when the obstruction to vision consists predominantly of lithometeors.

(d) There is no need for international visibility restrictions for the specifications for ww = 07 and 09. National instructions will be used to indicate how these specifications will be reported.

(e) The visibility restriction on ww = 10 should be 1000 m or more. The specification refers only to water droplets.

(f): In case ww = 11 or 12 the apparent visibility will be less than 1000 m. = 11

(g): In case ww = 28 visibility should have been less than 1000 m.; the specification only refers to visibility restrictions which occurred as a result of water droplets. 1d

confined to heights below eye level, and code figures 38 and 39 should be reported when the drifting extends above eye level.

(i) With regard to ww = 36, 37, 38 and 39, the necessary uniformity in reporting these figures which may be desirable within certain regions can be obtained by national instructions, and it is not necessary to specify international visibility limits in these specifications.

(j): A visibility restriction "less than 1000 m." should be applied to ww = 41-49. In case ww = 40 the apparent visibility in the fog patch or bank will be less than 1000 m. 40-49 will be used when the obstruction to vision is predominantly water droplets.

ww table means "at the point where the observation is normally taken".

Cf: Rec. 27 (CAeM Paris 1950).

(13) That certain specifications in the French text of Code 92 (ww - Present weather) be amended to read as follows :

(a) ww = 08 - Tourbillon de sable caractérisé, observé durant l'heure précédente au point d'observation ou à ses alentours, mais pas de tempête de poussière ou de sable

ww = 09 - Tempête de poussière ou de sable observée au moment de l'observation en vue du point d'observation, ou à ce point pendant l'heure précédente

(b) The note at the left of code figures 04-09 to read : "Brume sèche, poussière, sable ou fumée".

(14) That

(a) The specification for code figure 1 in Code 19 (c_2 - Description of kind of ice) be amended to read as follows :

1 New ice

(b) The following note be added to Code 19 :

"Note: The term jamming means that the ice is being squeezed or crowded together into a compact mass".

Cf: Rec. 1 (CMM London 1952).

(15) That the meaning of the symbol 'N' in Code 60 be changed to :

N - The fraction of the celestial dome covered by cloud

(16) That the table of Code 60 be changed to read :

Code Figure

0	0	0
1	1/10 or less, but not zero	1 okta or less, but not zero
2	2/10 - 3/10	2 oktas
3	4/10	3 oktas
4	5/10	4 oktas
5	6/10	5 oktas
6	7/10 and 8/10	6 oktas
7	9/10 or more, but not 10/10	7 oktas or more, but not 8 oktas
8	10/10	8 oktas
9	Sky obscured, or cloud amount cannot be estimated	

(17) That the following changes be made with respect to N and the notes thereunder on page I-A-3-39 of Fascicule I, Publication No. 9 :

(1) Delete the present meaning for N and insert: "The fraction of the celestial dome covered by cloud".

(2) Amend note 1) to read as follows: "This symbol gives the fraction of the celestial dome covered by clouds, irrespective of their Genus (type)".

(3) Delete note 2) and replace by the following :

"In all codes reporting meteorological observations, N is to be reported as actually seen by the observer during the observation".

(4) Delete the present note 3).

(5) Amend note 4) to read as follows :

"With a mackerel sky (Ac or Sc translucidus), breaks between the cloud elements always exist. Even if these clouds extend over the whole celestial dome, the total amount could be reported by N = 7 or less".

(6) Amend the first sentence of note 5) to read as follows :

"If blue sky or stars are seen through the existing fog or mist, without any trace of cloud above the fog or mist, N is reported as 0".

Cf: Rec. 27 (CAeM Paris 1950).

(18) That the following note be added under FM 11, pages I-A-1-16 and I-A-1-17, Fascicule I, Publication No. 9 :

"When the 8-group is included in the SYNOP code, the rules for the use of the 8-group in FM 15 shall apply and shall specify minimum requirements".

Cf: (1) Rec. 8 (1-52) (RA VI Zürich 1952)
(2) Rec. 26 (CAeM Paris 1950).

(19) That the following note be included under C Genus (type) of cloud (Code 10), page I-A-3-21, Fascicule I, Publication No. 9 :

"A layer of clouds exists when N, N_s, etc. = 1 or more".

Cf: Rec. 2 (RC-VI London 1949).

(20) That, in reporting visibility at sea, (Code 84: VV - Horizontal visibility) only the decade 90-99 should be used in reports of merchant ships. Ocean weather ships should report in the full VV code.

Cf: Res. 12 (CMM-I) (London 1952).

(21) That the following coding procedures for hh and VV apply :

The Tables for hh and VV are to be considered as a coding device in which certain code figures are assigned values. These are discrete values (not ranges, with the exception of hh 90-99 where ranges are specified). Any observation or forecast of values to be coded in the tables for hh and VV should be made without regard to the table. The coding is then accomplished according to the following rule:

"If the observed or forecast visibility (height) is between two of the reportable distances (heights) as given in the table, the code figure for the lower reportable distance (height) will be reported",

except for the hh 90-99; in this decade, a height exactly equal to one of the heights at the ends of the ranges will be coded in the higher range, e.g., a height of 600 m will be reported by code figure 95.

Cf: Rec. 27 (CAeM Paris 1950);

(22) That note 1) under "W Past weather" on page I-A-3-57, Fascicule I, Publication No. 9 be amended by adding the following :

"2 hours for intermediate observations if taken every two hours".

Rec.16 (CSM-I) - HEIGHT OF WAVES

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING,

(1) That the present height equivalents in feet and metres can lead to different descriptive terms for the same wave height in weather bulletins;

(2) That the code table for S - State of sea, should correspond to the descriptive terms for wave height;

RECOMMENDS,

(1) That the following table define height of waves for various terms used in providing weather information and forecasts to mariners :

Term	Mean maximum height, metres	Mean maximum height, feet
Calm glassy	0	0
Rippled	0-1/4	0-1
Smooth	1/4-1/2	1-2
Slight	1/2-1 1/4	2-4
Moderate	1 1/4-2 1/2	4-8

Term	Mean maximum height, metres	Mean maximum height, feet
Rough	2 1/2-4	8-13
Very rough	4-6	13-20
High	6-9	20-30
Very high	9-14	30-45
Phenomenal	Over 14	Over 45

(2) That the code table for S - State of sea (Code 75, Fascicule I, Publication No. 9) should read as follows :

Code Figure S	Mean maximum height of sea waves, metres	Mean maximum height of sea waves, feet (approximately)
0 Calm (glassy)	0	(0)
1 Calm (rippled)	0-1/4	(0-1)
2 Smooth (wavelets)	1/4-1/2	(1-2)
3 Slight	1/2-1 1/4	(2-4)
4 Moderate	1 1/4-2 1/2	(4-8)
5 Rough	2 1/2-4	(8-13)
6 Very rough	4-6	(13-20)
7 High	6-9	(20-30)
8 Very high *)	9-14	(30-45)
9 Phenomenal	Over 14	(Over 45)

*) As might exist at the centre of a hurricane.

N o t e : The exact bounding height should be included in the lower category, e.g., a height of 4 metres should be coded as 5.

* *

Cf: (1) Res. 64 (CD Washington 1947), Publ. OMI No. 71
(2) Res. 9 (CMM London 1952), Publ. WMO No. 10.RP.2.

Rec.17 (CSM-I) - CODING OF TEMPERATURE VALUES

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that coding of temperature in uniform specifications is highly desirable;

RECOMMENDS,

(1) That degrees Celsius be used for coding temperatures in all upper air reports;

(2) That in coding temperatures of surface reports for international exchange of information, degrees Celsius be accepted in principle;

(3) That in view of the fact that a changeover from Fahrenheit to Celsius may involve great difficulties for certain Members, the realization of (2) can be postponed for such a period of time as would enable those Members to prepare for a smooth transition;

(4) That the matter of coding temperatures in units of half degrees Celsius in surface reports be further studied and that it be discussed by the Commission for Synoptic Meteorology when, for the purpose of fixing the date of the world-wide introduction of degrees Celsius for international exchange of surface data, temperature scales are again under consideration.

(5) It is hoped that the discussion, mentioned under (4), can be accomplished at the next session of the Commission for Synoptic Meteorology.

* *

Cf: Res. 101 and 183 (CD Washington 1947), Publ. OMI No. 71.

Rec.18 (CSM-I) - INTRODUCTION OF THE CODE GROUP D_sv_sxxx

The COMMISSION FOR SYNOPTIC METEOROLOGY,

NOTING,

(1) That the International Civil Aviation Organization has requested that provision be made for the inclusion of information regarding ship's course and speed in weather reports from supplementary and other ships in any area where the inclusion of this information as a routine is required by the responsible ship-report collecting centre, at the request of the local search and rescue authority, under such conditions as may be agreed between that authority and the responsible meteorological authority;

(2) That, as the provision of this information may contribute to the planning of search and rescue operations and thereby to the safety of human life, a departure from the general principle that the contents of weather reports should be confined to the information required by Meteorological Services is justifiable;

(3) That the Commission for Maritime Meteorology has indicated, in paragraph (b) of the amended Recommendation 17 of its First Session, that there is no objection in principle, from the maritime meteorological aspect, to compliance with the request of the International Civil Aviation Organization;

(4) That the specific request addressed to the World Meteorological Organization can be met without invoking the co-operation of the agencies listed in paragraph (a) of the amended Recommendation 17 of the First Session of the Commission for Maritime Meteorology, viz. the International Civil Aviation Organization, Intergovernmental Maritime Consultative Organization and International Telecommunications Union;

RECOMMENDS,

(1) That the group D_sv_sxxx be added to code forms FM 22 and FM 23;

(2) That the following note be inserted under code forms FM 22 and FM 23 in Fascicule I of Publication No. 9 :

> "The group D_sv_sxxx shall be included in ships' reports from an area only when the ship-report collecting centre for that area, in order to meet a requirement of a search and rescue centre, has requested its inclusion, as a routine procedure, by all ships in the area".

(3) That note (6) under FM 21 (page I-A-1-22 of Fascicule I, Publication No. 9) be amended to :

> "Ships which according to national instructions or because of failure of instruments do not report the group D_sv_sapp shall, however, include a group D_sv_sxxx in the ship-report when in an area where the collecting centre, in order to meet a requirement of a search and rescue centre, has requested this inclusion as a routine procedure".

(4) That any further joint discussion of the reporting of direction and speed of ships between the International Civil Aviation Organization, the Intergovernmental Maritime Consultative Organization, the International Telecommunications Union and the World Meteorological Organization should be postponed until a joint meeting between these organizations is convened on the initiative of some organization other than the World Meteorological Organization.

* *

Cf: (1) Rec. 22, Final Report, ICAO SAR Division, Third Session
(2) Rec. 17 (amended) (CMM London 1952), Publ. WMO No. 10.RP.2

Rec.19 (CSM-I) - IMPROVEMENT OF SYMBOLIC FORMS

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING,

(1) That in various code forms, groups are present with fixed indicators, which may be left out for various reasons;

(2) That efforts have been made to indicate the character of these groups by various forms of brackets;

RECOMMENDS that one single form of brackets be used to indicate drop-out groups in forms of messages, contained in Fascicule I of Publication No. 9, but that notes should be added to indicate in each case, whether the group is dropped out for meteorological, national, regional or other reasons.

* *

Cf: Rec. 27 (CAeM Paris 1950), Publ. OMI No. 80.

Rec.20 (CSM-I) - GEOPOTENTIAL OF CONSTANT PRESSURE SURFACE IN SYNOPTIC CODE FORM

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that, for isolated high level mountain stations, not located on a plateau region it is difficult, if not impossible, to reduce their pressure readings to mean sea level;

RECOMMENDS,

(1) That note 3) under PPP in Fascicule I of Publication No. 9 be deleted and replaced by the following notes (a) through (d);

(a) All stations which <u>can</u> report MSL pressure with reasonable accuracy shall do so in the PPPTT group;

(b) A station which cannot report MSL pressure with reasonable accuracy shall, by regional agreement, report in place of PPP (pressure reduced to MSL) either the geopotential of an agreed standard "constant pressure level" or the pressure reduced to an agreed datum level for that station. The level chosen for each station will be declared in Volume A of Publication No. 9;

(c) High level stations which can do both will report pressure reduced to MSL in the group PPPTT and may use the group ($6a_3hhh$) where hhh will indicate the geopotential in gpm or gpft of the standard "constant pressure level" and a_3 relates to the following specifications :

a_3 Code figure		
0	1000 mb level	hhh in gpm
1	850 mb level	
2	700 mb level	
3		
4		
5		
6		
7	700 mb level	hhh in gpft
8	850 mb level	
9	1000 mb level	

(d) When this group is used in the SYNOP code it will appear as the last group in the report.

N o t e : The group ($6a_3hhh$) should not be included in the form FM 11.

Rec.21 (CSM-I) - PRINCIPLES FOR USE IN DESIGNING FORMS OF MESSAGES

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that questions involving the construction of code forms and code tables, or the modification of existing ones, arise at every session of the Commission for Synoptic Meteorology (formerly Commission for Synoptic Weather Information of the International Meteorological Organization) and that as a result of the long experience which the Commission has had in this matter, certain essential basic principles in code construction are becoming generally recognized;

RECOMMENDS that the Secretariat of the World Meteorological Organization should assemble all direct and indirect references to such principles as are recorded in the proceedings of the International Meteorological Organization and the World Meteorological Organization, and their constituent bodies, that can be regarded as still relevant, and present them in a co-ordinated form in a conference document for consideration at the next session of the Commission for Synoptic Meteorology, with a view to the

adoption by the World Meteorological Organization of a set of such principles to be taken into account in all code construction or modification.

Rec. 22 (CSM-I) - DECODING TABLE FOR ww TO BE USED IN GROUND-AIR TRANSMISSIONS

The COMMISSION FOR SYNOPTIC METEOROLOGY,

NOTING the request of the International Civil Aviation Organization for comment on proposed terminology in the decode table for ww prepared at the First Air Navigation Conference of the International Civil Aviation Organization, Montreal, 1953;

RECOMMENDS,

(1) That the following suggestions for improvement of the simplified decode of ww should be forwarded for the attention of the International Civil Aviation Organization :

*36-37	Low drifting snow
*38-39	High drifting snow (blowing snow)
40	Distant fog
41-47	Fog
68	Rain and snow
69	Heavy rain and snow
76-78	Snow
79	Ice pellets
83	Showers of rain and snow
84	Heavy showers of rain and snow
93	Hail
94	Heavy hail

(2) That the attention of the International Civil Aviation Organization be drawn to the proposed w_1w_1 table as that organization may wish to develop a simplified decode for present weather in forecast codes.

* *

Cf: Rec. 26, First ICAO AN Conference, 1953.

*) The notes appearing in Fascicule I of Publication No. 9 for the use of these code figures have been clarified in Rec. 15 (CSM Washington 1953), paragraph 12 (h) and (i).

Rec.23 (CSM-I) - HANDLING OF PLAIN LANGUAGE RADIOTELEPHONY IN-FLIGHT REPORTS FOR GROUND-TO-GROUND COMMUNICATIONS

The COMMISSION FOR SYNOPTIC METEOROLOGY,

RECOGNIZING the importance of avoiding delays which result from encoding of plain language in-flight weather reports before including them in ground-to-ground exchanges;

RECOMMENDS that plain language radiotelephony in-flight reports should be transmitted ground-to-ground in the form in which they are lodged at ground receiving stations.

* *

Cf: Report of Chairman, ICAO First AN Conference, Montreal 1953.

Rec.24 (CSM-I) - INSTRUCTIONS FOR REPORTING VISIBILITY

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING,

(1) That the instruction given in note 7) under VV, page I-A-3-56, Fascicule I, Publication No. 9, i.e. "If the horizontal visibility is not the same in the different directions, the shorter distance should be given for VV", does not give the synoptic meteorologist the information he requires in some cases and does not give the aeronautical interests the information they require in many cases, and that these inadequacies have led to wide differences in national practices;

(2) That note 7) under VV, page I-A-3-56, Fascicule I, satisfies the interests of the Commission for Maritime Meteorology;

(3) That the problem of observing and reporting visibility is very complex and that determining the visibility in the cases of some stations is difficult;

RECOMMENDS,

(1) That Members, when writing their national instructions for reporting visibility, take into consideration the following definition, which satisfies established aeronautical needs at the present time but which can be fully complied with only under ideal observing conditions :

"Visibility to be reported in the SYNOP and AERO codes should be the greatest visibility which is attained or surpassed throughout half of the horizon circle, not necessarily continuous".

(2) That the Secretariat obtain from the Meteorological Services details and copies of the national instructions issued on the observing and reporting of VV;

(3) That the Secretariat distribute this information to Members :

(4) That the whole problem of reporting visibility should be further studied by the Commissions for Aeronautical Meteorology, for Instruments and Methods of Observation, for Synoptic Meteorology and for Maritime Meteorology with the object of achieving the highest degree of uniformity in national instructions and practical realization, at the same time taking into account the various requirements with respect to visibility observations.

* *

Cf: (1) Res. 11 (CMM London 1952), Publ. WMO No. 10 RP.2
(2) Res. 13 (ICAO 1st ANC, Montreal 1953).

Rec.25 (CSM-I) - USE OF BLOCK NUMBERS IN METEOROLOGICAL MESSAGES

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that it is necessary to establish uniform procedure for the use of the group 999II,

RECOMMENDS that the following instructions for the use of the block number group 999II be included wherever applicable in Part A-1 of Fascicule I, Publication No. 9 :

"It will not be necessary to use the 999II group in collective messages when the individual reports are identified by the index number (IIiii). However, when individual reports are identified by the station number (iii) and all reports in a collective message have the same block number, the group 999II will only be included immediately before the group iii of the first report in the message. In case any following report or group of reports originate from station(s) with block numbers not identical with the preceding block number, the group 999II will be given immediately before such a report or group of reports. The group 999II will not be repeated at the end of the group of reports to which it pertains in collectives for ground-to-air transmissions and,

while they may be reported at the end of groups of reports for ground-to-ground transmissions, care should be taken to ensure that such repetitions do not lead to confusion".

* *

Cf: (1) Rec. XX (RC.VI London 1949), Publ. OMI No. 77
(2) Rec. 28 (CAeM Paris 1950), Publ. OMI No. 80.

Rec.26 (CSM-I) - USE OF x IN CODED MESSAGES

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that there is a need for establishing a uniform practice in the use of the letter x in coded messages;

RECOMMENDS that the letter x be used in coded messages to indicate that information on a certain meteorological element was missing when the report was made or to indicate that during the transmission part of the message was not heard or was mutilated.

* *

Cf: Rec.27 (CAeM Paris 1950), Publ. OMI No. 80.

Rec.27 (CSM-I) - USE OF SOLIDUS (/) OR x IN CODES

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that the solidus is easily confused in manuscript with the figure 1, and that the letter x entails additional keyboard operation when figure groups are transmitted by teleprinter;

RECOMMENDS,

(1) That when specifications are being drawn up for use in codes, the figures 0 to 9 only , should be used unless it is quite impracticable to do so.

(2) That, in the case of existing codes in which optional signs such as x, /, -, appear for certain specifications, observers should be instructed to use only the letter x.

* *

Cf: Rec. 27 (CAeM Paris 1950), Publ. OMI No. 80.

Rec. 28 (CSM-I) - USE OF VARIOUS DIGITS IN METEOROLOGICAL MESSAGES

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that it is necessary to reduce the possibilities for errors in meteorological telecommunications, to effect every economy; and

NOTING,

(1) That at present in the figure groups used for issuing meteorological information the symbol solidus (/) and the letter x are used by different Meteorological Services to indicate either missing figures or the character of certain coded weather elements;

(2) That experience has proved the danger of errors in hand transcription of the solidus (/) which, in figure groups, can easily be mistaken for the figure 1;

(3) That certain centres are using for messages exchanged over meteorological teleprinter and radio teleprinter circuits the plus sign (+) or the upper case character on the Z key, in order to avoid the confusion mentioned under (2) and in order to avoid changes of keyboard which would be necessary when using the letter x;

(4) That transfer of messages from teleprinter or radio teleprinter circuits to W/T transmissions and vice versa implies in the case mentioned under (3) substitution of the + for x or vice versa;

RECOMMENDS,

(1) That the World Meteorological Organization approach the International Telecommunications Union and (a) endeavour to obtain standardization of the plus sign (+) so that it could be used in meteorological teleprinter exchanges to denote missing figures or could be used in certain codes, and (b) request that a Morse character be assigned to the plus sign.

(2) That in transmission of meteorological messages using the Morse Code the internationally recognized abbreviated Morse character (one dash) should be used for the digit zero in preference to the long character (five dashes) whenever practicable.

* *

Cf: (1) Rec. IX (RC VI London 1949), Publ. OMI No. 77
(2) ICAO Doc. 4478, COM/501/1 (PANS-COM), Paragraph 3.8.2.

Rec.29 (CSM-I) - INCLUSION OF SHIPS' CALL SIGNS IN METEOROLOGICAL MESSAGES

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING,

(1) That the inclusion of call signs in collective messages of ships' reports is desirable in order that users may identify the vessels concerned;

(2) That the call sign of each ship originating a meteorological report is known to the coast station receiving the message, as that call sign is used by the ship when initiating the call to the coast station;

(3) That if ships include their call signs in the text of original messages, extra cost would be involved;

RECOMMENDS,

(1) That Members should, if possible, arrange with their telecommunications services for the inclusion of 4-letter call signs of ships in the preambles of ships' weather messages when transmitted from coastal receiving stations to collecting centres;

(2) That these call signs should also be included in all collective messages of ships' reports;

(3) That in cases where inclusion of these call signs is not possible, identification of ships be made by name or by special numbers;

(4) That the World Meteorological Organization take action with the International Telecommunications Union with a view to securing arrangements for waiving any charges which might arise from the inclusion of call signs in the preambles of ship-shore meteorological messages;

(5) That Resolution 92 (CD Washington 1947) be cancelled.

***

Cf: (1) Res. 3 (CMM London 1952), Publ. WMO No. 10.RP.2
(2) Res. 92 (CD Washington 1947), Publ. OMI No. 71.

Rec.30 (CSM-I) - DISSEMINATION OF REPORTS FROM NORTH ATLANTIC OCEAN WEATHER STATIONS

The COMMISSION FOR SYNOPTIC METEOROLOGY,

NOTING,

(1) That there is a requirement for more expeditious handling of meteorological messages from North Atlantic ocean weather stations, especially during periods of poor radio propagation;

(2) That the question of dissemination of reports from ocean weather stations is under active consideration by the International Civil Aviation Organization;

RECOMMENDS that, pending completion of the study by the International Civil Aviation Organization of problems related to a more expeditious handling of meteorological messages from North Atlantic ocean weather stations, the United States of America be requested to place the arrangements set forth in the Annex hereto into effect as soon as possible as an interim measure;

DECIDES that this recommendation should be treated as an urgent matter.

*

Cf: Rec. 31 (I-52) (RA VI Zürich 1952), Publ. WMO No. 11.RP.3.

ANNEX

PROPOSED INTERIM PLAN FOR TRANSMISSION OF METEOROLOGICAL MESSAGES FROM NORTH ATLANTIC OCEAN WEATHER STATIONS

A small collective bulletin, consisting of reports from ocean weather stations A, B and C, will be established for broadcast on a trial basis by Radio Station NMH Washington. The proposed broadcast schedule is shown below:

Times of Broadcast (GMT)	Hours of Observations (GMT) SYNOP	PILOT	TEMP
0043	0000	2100	
0343	0300		
0555			0300 (First Section)
0643	0600	0300	0300 (Second Section)
0943	0900		
1243	1200	0900	
1543	1500		
1755			1500 (First Section)
1843	1800	1500	1500 (Second Section)
2143	2100		

At the beginning of each broadcast Radio NMH will key V and the call sign NMH for 1 minute before transmitting the reports.

Proposed broadcast frequencies are as follows :

0000 to 1259 GMT : 4230, 8682 and 12690 kcs.
1300 to 2359 GMT : 8682, 12690 and 16960 kcs.

In case weather messages from Stations A, B and C are not available by scheduled times above, as for example during periods of radio blackout, Radio NMH will transmit an announcement for recipients to stand by, that is, QRX 10 minutes, 20 minutes, etc., as the case may be. Radio NMH will be required to transmit similar announcements during ALERTS. The broadcasts will be made at a speed of 18 to 20 five-figure groups per minute and will be made on three frequencies simultaneously.

If experience shows that amendments to the above plan are desirable and feasible, changes will be made as appropriate by the Member responsible for the broadcast.

Rec.31 (CSM-I) - ANALYSIS AREAS AND EXCHANGE OF ANALYSES

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that there is a need for world-wide co-ordination in the establishment of master analysis areas and centres and in the international exchange of analyses for all purposes;

RECOMMENDATION 31

NOTING the recommendations of various sessions of the International Civil Aviation Organization, the International Meteorological Organization and the World Meteorological Organization on this subject;

RECOMMENDS,

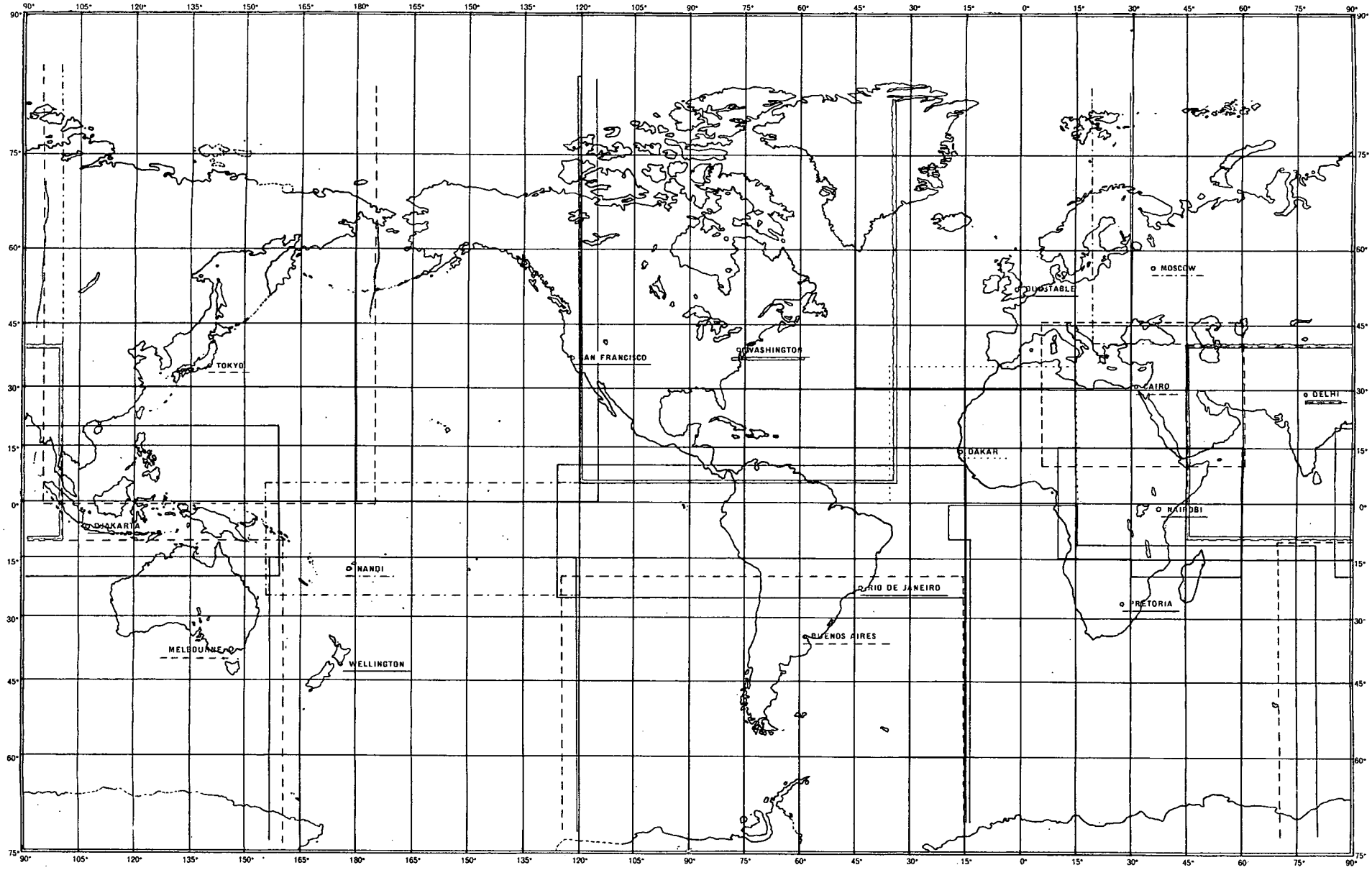
(1) That the world plan for master analysis areas and the tentatively indicated centres of responsibility be as follows :

Limits of areas of responsibility

Region I	
Cairo	Between the parallels 10°N and 45°N from 5°E to 60°E
Dakar	Between the equator and the parallel 35°N from 35°W to 15°E
Nairobi	From the point 15°N, 10°E, eastward to 15°N, 60°E, southward to 20°S, 60°E, westward to 20°S, 30°E, northward to 15°S, 30°E, westward to 15°S, 10°E, northward to starting point.
Pretoria	Along meridian of 15°W northward to the point 10°S, 15°W, westward to 10°S, 20°W, northward to 0°, 20°W, eastward to 0°, 15°E, southward to 10°S, 15°E, eastward to 10°S, 80°E and thence southward.
Region VI	
Dunstable	North of the parallel 30°N from 45°W to 30°E
Moscow	North of the parallel 40°N from 20°E to 100°E
Region IV	
Washington	North of the parallel 5°N, from 120°W to 35°W
San Francisco	North of the equator from 180°W to 115°W
Region III	
Rio de Janeiro	Between the parallels 25°S and 10°N from 125°W to 15°W
Buenos Aires	South of the parallel 20°S from 125°W to 15°W
Region V	
Melbourne	South of the parallel 10°S from 70°E to 160°E
Nandi	Between the parallels 25°S and 5°N from 155°E to 120°W

Annex to Rec. 31 (CSM - I)
Annexe à la Rec. 31 (CSM - I)

ZONES D'ANALYSES TYPES – MASTER ANALYSIS AREAS



Djakarta	Between the parallels 20°S and 20°N from 85°E to 160°E
Wellington	South of the parallel 15°S from 155°E to 120°W

Region II

Tokyo	North of the equator from 95°E to 175°W
Delhi	Between the parallels 10°S and 40°N from 45°E to 100°E

N o t e : A map showing the above areas is appended to this recommendation as an annex.

(2) That each Regional Association at its next session review the above plan taking into account as appropriate Recommendation 20 of the ICAO SAM/SAT RAN Meeting, 1951 and Recommendation 22 of the ICAO SEA/SOP RAN Meeting, 1953, in order to determine whether regional requirements can be met within its framework or whether modifications are necessary;

(3) That centres should be responsible for the issue of surface and upper air analyses (both actual and prognostic) for the areas of responsibility assigned to them; except in equatorial regions, upper air analyses should give information for 700, 500, 300 mb levels and such other levels as may be required under regional agreements;

(4) That actual and prognostic surface analyses should be issued 4 times a day in respect of the main synoptic hours, and actual and prognostic upper air analyses should be issued twice a day in respect of the 0300 and 1500 GMT maps;

(5) That actual surface analyses should be issued within 6 hours and upper air analyses within 8 hours after the synoptic hours to which they refer; surface prognostic analyses should be issued within 8 hours and upper air prognostic analyses within 10 hours after the hours of observation upon which they are based;

(6) That if an exchange of analyses for smaller areas is an essential regional requirement, e.g., as an aid in the compilation of master analyses for the areas indicated on the attached chart, (i) these smaller areas should so far as possible be convenient subdivisions of the areas indicated on the chart, (ii) the centre responsible for the issue of the upper air analysis for a small area should be the same as that responsible for the corresponding surface analysis and (iii) the international exchange of these analyses for small areas should be limited to exchange within the region;

(7) That the International Civil Aviation Organization be informed of this recommendation.

Cf: (1) Res. 29 (IMC Paris 1946), Publ. OMI No. 55
(2) Rec. 6.6.4 (CAeM Paris 1950), Publ. OMI No. 80
(3) Rec. 21, MET Committee, ICAO MID RAN Meeting, Istanbul 1950
(4) Rec. 2, ICAO, Special AFI RAN Meeting, Paris 1950
(5) Rec. 5, ICAO, Special NAT RAN Meeting, Paris 1950
(6) ICAO Doc. 7034 - MET/517
(7) Rec. 12 (CD Paris 1951), Publ. OMI No. 81
(8) Rec. 20, MET Committee ICAO SAM/SAT RAN Meeting, Buenos Aires 1951
(9) Rec. 21, MET Committee ICAO EUM RAN Meeting, Paris 1952
(10) Res. 15 (I-52) (RA VI Zürich 1952), Publ. WMO No. 11 RP.3
(11) Res. 20 (RA I Tananarive 1953), Publ. WMO No. 13 RP.5
(12) Rec. 22, MET Committee ICAO SEA/SOP RAN Meeting, Melbourne 1953.

Rec.32 (CSM-I) - UNIVERSAL TIME

The COMMISSION FOR SYNOPTIC METEOROLOGY,

NOTING,

(1) The position of the International Civil Aviation Organization, as a consequence of a study which involved consultation with 21 international organizations, that there appeared to be insufficient justification at present for modifying the International Civil Aviation Organization practice of employing GMT;

(2) That the terms"Greenwich Mean Time", Greenwich Civil Time" and "Universal Time" all now refer to mean solar time reckoned from midnight on the Greenwich meridian and that no practical inconvenience or confusion appears to arise from the concurrent use of these three synonyms for this standard of time;

RECOMMENDS that the World Meteorological Organization not initiate any further action at present to secure the designation and international use of one agreed term to denote the time reckoned from midnight on the meridian of Greenwich.

* *

Cf: Rec. 20 (CAeM Paris 1950), Publ. OMI No. 80.

Rec.33 (CSM-I) - ABBREVIATED HEADINGS

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING the desirability of establishing a uniform system of abbreviated headings for meteorological transmissions;

RECOMMENDS,

(1) That a system of abbreviated headings for meteorological transmissions be established, based on the following form :

MTTAA CCCC YYGGgg

M - International indicator for meteorological messages
TT - Data designator - see Appendix A
AA - Geographical designator - see Appendix B
CCCC - International 4-letter call sign of the station editing or compiling message
YYGGgg - International date and time group

N o t e s :

1. When required, a number may be inserted after the group MTTAA, in order to differentiate between two or more bulletins of similar content from the same general area.
2. Successive bulletin numbers, where required, may be entered after the group CCCC in messages compiled by a particular station.
3. The identifier letter M may be omitted on meteorological telecommunications circuits when there is no possibility of confusion by so doing.

(2) That Members of Regional Associations which decide to use a system of abbreviated headings for ground-to-ground transmissions should follow the pattern laid down in paragraph 1.

N o t e :

Requests for changes in or additions to the lists of designators in Appendices A and B should be submitted to the President of the Commission for Synoptic Meteorology for approval.

***

Cf: Rec. 17 (CAeM Paris 1950), Publ. OMI No. 80.

APPENDIX A

DATA DESIGNATORS

Surface Data	S	Upper-air data	U
Main hours	SM	Pilot Balloon	UP
Intermediate hours	SI	Radiosonde	US
Hourly & 1/2 hourly	SA	Rawin	UW
Special	SP	Selected levels	UL
Miscellaneous	SX	Reconnaissance flight	UR
"Atmospherics"	SF	Aircraft report	UA
		Miscellaneous	UX
Forecasts	F	Analyses	A
Flight forecasts	FF	Surface	AS
Route forecasts	FR	Upper air	AU
Aerodrome forecasts	FT	Miscellaneous	AX
Surface prognostic charts	FS	Warnings	W
Upper air prognostic charts	FU	Hurricane warnings	WH
Miscellaneous	FX	Warnings (other)	WW

INDICATEURS GÉOGRAPHIQUES (AA) PROPOSÉS POUR EMPLOI DANS LES EN-TÊTES DE MESSAGES

Forme proposée d'en-tête de message : MTTAA (n) CCCC YYGGgg

PROPOSED GEOGRAPHICAL DESIGNATORS (AA) FOR USE IN MESSAGE HEADINGS

Proposed Form of Message Heading : MTTAA (n) CCCC YYGGgg

Appendix B to Rec. 33 (CSM - I)
Appendice B à la Rec. 33 (CMS - I)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
A	Antarctica	Albania	Arctic Ocean	Aden	French Equat. Africa	Africa	Argentine		Ascension Island	Austral Islands	Alaska	Algeria		Angola	French West Africa			Arabian Sea	Asia	Antigua	Australia				Byelo-Russian S.S.R.	
B	Bahamas	Bay of Bengal	Bechuana-land	Basuta-land	Bermuda		British Guiana	British Honduras			Banks Island	Belgium	Burma	Bonaire	Bolivia			Barbadoes	Bering Sea		Bulgaria					
C	Caribbean	Belgian Congo	Curacao			French Congo		Chile	China		Corsica	Ceylon	Cayman Island	Canada	Colombia			Canaries	Costa Rica	Canton Island	Cuba	Cape Verdi Islands				
D							D. Guiana -Suriname	Dahomey				Germany		Denmark	Dominica			Dominican Republic								
E	British E. Africa		East China Sea		Eastern Europe		Egypt		Ireland	Fiji Islands		Ellice Islands	Middle Europe	Northern Europe	Estonia S.S.R.		Ecuador	Eritrea	St. Eustatius	Ethiopia	Europe		Western Europe			
F	Faroes						French Guiana		Finland	Franz Joseph Land	Falkland Islands		French Morocco	French Nigeria				France	French Sudan							
G	Gulf of Alaska	Gambia	Gold Coast					Afghanistan	Gibraltar			Greenland	Guam			Guadeloupe		Greece		Gilbert Islands	Guatemala			Gulf of Mexico		
H	Haiti				St. Helena						Hongkong				Honduras						Hungary	Haute-Volta	Hawaiian Islands			
I			French Indochina	Indonesia	Ireland							Iceland		India	Indian Ocean		Iraq	Iran	Israel			Ivory Coast			Italy	
J													Jamaica	Jan Mayen		Japan										
K	Caroline Islands						Kerguelen		Christmas Island		Cocos Island		Cameroons	Kenya	Korea				Kashmir	St. Kitts	Cook Island					
L		Lebanon	St. Lucia						Liberia		Laccadive Island			Southern Line Islands						Lithuania S.S.R.	Aleutian Islands	Latvia S.S.R.		Luxembourg	Libya	
M	Mauritius		Central Mediterranean	Madeira		St. Martin (French)	Madagascar		Marshall Islands			Malta	Mediterranean	St. Martin (Netherlands)	Mongolia		Marquesas	Martinique		Mauretania	Macau	Maldive Island	Western Mediterranean	Mexico		Mozambique
N	North America	British No. Borneo	New Caledonia & Loyalty Is.		Near East		New Guinea	New Hebrides	Nigeria		Nicaragua	Netherlands			Norway			Northern Rhodesia	Nassau	North Atlantic		Nyasa			Nyasaland	New Zealand
O						French Oceania							Oman					South Orkney Island	Austria							
P	Pacific				Persian Gulf		Portuguese Guinea	Phillipines	Phoenix Island		Pakistan	Poland	Panama	North Pacific	Portugal			Peru	South Pacific	Pitcairn Island	Puerto Rico				Paraguay	
Q																										
R	U.S.S.R. (Asia)	Aruba			Reunion			So. Rhodesia	Rio de Oro				Rio Muni		Roumania				U.S.S.R. (Europe)							
S	South America	British Somaliland	Seychelles Islands	Saudi Arabia	Society Islands	French Somaliland	Senegal		Italian Somaliland	Sea of Japan	Sarawak	Sierra Leone	Spanish Morocco	Sweden	Solomon Islands	Spain		Saar	South China Sea	South Atlantic	Sudan (A.E.)	Salvador	Switzerland	Santa Cruz Island	Syria	Spitzbergen
T	Tuamotu Island	Tibet	Tristan da Cunha	Trinidad			Togo	Thailand	Turks Island	Trans-Jordan	Takelau Island		Timor	Tanganiki	Tonga			Trieste	Tunisia		Turkey					
U							Uganda				United Kingdom							Ukrainian S.S.R.	United States						Uruguay	
V									Virgin Islands					Venezuela												
W	British W. Africa										Wake Island														Swaziland	
X																										
Y					Yemen		Yugoslavia																			
Z		Saba											Samoa										South West Africa			

Rec.34 (CSM-I) - QUALITY OF METEOROLOGICAL BROADCASTS AND TRANSMISSIONS

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that it is necessary to ensure high standards in the quality, procedures, contents, scheduling, and technical characteristics of meteorological broadcasts and transmissions,

RECOMMENDS,

(1) That the attention of Members be drawn to the necessity for monitoring all meteorological broadcasts and transmissions;

(2) That recipients of all types of meteorological broadcasts and transmissions should report deficiencies to the Meteorological Service of the country making them, and also keep the President of the appropriate Regional Association informed of such deficiencies.

* *

Cf: Rec. 11 (RC VI London 1949), Publ. OMI No. 77.

Rec.35 (CSM-I) - PROCEDURES FOR RADIOTELEGRAPH METEOROLOGICAL BROADCASTS

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING the desirability of uniform practice in the preparation and transmission of meteorological data in radiotelegraph broadcasts;

RECOMMENDS that the procedures outlined below be followed in preparing and transmitting data in radiotelegraph meteorological broadcasts in Morse code for general purposes,

(1) Transmissions should be made by an automatic keying device to ensure correct speed as well as uniformity of transmission. The speed should be between 18 and 20 five-figure groups per minute (24 to 28 bauds). In areas where transmission and reception are still accomplished by hand, the average speed of transmission may be 15 five-figure groups per minute if agreed regionally;

(2) Transmitting stations should make marking transmissions over a period of two minutes before the scheduled time of beginning of each transmission. A marking transmission should also be sent by these transmitters each time they resume their traffic after an interruption of more than ten minutes. A station which is unable to commence its transmissions at the scheduled time should interrupt its marking transmission at the time scheduled and, after transmitting its call signs, it should indicate the estimated duration of the

delay or send the appropriate Q code signal. The marking transmission will then be transmitted until the transmission can be effected normally. After an estimated duration of delay is stated, the scheduled transmission shall not be commenced until after the expiration of such a time interval;

(3) All automatic transmissions shall be made from perfectly perforated tape or from tape in which all errors detected have been removed. Errors detected during transmission should, when practicable, be corrected by transmitting the correction manually; when this is not practicable the correction shall be sent at the end and as a continuation of the transmission preceded by the procedure signal "COR";

(4) When radio broadcasts are being transmitted on more than one frequency simultaneously, the call sign of each of the frequencies on which the transmission is being made shall be indicated. Stations should indicate the addition or deletion of a frequency if this occurs during a transmission.

* * *

Cf: Res. 53, 54, 55 and 56 (I-52) RA VI.

Rec.36 (CSM-I) - CONTINUANCE OF NORTH AMERICAN CONTINENTAL BROADCAST

The COMMISSION FOR SYNOPTIC METEOROLOGY,

NOTING,

(1) The announced intention to discontinue the operation of the continental radiotelegraph broadcast facility at WSY New York;

(2) The numerous requests that the continental radiotelegraph broadcast made by WSY not be discontinued at the present time because it fulfills a useful purpose;

CONSIDERING,

(1) That world-wide re-organization of the system for exchange of meteorological information will take appreciable time;

(2) That the exchange of information by the radioteleprinter circuit New York-Azores-Paris does not yet satisfy the requirements of Members of Regional Association VI;

(3) That the existing frequencies used by WSY are not regarded as completely satisfactory;

RECOMMENDS,

(1) That a North American radiotelegraph broadcast with a content and schedule similar to that of the WSY continental broadcast be continued after June 30, 1953 (the date announced for discontinuance of the WSY broadcast) until such time as the President of the Commission for Synoptic Meteorology, on the basis of information to be obtained from all Members concerned, and in consultation with the Working Group on Telecommunications, is able to notify the President of the World Meteorological Organization that a requirement for such a broadcast no longer exists;

(2) That if such notification is not given before the Second Session of the Commission for Synoptic Meteorology, the matter should be reviewed at that session in the light of advances made in the general field of telecommunications;

(3) That the Member responsible for the broadcast be asked to make arrangements so that the transmission shall be such as to permit reliable reception throughout Europe;

DECIDES that this recommendation should be treated as a matter of urgency.

* *

Cf: (1) Res. 20 (IMC Paris 1946), Publ. OMI No. 55
(2) Rec. 29 (I-52) (RA VI Zurich 1952), Publ. WMO No. 11.RP.3.

Rec.37 (CSM-I) - ORDER OF PRIORITY IN COLLECTIVE TRANSMISSIONS

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING,

(1) That Resolution 40 (IMC Paris 1946) of the International Meteorological Committee does not clearly indicate whether the specified order of priority relates simply to the order within various groups of messages, or whether the groups themselves are given in order of priority;

(2) That in case of point-to-point landline or radioteleprinter transmissions, scheduling and treatment of cases of traffic congestion should be the subject of regional agreement or of arrangements between the Members concerned;

RECOMMENDS,

(1) That in collective broadcasts the order of transmission, depending upon the availability of data at the centre of collection and dissemination, should be as far as possible in accordance with the schedule given below. The order of priority relates primarily to the order of items within the various groups and not to the order of the groups themselves.

Group 1. Warnings

Group 2. (Surface observations, observations of atmospherics)

1 SYNOP
2 SHIP (Ocean Weather Station)
3 SHIP (Other than Ocean Weather Station)
4 SFAZI/SFLOC
5 RETARD) of Group 2
6 RECTIF)

Group 3. (Upper air observations)

1 TEMP
2 PILOT
3 AIREP/POMAR
4 NEPH
5 RETARD) of Group 3
6 RECTIF)

Group 4. (Analyses, Forecasts)

1 ANALS
2 PROGS
3 Forecasts (where normal channels are not adequate)
4 RECTIF - of Group 4

Group 5. Miscellaneous, e.g., CLIMAT, SEISMO, SFAZU

N o t e : In certain cases, subject to regional agreement, RETARDS may be broadcast at the end of a collective transmission in a separate group instead of in Groups 2 and 3.

(2) That Resolution 40 (IMC Paris 1946) be cancelled;

(3) That Paragraph 4.1 of the Introduction to Fascicule III, Publication No. 9 be amended accordingly.

* *

Cf: Res. 40 (IMC Paris 1946), Publ. OMI No. 55
Res. 33 (I-52) (RA VI Zürich 1952), Publ. WMO No. 11.RP.3
Rec. 35 (I-52) (RA VI Zürich 1952), Publ. WMO No. 11.RP.3
Rec. 5 (RA I Tananarive 1953), Publ. WMO No. 13.RP.5

Rec.38 (CSM-I) - WORLD-WIDE ORGANIZATION OF METEOROLOGICAL BROADCASTS

The COMMISSION FOR SYNOPTIC METEOROLOGY,

NOTING,

(1) The deficiencies which are currently experienced by individual Services, partly as a result of the fact that Resolution 20 (IMC Paris 1946) of the International Meteorological Committee has not been completely implemented, are not so great as to require a radical change in the basic principles underlying the existing organization of such broadcasts;

(2) That the introduction of more modern telecommunications techniques is effective in supplementing the exchange of data between certain Regions which have developed such techniques;

RECOMMENDS,

(1) That continental and sub-continental radiotelegraph broadcasts be made from the centres listed below :

		Continental
Region	I	Nairobi
	II	New Delhi; Tokyo
	III	Rio de Janeiro
	IV	New York
	V	Manila
	VI	London

		Sub-continental
Region	I	Nairobi; Algiers; Kano; Cairo; Dakar; Pretoria
	II	Teheran; New Delhi; Shanghai; Khabarovsk; Tokyo
	III	Rio de Janeiro; Buenos Aires; Lima
	IV	New Orleans
	V	Canberra; Nandi; Darwin; Singapore
	VI	London; Paris; Rome; Moscow

N o t e : There now exist two other centres as referred to in Resolution 6 (CD Paris 1951) of Conference of Directors.

The determination of the actual location of continental and sub-continental broadcasting stations shall be a matter for Regional Associations;

(2) That each Regional Association should formulate plans as necessary for the improvement of the existing radio transmissions and the establishment of teleprinter networks or circuits or high-speed radiotelegraph transmissions within the Region as a means of remedying certain existing deficiencies, such plans to be integrated by the Commission for Synoptic Meteorology on a world-wide basis at a later stage;

(3) That each Regional Association should supply the Secretariat of the World Meteorological Organization with a consolidated statement of deficiencies and suggestions for improving the exchange of information so that these may be considered by the Telecommunications Working Group of the Commission for Synoptic Meteorology;

(4) That the following principles should apply with respect to the responsibilities of Regional Associations in the organization of meteorological broadcasts :

(a) That each Regional Association should assume responsibility for making arrangements leading to the establishment and maintenance of continental and sub-continental broadcasts (or alternative telecommunication systems) which are adequate to meet the requirements stipulated by the Commission for Synoptic Meteorology for the interchange of meteorological data within its own Region and between its own Region and adjacent Regions;

(b) That each Regional Association should assume responsibility for assigning to its continental and sub-continental broadcast centres the specific areas and countries from which reports are collected for inclusion in its broadcasts;

(c) That the contents, schedules and other important aspects of continental and sub-continental broadcasts be determined by Regional Associations after consultation with known or probable recipients within and without the Region.

* *

Cf: Res. 20 (IMC Paris 1946), Publ. OMI No. 55.

Rec.39 (CSM-I) - FACSIMILE TRANSMISSIONS

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that facsimile is an extremely effective means of communication for meteorology, permitting even in its present stage of development, improvements in meteorological services, complete accuracy of material transmitted, and a certain amount of economy;

NOTING that the question of standardization of facsimile apparatus is under consideration in a study group of the International Radio Consultative Committee and has been discussed by the International Telegraph Consultative Committee;

RECOMMENDS,

(1) That all Members should encourage the development of facsimile apparatus for meteorological purposes and should keep the Secretariat of the World Meteorological Organization informed of experimental transmissions or scheduled broadcasts, with a view to inclusion of such information in Fascicule III of Publication No. 9;

(2) That Members should communicate progress in the application of facsimile for meteorological purposes to the Secretary-General of the World Meteorological Organization who should be requested to issue a consolidated report of such progress at least once per year.

* *

Cf: (1) Rec. XXV (CR VI London 1949), Publ. OMI No. 77
(2) Res. 47 (I-52) (RA VI Zurich 1952).

Rec.40 (CSM-I) - RELATIONS WITH THE INTERNATIONAL TELECOMMUNICATIONS UNION

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING,

(1) The desirability of making the views and suggestions of the World Meteorological Organization on questions related to meteorological telecommunications available at an early stage to the constituent committees and study groups of the International Telecommunications Union, which deal with problems, wholly or partially of interest to meteorology;

(2) The desirability of establishing liaison in the early stages of formulation of draft recommendations of the International Telecommunications Union;

(3) The need for effective representation at subsequent higher-level meetings of the International Telecommunications Union where decisions affecting meteorological telecommunications are taken;

RECOMMENDS,

(1) That the Secretariat of the World Meteorological Organization should be requested to keep the President of the Commission for Synoptic Meteorology informed as far in advance as possible of all scheduled conferences of the International Telecommunications Union so that (a) he may consult the Working Group on Telecommunications in regard to the items of the Agenda which may have a meteorological interest; (b) if such interest is found, he may consult the working group further regarding the representation of the World Meteorological Organization and the preparation of draft instructions for the observer of the World Meteorological Organization if one is designated; (c) he can arrange for advance consultation with the Presidents of other Technical Commissions concerned, such as the Commissions for Maritime Meteorology, Aeronautical Meteorology or Instruments and Methods of Observation, as required;

(2) That Permanent Representatives of Members be kept informed of any meteorological aspects of items to be discussed at meetings of the International Telecommunications Union so that the national representative at these meetings may be aware of meteorological requirements.

* *

Cf: Rec. 4 (CMM-I) (London 1952), Publ. WMO No. 10.RP.2.

Rec.41 (CSM-I) - STATION MODEL FOR SURFACE AND UPPER AIR OBSERVATIONS

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that the International Station Model should remain substantially unchanged for surface weather maps and should be followed in principle in the plotting of upper air charts and cross sections, but that some changes in detail need to be made;

RECOMMENDS,

(1) The following additions to the station model for surface observations :

(a) The average direction and speed made good should be plotted below the value of W (land station RR position or below RR if RR is reported) with the arrow pointing in the direction towardswhich the ship is moving and with the code figure for speed entered at the point of the arrow.
The direction and speed of ship $D_s v_s$ are related to both pressure PPP and past weather W and should be plotted near these two elements;

(b) The direction, period and height of waves is to be plotted under h. The direction is represented by a wavy line with a single arrow head; the point of the arrow is to be directed away from the source direction of the waves. The code figures for P_w and H_w are to be plotted, separated by a solidus, at the right of the arrow head. When 50 has been added to $d_w d_w$ to indicate height of waves exceeding 4 3/4 m (15 ft), 10 should be added to H_w for plotting purposes;

(c) For all stations not reporting $N_h C_L h C_M C_H$ the data in the $8N_s C h_s h_s$ cloud group should be plotted below the station circle in the positions of $C_L N_h$ and h respectively. The recommended symbols for C and the two figures for $h_s h_s$ will avoid any possible confusion with $C_L h$.
Where $8N_s C h_s h_s$ is reported in the SYNOP Code, the plotting of the data contained in this group is left to the decision of the National Services;

(d) If $T_x T_x / T_n T_n$ is entered, it should be plotted above TT and in an analogous fashion;

(e) If s is to be plotted, the code figure for s should be entered above PPP but to the right of E;

(f) The code figure for R_t should be entered to the right of W.

(2) That upper air observational data be plotted on upper air charts in accordance with Resolution 99 (CD Washington 1947) amended as follow :

Amend Item (e) to read: "If tendencies of temperature, absolute geopotential or relative geopotential ("thickness") are used, they should be plotted under or to the right of the element to which they refer, in the same colour but preceded by a plus (+) or minus (-) sign when not equal to zero (0)".

Amend Item (f) to conform to Recommendation 42 (CSM I).

Amend Item (h) as follows : For the words "contour lines" read "isohypses (contour lines)" and for the words "thickness lines" read "relative isohypses (thickness lines)".

* *

Cf: Res. 99 (CD Washington 1947).

Rec.42 (CSM-I) - SYMBOLS FOR VARIOUS CODES

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING,

(1) That world-wide uniformity is necessary in the plotting of wind data;

(2) That the changes of certain codes involved a revision of existing symbols;

RECOMMENDS,

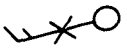
(1) That wind should be represented on surface charts as follows :

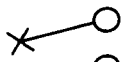
(a) On surface charts the wind should be represented by feathers and solid pennants with the full feathers representing 10 knots (5 m/s), the 1/2 feathers representing 5 knots (2.5m/s), and the solid pennant representing 50 knots (25 m/s);

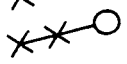
(b) The wind shaft should be directed towards the centre of the station circle but should stop on the station circle at the point from which the wind is blowing. All pennants and feathers should fly towards the left of the wind shaft in the northern hemisphere and to the right of the wind shaft in the southern hemisphere. Feathers should be at an angle of approximately 120° from the wind shaft. Pennants should be triangles with their base on the wind shaft;

(c) Missing wind data should be indicated by one of the following two methods according to national decisions :

Method 1

(i) Missing wind direction: 

(ii) Missing wind speed: 

(iii) Missing direction and speed: 

Method 2

(i) Missing wind direction: No wind plot in the station model

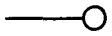
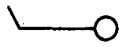
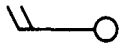
(ii) Missing wind speed: 

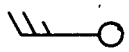
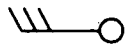
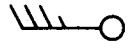
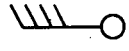
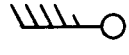
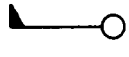
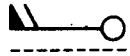
(iii) Missing direction and speed: No wind plot in the station model

N o t e s :

1. If Method 1 is followed, no wind plot is required when calm is reported.
2. If Method 2 is followed, calm will be indicated by a circle drawn around the station circle.
3. In the cases (i) and (iii) under Method 1, the shaft shows an inferred reasonable wind direction.

(d) Examples of Plotting Wind Speed on Surface Charts

SPEED (Metres per second)		SPEED (Knots)
0.5 - 1		1 - 2
1.5 - 3.5		3 - 7
4 - 6		8 - 12
6.5 - 8.5		13 - 17
9.0 - 11.0		18 - 22

SPEED (Metres per second)		SPEED (Knots)
11.5 - 13.5		23 - 27
14 - 16		28 - 32
16.5 - 18.5		33 - 37
19 - 21		38 - 42
21.5 - 23.5		43 - 47
24 - 26		48 - 52
26.5 - 28.5		53 - 57
29 - 31		58 - 62
49 - 51		98 - 102
51.5 - 53.5		103 - 107

(2) That wind should be represented on upper air charts in accordance with the following :

(a) The wind at the level of the chart should be plotted with a solid shaft to the station circle with the feathers and solid pennants flying to the left of the wind shaft in the northern hemisphere and to the right of the wind shaft in the southern hemisphere. The feathers and solid pennants have the same values as used on surface charts;

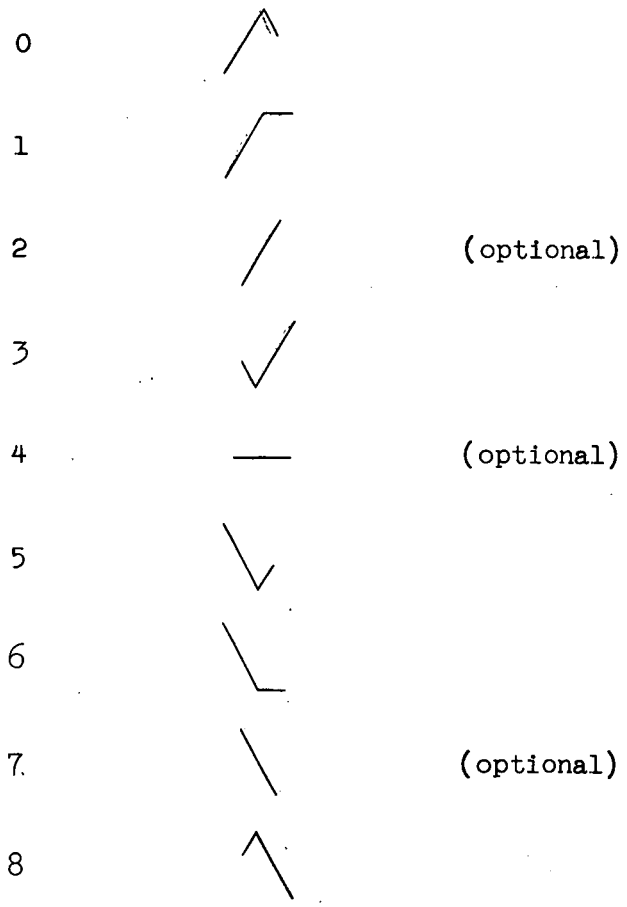
(b) Derived winds (e.g., "thermal winds") should be plotted with the shaft into the station circle and the feathers and solid pennants flying towards the side of higher pressure;

(c) If one derived wind is plotted, the shaft should be a solid line. If two derived winds are plotted, one of them should be plotted with a broken shaft;

(d) In isotach and other wind field analyses, figures for dd and ff may replace the feathers and pennants. The figures should be plotted in the positions along the shaft in the position otherwise occupied by the feathers and pennants;

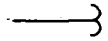
(e) If multicolour plotting is used, colour separation between the observed and derived winds is recommended with the plotting practices mentioned above being followed.

(3) Symbols for the new code for pressure tendency a are as follows :



N o t e : The slanting part of the symbols should make an angle of about 30° with the vertical.

(4) The following plotting symbols for C (New Code 10) :

Code Figure			Code Figure		
0	Ci		5	Ns	
1	Cc		6	Sc	
2	Cs		7	St	
3	Ac		8	Cu	
4	As		9	Cb	

(5) That the following plotting symbols for state of ground be used :

Code Figure	Symbol	Code Figure	Symbol		
0		5			
1		6			
2		7			
3		8		or	
4		9		or	

Cf: Rec. 47 (CSM Washington 1953).

Rec.43 (CSM-I) - REPRESENTATION OF ATMOSPHERICS DATA ON SURFACE CHARTS

The COMMISSION FOR SYNOPTIC METEOROLOGY,

NOTING that no international system for the representation of atmospherics data on surface charts has so far been developed;

RECOMMENDS that the following plotting model, symbols and procedures be used for representing atmospheric data on surface charts :

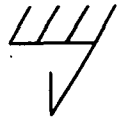
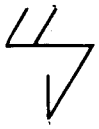
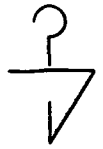
(a) Basic plotting model: $\frac{GG}{A_i}$

(b) Plotting procedure

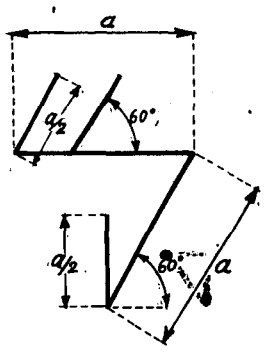
(i) The point at the bottom of the basic symbol A_i is plotted at the location reported in the code group $L_aL_aL_oL_ok$;

(ii) The time GG is entered in two digits as received in the message;

(iii) The repetition rate of atmospherics A_i is plotted as follows:

Code Figure Reported for A_i	Plot of A_i	Code Figure Reported for A_i	Plot of A_i
0		5	
1		7	
3		9	

(c) Dimensions of the basic symbol :



a = 1 cm or 1/2 inch

Rec.44 (CSM-I) - PLOTTING MODELS FOR POMAR AND RECCO

The COMMISSION FOR SYNOPTIC METEOROLOGY,

NOTING that plotting models for POMAR and RECCO require further study on a national and regional basis before international adoption will be possible;

RECOMMENDS that national or regional models should adhere as closely as practicable to the standard station model.

* *

Cf: Fasc. I, Chap. III of Publ. No. 9.

Rec.45 (CSM-I) - INDICATION OF TOPOGRAPHICAL SITUATION OF METEOROLOGICAL STATIONS

The COMMISSION FOR SYNOPTIC METEOROLOGY,

NOTING the usefulness of indicating the topographical situation of meteorological stations on maps and charts for the interpretation of surface reports;

RECOMMENDS that Members requiring symbols for the indication of station character on maps and charts use the following symbols :

Situation	Symbol
On the coasts	
On a plain	
On the side of a hill or mountain	
In a deep valley	
In an open valley	
At the top of a ridge, hill or mountain	
At the foot of a hill or mountain	

Cf: Res. 45 (I) (Cg Paris 1951), Publ. WMO No. 1/I

Rec.46 (CSM-I) - WEATHER ANALYSIS SYMBOLS

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that further study with a view to improvement and standardization of weather analysis symbols is necessary;

RECOMMENDS,

(1) That the Secretariat of the World Meteorological Organization study and prepare recommendations for consideration of the Commission for Synoptic Meteorology in regard to the improvement and standardization of analysis symbols;

(2) That, to aid in this study, Members interested in gaining universal adoption of symbols now used on a national basis submit supporting papers and that the Secretariat distribute these papers to Members for review and comment;

(3) That the study give particular attention to (a) the Canadian TROWAL model, (b) the classic occlusion models and their associated upper warm and cold fronts, and (c) proposals for gaining international standardization in the designation of other weather systems, such as medium cloud zones, fog areas, cloudless areas and certain upper air features e.g. (frontal isohypses) on weather maps.

Rec.47 (CSM-I) - USE OF TERMS "HEIGHT, ELEVATION AND ALTITUDE"

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that the definitions for the terms "height, elevation and altitude" need clarification and improvement in order to obtain world-wide uniformity;

RECOMMENDS,

(1) That, when the term "height" is employed by the World Meteorological Organization, it will have one of the following meanings :

Height:

(a) The vertical distance of a level, point, or an object considered as a point, measured from a specified datum;

N o t e : The datum may be specified either in the text or in an explanatory note in the Publication concerned.

(b) The vertical dimension of an object.

N o t e : The term "height" may also be used in a figurative sense for a dimension other than vertical, e.g., the height of a letter or a figure painted on a runway.

(2) That, when the term "altitude" is employed by the World Meteorological Organization, it will have the following meaning :

Altitude. The vertical distance of a level, point or an object considered as a point, measured from mean sea level.

(3) That, when the term "elevation" is employed by the World Meteorological Organization, it will have the following meaning :

Elevation. The vertical distance of a point or level on or affixed to the surface of the earth, measured from mean sea level.

* *

Cf: Rec. 27 (CAeM Paris 1950).

Rec.48 (CSM-I) - PUBLICATION OF METHODS OF PRESSURE REDUCTION

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING,

(1) That publication by National Meteorological Services of methods of pressure reduction does not serve the purpose intended by Resolution 144 (CD Washington 1947);

(2) That information as to the level to which the barometer reading is reduced should be given wide dissemination;

RECOMMENDS,

(1) That the World Meteorological Organization shall publish the methods of pressure reduction. It is suggested that in Volume A of Publication No. 9, an Appendix should contain the various methods in use, each of which would be assigned a separate code letter. The main station list would contain a column with the appropriate code letter opposite the station;

(2) That where appropriate, the Appendix to Volume A should contain references to the scientific literature in which the fundamental principles of the various reduction procedures are detailed;

(3) That the level to which the barometer reading is reduced shall also be included in Volume A for each station.

Rec.49 (CSM-I) - INTERNATIONAL CLOUD ATLAS-EDITION-1953

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING,

(1) The need for a general cloud atlas, an abridged atlas for observers on the earth's surface both on land and at sea [Resolution 5 (CMM London 1952)] and an album for observers in aircraft;

(2) The desirability of succinctness, lack of duplication, ease of reference, economy and broadness of distribution;

(3) The need for preparing smooth and coordinated copies in both English and French of the General Atlas, the Abridged Atlas and the Album, incorporating the major and minor changes in arrangement and substance, agreed to specifically or in principle by one of the committees of the First Session and numerous editorial improvements;

RECOMMENDS,

(1) That the Cloud Atlas shall have the following title, "International Cloud Atlas - 1953";

(2) That the Cloud Atlas shall consist of :

(a) International Cloud Atlas - 1953

(i) Volume I - Text
(ii) Volume II - Plates

(b) International Cloud Atlas - 1953
Abridged

(c) International Cloud Album for Observers in Aircraft

(3) That Volume I - Text, of the "International Cloud Atlas - 1953" shall consist of the text as outlined in Annex I of CSM I/Com-C/Doc. 10, with the understanding that in Part II, Chapter II the order of the elements within the sections 1, 2, 3 and 4 is not significant;

(4) That the definitions of the cloud genera and meteors shall be as specified in Annex II of CSM I/Com-C/Doc. 10, with the understanding that there is, in most cases, in addition, considerable descriptive matter which is partly definitive;

(5) That the code specifications for C_L, C_M, C_H shall be as specified in Annex III of CSM I/Com-C/Doc. 10; See Annex to this Recommendation.

(6) That Volume II - Plates, of the "International Cloud Atlas - 1953" shall consist of the 225 plates selected by CCH*) with appropriate legends including code figures of the clouds shown in each, in accordance with Codes C_L, C_M, C_H;

(7) That the "International Cloud Atlas - 1953 Abridged" shall consist of text and appropriate plates, not exceeding 72 in number, in accordance with the general principles and contents as set forth in Annex IV of CSM I/Com-C/Doc. 10;

(8) That it be suggested to the Commission for Aeronautical Meteorology in connection with the drafting of the observing manual for air crews and Chapter 14 of Publication No. 8 of the World Meteorological Organization that the "International Cloud Album for Observers in Aircraft" should consist of text and appropriate plates, not exceeding 30 in number, in accordance with the table of contents presented in Annex V of CSM I/Com-C/Doc. 10;

(9) That temporary working groups be established to complete the objectives, stated or implied in paragraphs3, 6 and 7, in accordance with the following general principles :

(a) The draft Volumes I and III prepared by the Committee for Clouds and Hydrometeors with those corrections and additions set forth in Annexes I and II to the Addendum to CSM I/Doc. 111, as amended and supplemented by Com. C/W.P. 3 shall form the substance of Volume I of the International Cloud Atlas - 1953. Only minor editorial changes shall be permitted;

(b) In the French text, French terms only shall be used for meteors without their English equivalents, and in the English text, English terms only shall be used for meteors;

(c) The bibliographical appendices shall be arranged according to standard bibliographic practices, and the accuracy of all listings shall be verified;

(d) The Appendix containing the etymology of Latin named clouds shall be reviewed by Latin scholars;

(10) That,

(a) The original French version shall be corrected from the English text prepared in accordance with paragraph 9;

*) The Commission for Clouds and Hydrometeors

(b) The original French version as established in 10 (a) and the English version as established in accordance with paragraph 9 shall be regarded as the official texts for translation into other languages;

REQUESTS,

(1) That the Executive Committee consider the propriety of a dedication page as included in the draft Volume I of the "International Cloud Atlas - 1953";

(2) That the Secretariat prepare the title page in accordance with standard practice of the World Meteorological Organization;

(3) That the Secretariat ensure the preservation of the original photographs, plates and cuts used in the printing of Volumes I and II of the "International Cloud Atlas - 1953";

(4) That the Secretariat investigate the feasibility of publishing all parts of the International Cloud Atlas - 1953 in the same size, format and binding as Publication No. 9 of the World Meteorological Organization.

Rec.50 (CSM-I) - INTERNATIONAL CLOUD ATLAS (VOLUME ON PHYSICS OF CLOUDS AND METEORS)

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING,

(1) That the Working Group on Clouds and Hydrometeors, established in accordance with Resolution 35 (I) of the First Congress recommended the publication of a compendium volume on the physics of clouds and meteors, the contents of which are given in the Annex hereto;

(2) That the plan and purpose of this compendium volume are substantially different from those of the parts of the Cloud Atlas already prepared;

(3) That this compendium volume would be issued considerably later than the parts of the Cloud Atlas already prepared;

(4) That there is a question of policy as to whether the World Meteorological Organization should sponsor the publication with articles signed by and credited to individual authors;

RECOGNIZING that the publication of a compendium on the physics of clouds and meteors, as given in Annex I is highly desirable;

DECIDES that the proposed compendium shall not at present be an integral part of the Cloud Atlas;

RECOMMENDS that the Executive Committee give further consideration to the problem of how a publication of this kind might be prepared and published.

* *

Cf: (1) Res. 18 (I) (Cg Paris 1951), Publ. WMO No. 1/I
(2) Res. 36 (EC-III) (EC Geneva 1952).

ANNEX

CONTENT OF A COMPENDIUM ON CLOUDS AND METEORS RECOMMENDED TO THE FIRST SESSION OF THE COMMISSION FOR SYNOPTIC METEOROLOGY BY THE WORKING GROUP ON CLOUDS AND HYDROMETEORS

The proposed compendium should consist of signed articles written by experts in micro- and macrophysics and physical synoptics of clouds and precipitation with the aim of giving meteorologists not specialized in the subject, a general idea of the present state of knowledge in these fields. Theoretical treatment of certain subjects should not be avoided but the physical basis of the processes described should be more in the foreground than the mathematical.

The compendium should consist of two sections, namely one on micro- and macrophysics and one on physical synoptics of clouds and precipitation. Details of the contents are given below.

NOTES:

(a) Chapter 1, devoted to "Particles in suspension in the atmosphere" would be a descriptive part in which the observed nature, form, dimensions, "spectrum", concentration, terminal velocity, optical and electrical properties, etc., of all particles present in the atmosphere are given.

(b) Chapter 2, devoted to "Mechanism of formation and dissipation of cloud elements and the evolution of cloud elements to precipitation elements" would be a discussion of the microphysical processes necessary for the formation or dissipation of water clouds, ice clouds or mixed clouds and the formation of various precipitation forms.

(c) Chapter 6, devoted to "fogs" would describe the macrophysical processes leading to the formation of fogs of various kinds.

(d) Chapters 7, 8, 9 and 10 will describe the various macrophysical processes leading to the formation of clouds and their related precipitation. In these chapters, the synoptic aspects should be kept to a minimum.

(e) Section II, Chapters 11, 12 and 13 will be mainly descriptive and deal with the synoptic distribution of clouds.

(f) The subject of induced precipitation would not be treated in a separate chapter; the work in this field in various parts of the world would instead be discussed at appropriate places in the compendium.

(g) Each author should make his own list of references; a composite list would be printed at the end of the book.

Rec.51 (CSM-I) - AMENDMENTS ISSUED TO VOLUME A AND FASCICULES III AND IV OF PUBLICATION No. 9

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that a pressing need exists for economy in amending Volume A and Fascicules III and IV of Publication No. 9;

RECOMMENDS,

(1) That amendments to Volume A should not normally be issued by the Secretariat more frequently than once every three months;

(2) That amendments to Fascicule III and IV should normally be issued by the Secretariat once a month;

(3) The Secretary-General of the World Meteorological Organization should be authorized to issue special amendments to Volume A and the Fascicules III and IV at any time he considers them necessary.

Rec.52 (CSM-I) - ENTRIES IN PUBLICATIONS OF THE WORLD METEOROLOGICAL ORGANIZATION

The COMMISSION FOR SYNOPTIC METEOROLOGY,

CONSIDERING that the establishment of a principle regarding the inclusion of information in publications of the World Meteorological Organization concerning meteorological facilities provided by Members, is desirable;

RECOMMENDS that in publications of the World Meteorological Organization such as Fascicule III, Publication No. 9, in which lists of meteorological facilities provided by Members appear, the only information to be included in the part listing the facilities of any particular Member should concern facilities provided by that Member; information on facilities which are not provided by that Member may be included in that list only if the prior concurrence of that Member is obtained.

Rec.53 (CSM-I) - PUBLICATION OF AN INTERNATIONAL LIST OF SELECTED AND SUPPLEMENTARY SHIPS

The COMMISSION FOR SYNOPTIC METEOROLOGY,

RECOMMENDATION 54

NOTING,

(1) The recommendation of the Commission for Maritime Meteorology, that an International list of selected and supplementary ships should be published [Recommendation 2 (CMM-I London 1952)];

(2) That this recommendation was referred by the Executive Committee to the President of the Commission for Synoptic Meteorology [Resolution 16 (EC-III)(EC Geneva 1952)];

CONCURS in this recommendation;

RECOMMENDS that the publication should also include a list of the types of instruments supplied by each Member for use in its selected and supplementary observing ships.

Rec.54 (CSM-I) - KEY STATIONS

The COMMISSION FOR SYNOPTIC METEOROLOGY,

NOTING the inadequacies of the present system of reporting cloud observations, particularly with respect to the development, direction and distance from the observer of the clouds reported;

RECOMMENDS that the procedures outlined in the Annex to this recommendation be adopted in principle on a trial basis during 1954 by at least one Member, who would desire to participate in this work and whose territory embraces a large area, and that the results be evaluated by that Member to establish the desirability of adopting such a procedure on an international basis.

ANNEX

TRIAL GROUP FOR KEY STATIONS

Certain weather stations, having full-time observers and a free horizon - especially on mountains, sea-coasts or isolated islands, and at ocean weather stations or aerodromes - should be asked to give, in a trial group, special information on the location and development of the clouds visible from the station.

The clouds in the sky may :

(1) Be evenly or irregularly distributed over all the sky;

(2) Occur as a cloud sheet, a group of clouds, or as a single cloud, which mainly occupies a certain part (a segment) of the sky, but which cannot be regarded as a cloud system, or

(3) Be arranged into a so-called cloud system.

At the observational hours for which the station shall send such a trial group, the group should never be missing in the report. (If the sky is cloudless the station shall report I_N0000. If all cloud observation is obstructed by fog, drifting snow, duststorm, or darkness, the whole trial group is reported as I_Nxxxx).

In the case of (1) above, the trial group always has the form I_NC_N999.

In the case of (2) above, the trial group has the form $I_NC_NH_Nd_Nf_N$
The letters in this group have the following meaning :

I_N - Indicator figure or sign for this type of group

C_N - Cloud reported by the trial group, according to the code for C

H_N - Angular distance from the upper edge of the cloud sheet, the group of clouds or the single cloud, down to the horizon. (See Table 1)

d_N - Direction to the highest point above the horizon of the cloud sheet, the group of clouds or the single cloud. (See page 220)

f_N - Development of the cloud sheet, the group of clouds, or the single cloud, during the last half hour, according to Table 2

In the case of (3) above, the trial group has the form $I_SC_SH_Sd_Sf_S$
The letters in this group have the following meaning :

I_S - Indicator figure or sign for this type of group

C_S - Cloud mainly forming the cloud system reported by the trial group, according to the Code for C

H_S - Angular distance from the upper edge of the cloud system down to its base at the horizon (Table 1)

d_S - Direction to the highest point above the horizon of the cloud system. (See page 220)

f_S - Development of the cloud system during the last half hour (See Table 2)

Cloud systems are mainly composed of those clouds which are reported by the code figures C_M = 1, 2, 4, 5 and 7 and also C_H = 4 - 8, but also of Cumulonimbus clouds, especially of the species capillatus, which may fuse or grow into a kind of a cloud system. In a cloud system the clouds are neither irregularly nor evenly distributed over the sky, when the cloud system is approaching. The clouds then grow up from a special segment of the horizon and are thicker or more concentrated in that direction. Moreover, an approaching cloud

system is often increasing as a whole, both as to thickness and extension, although the individual clouds, or parts of clouds, may change rapidly and even dissolve. More detailed statements concerning different kinds of cloud systems are found in the International Cloud Atlas, edition 1939.

It is important that a cloud system should not be confused with a bank of low cloud, or of fog, at a distance. By comparison, the latter is not visible at such a great distance as a cloud system. Therefore, it is generally either white or grey without any yellowish tint, and it is also denser than a bank of approaching medium or high clouds. A bank of low clouds or fog also has a rather clear-cut and generally typical wavy upper edge.

If there is more than one kind of cloud in the sky that fulfills the conditions mentioned in paragraph (2) above, then those clouds should be described each by one trial group. In this case, Cumulonimbus should be preferred for Cumulus, and Altocumulus or Stratocumulus for Stratus.

If two different cloud systems appear simultaneously in the sky in different directions, or in the same direction but at two different levels, each cloud system should be reported by one trial group. If a more or less continuous cover of low clouds (not forming a system) prevents the observer from determining whether there is a cloud system, this cloud cover should be reported as in the case (1).

Table 1

H_N H_S -- The angular distance from the uppermost edge of the cloud sheet, etc., or the cloud system, down to the horizon, in the direction d_N or d_S

Angular Distance	H_N H_S	Angular Distance	H_N H_S
0° - 5°	0	90° - 135°	5
5° - 15°	1	135° - 150°	6
15° - 30°	2	150° - 165°	7
30° - 45°	3	165° - 175°	8
45° - 90°	4	175° - 180°	9

Notes:

1. When determining the position of this edge, that part of the celestial dome within which clouds C_N form an essentially continuous cover, is taken into account. The rest of the sky where clouds C_N may occur scattered, or may be absent is left out of consideration. (See Fig. 3, page 47, in the Swedish instruction on the Synop Code, S.M.H.I, Stockholm 1952).
   In the case of a group of clouds, only the typical and rather well-developed clouds C_N are counted; the detached or torn pieces of clouds that may occur are disregarded.

2. Stations that have a theodolite, or any other instrument, for determining angular heights, should use this for determining H_N and H_S. In the lack of any instrument, the observer may use the width of the hand (including the thumb), which at full arm's length corresponds to about 10°.

d_N d_S - The direction to the highest point of the cloud sheet, etc., or the cloud system above the horizon

Notes:

1. This direction is reported according to a scale from 1 to 8, where 1 = NE, 2 = E, etc.

2. When a cloud system has surpassed zenith and still, on the whole, reaches down to the horizon in that direction from which it invaded the sky, the figure d_S still refers to this direction. When an ordinary cloud cover, or a group of clouds, or an individual cloud, has surpassed zenith, d_N is the direction to the "centre of gravity" of this cloud.

3. If the sky is entirely covered by the cloud system in question, $H_S d_S$ is reported as 99.

Table 2

f_N f_S - The development of the cloud sheet, etc., or of the cloud system, during the last half hour

Cloud Development		f_N f_S
There have been no clouds during the last half hour		0
The extension of the cloud system etc. is decreasing		1
The extension of the cloud system etc. is unchanged	but its thickness decreases	2
	and its thickness is unchanged	3
	but its thickness is increased	4

Cloud Development		f_N f_S
The extension of the cloud system etc. is increasing	but its thickness decreasing	5
	but its thickness unchanged	6
	and its thickness increasing	7
The extension of the cloud system etc. is rapidly increasing	but its thickness unchanged	8
	and its thickness increasing	9

Rec.55 (CSM-I) - INTERNATIONAL GEOPHYSICAL YEAR

The COMMISSION FOR SYNOPTIC METEOROLOGY,

NOTING,

(1) That the President of the Commission for Synoptic Meteorology has forwarded the proposals (See Annex I) for the International Geophysical Year, made by the Members of the Commission for Synoptic Meteorology, to the Secretary-General for further action;

(2) The proposals forwarded by the President of the Commission for Synoptic Meteorology to the Chairman of the Working Group on the International Geophysical Year of the World Meteorological Organization;

RECOMMENDS that the Executive Committee instruct the Secretary-General to inform Members about the final programme of the International Geophysical Year as soon as possible and to ascertain what assistance Members can render in its execution.

ANNEX

PROPOSALS FOR THE INTERNATIONAL GEOPHYSICAL YEAR

1. Pole to Pole Cross-sections. In order to fill in the gaps in the aerological network of soundings for temperature, pressure humidity, wind speed and direction along certain vertical cross sections of the atmosphere

extending between the high northern latitudes and the high southern latitudes, the countries which are traversed by or adjacent to the following lines should endeavour to maintain their existing stations or establish new ones along and adjacent to the lines :

(a) Alert, Isachsen, Mould Bay, Barrow, Kotzebue, Nome, Aleutian Islands, OWS Queen, Midway, Johnston Island, Canton Island, Fiji Islands, two or more stations in New Zealand and MacQuarie or other islands south of New Zealand.

(b) Alert southward through stations in Western Greenland and the eastern Canadian archipelago and mainland, eastern United States, West Indies, and eastern South America to southern Argentina.

(c) Station Nord in Perryland, Greenland southward through Jan Mayen, Iceland, British Isles, France, Spain and Western Africa to Cape Town.

2. Upper Air Data to at least the 200 mb pressure surface. All nations having upper air sounding stations should make every effort to have complete observations made to the greatest possible heights and at least to the 200 mb pressure surface. International days should be designated in order that those nations having only upper air sounding equipment available for non-routine observations may concentrate on high altitude soundings for those days.

3. Measurement of the water vapour content of the atmosphere at high levels. It is expected that a very sensitive water vapour absorption spectograph will be developed in the near future which can be operated on pressurized aircraft and may be suitable for obtaining data to very high altitudes.

4. Intensive study of global circulation. It will be necessary to establish aerological stations temporarily at strategic points where most required. It is suggested that the co-operation of whaling fleets in the Antarctic be sought to obtain upper air temperatures and winds in these regions.

Owing to cost of equipment, it will most likely be impossible for many Services to acquire permanent equipment and it may be useful to ascertain at an early date the extent to which larger Services might be able to provide ground installations on loan.

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page 205: Recommendation 43 (CSM-I):
Read for (a): Basic plotting model : GG A_i

Read for (b) (i) The point at the bottom of the basic symbol A_i is plotted at the location reported in the code group $L_aL_aL_oL_ok$;

page 206: Recommendation 44 (CSM-I):
Read "models" instead of "model" for the last word under RECOMMENDS.

page 207: Recommendation 45 (CSM-I):
Replace symbols by those given on attached sheet.

page 211: Recommendation 49 (CSM-I):
Paragraph (5) under RECOMMENDS: Add at the end "See Annex to this Recommendation".

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* *

ANNEX TO REC.49 (CSM-I) - INTERNATIONAL CLOUD ATLAS - EDITION 1953

The code specifications for C_L, C_M and C_H mentioned in RECOMMENDS (5) are as follows:

C_L - Clouds of the genera Stratocumulus, Stratus, Cumulus and Cumulonimbus

Technical language specifications	Plain language specifications
0 No C_L clouds	0 No Cumulus, Cumulonimbus, Stratocumulus or Stratus
1 Cumulus humilis, Cumulus fractus other than of bad weather, or both	1 Ragged Cumulus other than bad weather or Cumulus with little vertical development and seemingly flattened or both
2 Cumulus mediocris or congestus, with or without Cumulus of species fractus or humilis, or Stratocumulus; all having their bases at the same level	2 Cumulus of moderate or strong vertical development generally with protuberances in the form of domes or towers, either accompanied or not by other Cumulus or by Stratocumulus; all having their bases at the same level

Technical language specifications	Plain language specifications
3 Cumulonimbus calvus, with or without Cumulus, Stratocumulus or Stratus	3 Cumulonimbus the summits of which, at least partially, lack sharp outlines, but are neither clearly fibrous neither cirriform nor in the form of an anvil; Cumulus, Stratocumulus or Stratus may be present
4 Stratocumulus cumulogenitus	4 Stratocumulus formed by the spreading out of Cumulus; Cumulus may also be present
5 Stratocumulus other than cumulogenitus	5 Stratocumulus not proceeding from the spreading out of Cumulus
6 Stratus nebulosus, Stratus fractus other than of bad weather, or both	6 Stratus in a more or less continuous sheet or layer, or in ragged shreds or both, but no Stratus fractus of bad weather
7 Stratus fractus or Cumulus fractus of bad weather (pannus), or both, usually below Altostratus or Nimbostratus	7 Stratus fractus of bad weather or Cumulus fractus of bad weather (pannus), or both; usually below Altostratus or Nimbostratus. By "bad weather" is meant the conditions which generally exist before, during or after precipitation
8 Cumulus and Stratocumulus, other than cumulogenitus, with bases at different levels	8 Cumulus and Stratocumulus, other than those formed from the spreading out of Cumulus; the base of Cumulus is at different level from that of Stratocumulus
9 Cumulonimbus capillatus (often with an anvil), with or without Cumulus, Stratocumulus, Stratus or pannus	9 Cumulonimbus, the upper part of which is clearly fibrous (cirriform) often in the form of an anvil; either accompanied or not by Cumulus, Stratocumulus, Stratus or pannus
/or- Clouds C_L invisible owing to darkness, fog, blowing dust or sand, or other similar phenomena	/or- Cumulus, Cumulonimbus, Stratocumulus or Stratus are invisible owing to darkness, fog, blowing dust or sand, or other similar phenomena

C_M - Clouds of the genera Altocumulus, Altostratus and Nimbostratus

Technical language specifications	Plain language specifications
0 No C_M clouds	0 No Altocumulus, Altostratus or Nimbostratus
1 Altostratus translucidus	1 Altostratus, the greatest part of which is semi-transparent; through this part the sun or moon may be weakly visible as through ground glass
2 Altostratus opacus or Nimbostratus	2 Altostratus, the greatest part of which is sufficiently dense to hide the sun (or moon) or Nimbostratus
3 Altocumulus translucidus or perlucidus at a single level	3 Altocumulus, the greatest part of which is semi-transparent, other than crenelated or in cumuliform tufts; the various elements of the cloud change but slowly and are all at a single level
4 Patches of Altocumulus translucidus or perlucidus (often lenticular), continuously changing and at one or more levels	4 Patches of semi-transparent Altocumulus (often in the form of almonds or fishes) which are at one or more levels; the elements of this cloud are continuously changing of aspect
5 Altocumulus translucidus or perlucidus in bands, or a layer of Altocumulus, progressively invading the sky; these Altocumulus clouds generally thicken as a whole. The layer may be Altocumulus opacus or duplicatus	5 Semi-transparent Altocumulus in bands or Altocumulus in one more or less continuous layer progressively invading the sky; these Altocumulus clouds generally thicken as a whole. The layer may be opaque or double with a second sheet
6 Altocumulus cumulogenitus	6 Altocumulus proceeding from the spreading out of Cumulus
7 Altocumulus duplicatus or opacus, not progressively invading the sky, or Altocumulus with Altostratus or Nimbostratus, or with both	7 Any one of the following cases: (a) Altocumulus in two or more layers usually opaque in places and not progressively invading the sky; (b) Opaque layer of Altocumulus not progressively invading the sky (c) Altocumulus coexisting with Altostratus or Nimbostratus or with both

Technical language specifications	Plain language specifications
8 Altocumulus castellanus or floccus	8 Altocumulus with sprouts in the form of small towers or battlements, or Altocumulus having the aspect of cumuliform tufts
9 Altocumulus of a chaotic sky, generally at several levels; Cirrus spissatus usually coexists	9 Altocumulus, generally at several layers in a chaotic sky; dense Cirrus is usually present
/or - Clouds C_M invisible owing to darkness, fog, blowing dust or sand or other similar phenomena, or because of a continuous layer of lower clouds	/or - Altocumulus, Altostratus and Nimbostratus are invisible owing to darkness, fog, blowing dust or sand, or other similar phenomena or more because of the presence of a continuous layer of lower clouds

C_H - Clouds of the genera Cirrus, Cirrostratus and Cirrocumulus

Technical language specifications	Plain language specifications
0 No C_H clouds	0 No Cirrus, Cirrostratus or Cirrocumulus
1 Cirrus fibratus, sometimes uncinus, not progressively invading the sky	1 Cirrus in the form of filaments, strands or hooks, not progressively invading the sky (often called "mares tails")
2 Cirrus spissatus, in patches or entangled sheaves, which usually do not increase and sometimes seem to be the remains of the upper part of a Cumulonimbus; or Cirrus castellanus or floccus	2 Dense Cirrus in patches or entangled sheaves which usually do not increase and sometimes seem to be the remains of the upper part of the Cumulonimbus; or Cirrus with sproutings in the form of towers or battlements or having the aspect of Cumuliform tufts
3 Cirrus spissatus cumulonimbogenitus; either the remains of Cumulonimbus, or parts of distant Cumulonimbus the cumuliform portions of which cannot be seen	3 Cirrus, often in the form of an anvil; either the remains of the upper parts of Cumulonimbus, or parts of distant Cumulonimbus, the cumuliform portions of which cannot be seen
4 Cirrus uncinus or fibratus, or both, progressively invading the sky; they generally thicken as a whole	4 Cirrus in the form of hooks or of filaments, or both, progressively invading the sky; they generally become denser as a whole

Technical language specifications	Plain language specifications
5 Cirrus, often in bands, and Cirrostratus, or Cirrostratus alone, progressively invading the sky; they generally thicken as a whole, but the continuous veil does not reach 45° above the horizon	5 Cirrus, often in bands converging towards one or two points of the horizon and Cirrostratus or Cirrostratus only; in either case they are progressively invading the sky, and generally growing denser as a whole, but the continuous veil does not reach 45 degrees above the horizon
6 Cirrus, often in bands, and Cirrostratus or Cirrostratus alone, progressively invading the sky; they generally thicken as a whole, but the continuous veil exceeds 45° above the horizon, without the sky being totally covered	6 Cirrus often in bands converging towards one or two points of the horizon, and Cirrostratus, or Cirrostratus only; in either case, they are progressively invading the sky, and generally growing denser as a whole, but the continuous veil exceeds 45 degrees above the horizon, without the sky being totally covered
7 Cirrostratus covering the whole sky	7 Veil of Cirrostratus completely covering the celestial dome
8 Cirrostratus not progressively invading the sky and not entirely covering it	8 Cirrostratus not progressively invading the sky and not completely covering the celestial dome
9 Cirrocumulus alone, or Cirrocumulus predominant among the cirriform clouds	9 Cirrocumulus alone or Cirrocumulus accompanied by Cirrus or Cirrostratus, or both, but Cirrocumulus is the predominant cirriform cloud
/or- Clouds C_H invisible owing to darkness, fog, blowing dust or sand or other similar phenomena, or because of a continuous layer of lower clouds.	/or- Cirrus, Cirrostratus and Cirrocumulus are invisible owing to darkness, fog, blowing dust or sand or other similar phenomena, or more because of the presence of a continuous layer of lower clouds.