WORLD METEOROLOGICAL ORGANIZATION

COMMISSION FOR BASIC SYSTEMS

ABRIDGED FINAL REPORT
OF THE
EXTRAORDINARY SESSION

Geneva, 1 - 10 December 1980

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WMO - No. 569

Secretariat of the World Meteorological Organization - Geneva - Switzerland
1981

ISBN 92 - 63 - 10569 - 3

NOTE

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LIST OF PERSONS ATTENDING THE SESSION

1. Officers of the session

J. R. Neilon	president
A. A. Vasiliev	vice-president

2. Representatives of WMO Members

M. Belbachir	principal delegate	Algeria
D. Belhosseine	delegate	
M. Mati	delegate	
S. A. Teffahi	delegate	
M. Yermeche	delegate	
A. Zehar	delegate	
J. A. Xavier	principal delegate	Angola
A. Nilde Goma (Mrs)	delegate	
S. Alaimo	principal delegate	Argentina
R. B. Crowder	principal delegate	Australia
P. F. Noar	delegate	
H. Maier	principal delegate	Austria
A. Quinet	principal delegate	Belgium
E. De Dycker	delegate	
G. Doumont	delegate	
I. Kanchev	principal delegate	Bulgaria
S. Milouchev	delegate	
I. M. Skuratovich	principal delegate	Byelorussian S.S.R.
P. I. Johns	principal delegate	Canada
J. Kruus	delegate	
G. A. McPherson	delegate	
R. Sônia Gomes de Sousa (Mrs)	principal delegate	Cape Verde
M. Gomes Rodriguez	delegate	
F. Roll Fuenzalida	principal delegate	Chile
Wang Shiping	principal delegate	China
Ruan Zujun	delegate	
Wang Caifang	delegate	

2. Representatives of WMO Members (contd.)

C. H. Arias	principal delegate	Colombia
E. Bernal	delegate	
G. Mankedi	principal delegate	Congo
A. Pouyouros	principal delegate	Cyprus
M. Pissas	delegate	
A. Papež	principal delegate	Czechoslovakia
Jong Yong Gu	principal delegate	Democratic People's
Hong Su Nam	delegate	Republic of Korea
Jo Gyoung Won	delegate	
F. A. Schrils Vidal	principal delegate	Dominican Republic
V. Lembert	delegate	
K. A. Khalil	principal delegate	Egypt
S. P. Huovila	principal delegate	Finland
J. Rinne	delegate	
J. M. Rainer	principal delegate	France
J. Bedel	delegate	
M. Merlet	delegate	
J. Pailleux	delegate	
P. Mba	principal delegate	Gabon
J. A. Sam	principal delegate	Gambia
E. Peters	principal delegate	German Democratic Republic
T. Mohr	principal delegate	Germany, Federal
W. Bopp	delegate	Republic of
J. Lieckfeld	delegate	
K. S. Tsui	principal delegate	Hong Kong
A. Kapovits	principal delegate	Hungary
Siregar Lukmanul Hakim	principal delegate	Indonesia
Sujitno	delegate	
J. M. Delaimi	principal delegate	Iraq
H. Minassian	delegate	

2. Representatives of WMO Members (contd.)

P. K. Rohan	principal delegate	Ireland
R. O. Mathews	delegate	
S. Jaffe	principal delegate	Israel
M. Levi	delegate	
F. Mosco	principal delegate	Italy
G. de Florio	delegate	
J. Djigbenou	principal delegate	Ivory Coast
T. Terauchi	principal delegate	Japan
M. Ochi	delegate	
A. I. Abandah	principal delegate	Jordan
H. Shair	delegate	
E. A. Mukolwe	principal delegate	Kenya
J. G. Wairoto	delegate	
R. A. Al-Sanei	principal delegate	Kuwait
T. K. Al-Alami	delegate	
Kou Sengdara	principal delegate	Lao People's Democratic Republic
T. Vongsyprasomtu	delegate	
A. Aboul Hosn	principal delegate	Lebanon
T. Tuoane	principal delegate	Lesotho
T. von Zweigbergk	delegate	
M. Ali Issa	principal delegate	Libyan Arab Jamahiriya
Z. Musbah Shafee	delegate	
J. M. Mifsud	principal delegate	Malta
S. Aguilar Anguiano	principal delegate	Mexico
O. Garrido-Ruiz (Miss)	delegate	
A. El Khatib	principal delegate	Morocco
J. Kastelein	principal delegate	Netherlands
J. A. Wisse	delegate	
C. F. Reudink	principal delegate	Netherlands Antilles
A. A. Neale	principal delegate	New Zealand

2. Representatives of WMO Members (contd.)

M. Boulama	principal delegate	Niger
F. O. Ókulaja	principal delegate	Nigeria
S. I. Adebayo	delegate	
O. Haug	principal delegate	Norway
A. Moene	delegate	
A. R. Al-Harmi	principal delegate	Oman
A. L. Huneidi	delegate	
J. Michalczewski	principal delegate	Poland
R. A. Costa Carvalho	principal delegate	Portugal
I. H. Al-Majed	principal delegate	Qatar
Seo Sang Moon	principal delegate	Republic of Korea
Sun Yong Kang	delegate	
A. K. Henaidi	principal delegate	Saudi Arabia
K. Faleh	delegate	
A. Yaghmour	delegate	
F. Jondot	principal delegate	Senegal
J. Sanchez	principal delegate	Spain
J. M. Rubiato	delegate	
R. Berggren	principal delegate	Sweden
L. Giörne	delegate	
M. Haug	principal delegate	Switzerland
D.-A. El-Fattal	principal delegate	Syrian Arab Republic
A. Hanna	delegate	
A. Sabbagh	delegate	
H. Malky	delegate	
B. Jalal	delegate	
B. Saragganandа	principal delegate	Thailand
T. Kechrid	principal delegate	Tunisia
V. Chovnovitch (Mrs)	principal delegate	Ukrainian S.S.R.

2. Representatives of WMO Members (contd.)

E. I. Tolstikov	principal delegate	U.S.S.R.
I. A. Ravdin	delegate	
E. G. Lomonosov	delegate	
A. D. Chistiakov	delegate	
A. A. Vasiliev	delegate	
K. Saenko	delegate	
V. Konoplev	delegate	
F. H. Bushby	principal delegate	United Kingdom
M. Atkins (Miss)	delegate	
D. R. Grant	delegate	
J. W. B. Richards	delegate	
E. Fotso	principal delegate	United Republic of Cameroon
W. D. Bonner	principal delegate	United States of America
C. A. Spohn	delegate	
G. D. Cartwright	delegate	
J. R. Neilon	delegate	
D. A. Olson	delegate	
B. Zavos	delegate	
S. Drabo	principal delegate	Upper Volta
C. A. Grezzi	principal delegate	Uruguay
R. R. Silva	delegate	
D. N. A. Araujo	principal delegate	Venezuela
V. Jurceč (Mrs)	principal delegate	Yugoslavia
G. Osil	principal delegate	Zaire
V. A. Simango	principal delegate	Zambia

3. Observers from non-Member countries

M. McCarthy	Holy See

4. Observers from international organizations

M. Cervesato	Food and Agriculture Organization of the United Nations
R. E. Hunt	Intergovernmental Oceanographic Commission
F. A. L. Oliveira	International Civil Aviation Organization

4. Observers from international organizations (contd.)

F. Masson	Inter-Governmental Maritime Consultative Organization
D. Söderman R. Newson	European Centre for Medium-range Weather Forecasts
L. Finaud	Agency for Air Safety in Africa and Madagascar

5. Observer

S. Kaddoura	Palestinian Liberation Organization

6. WMO Secretariat

G. K. Weiss	Representative of the Secretary-General
H. Bari	
E. B. Fawcett	
F. Pimenta Alves	
J. Luo	

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GENERAL SUMMARY OF THE WORK OF THE SESSION

1. OPENING OF THE SESSION (Agenda item 1)

1.1 The extraordinary session of the Commission for Basic Systems was held in Geneva from 1 to 10 December 1980. In view of the large number of participants at this session, all meetings were held at the "Centre international de conférences de Genève (CICG)". All documents were provided in the four working languages of the Organization and simultaneous interpretation in these languages was provided in all plenary meetings and in meetings of the working committees. Since, for financial reasons, only one team of interpreters could be made available for the session, it was decided that the working committees would meet consecutively.

1.2 The session was opened by the president of the Commission, Mr. J. R. Neilon, at 10.10 a.m. on 1 December 1980.

1.3 Prof. A. C. Wiin-Nielsen, Secretary-General of the World Meteorological Organization, expressed his pleasure in welcoming the participants to the extraordinary session of the Commission for Basic Systems. He recalled that CBS is dealing with areas in which rapid technical developments are taking place and mentioned the new means of observing the atmospheric parameters, such as satellites, buoys, ASDAR and others, and the effect they will have on the organization of the present system. Prof. Wiin-Nielsen said that communication techniques were also rapidly developing and, although the Global Telecommunication System (GTS) functioned in an ideal way on paper, there still existed differences between theory and practice. He said that it should be the goal of CBS to develop the best GTS possible, considering the technical possibilities and the economic limitations. In conclusion, Prof. Wiin-Nielsen expressed his wishes for a successful extraordinary session and his hope that good progress would be made.

1.4 In his opening address, the president of CBS, Mr. J. R. Neilon, reviewed the activities of the Commission since its seventh session and the progress that had been made by the Global Observing System, the Global Data-processing System and the Global Telecommunication System since the original WWW plan was approved and recalled the substantial contributions the WWW made to the different research programmes. He considered in some detail the Integrated WWW System Study and expressed the view that this extremely important activity should be fully co-ordinated with all members of the Commission, other technical commissions and other WMO programmes and bodies. Mr. Neilon said that he did not expect this study to result dramatically and suddenly in a completely new WWW, but in an improved WWW. In conclusion, the president said that with hard work, imagination, talent and the spirit of co-operation that had long been a hallmark of WMO activities, it would be possible to improve not only the systems that would be considered during the session, but also the quality of life on this planet.

1.5 There were 150 participants at the extraordinary session. These included 141 representatives from 74 Members of WMO, one observer from a non-Member country of WMO and eight representatives from six international organizations and a non-governmental body. A complete list of participants is given at the beginning of this report.

2. ORGANIZATION OF THE SESSION (Agenda item 2)

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

At the first plenary meeting the representative of the Secretary-General presented a list of countries, non-Member countries and international organizations represented at the extraordinary session. This list was accepted as the first report on credentials and further reports would be submitted to the extraordinary session at ensuing plenary meetings. It was decided not to set up a Credentials Committee.

2.2 Adoption of the agenda (Agenda item 2.2)

The provisional agenda was adopted at the first plenary meeting without change. The final agenda is reproduced at the beginning of this report, together with an indication of the relevant documents and numbers of resolutions and recommendations.

2.3 Establishment of committees (Agenda item 2.3)

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

(a) Committee A: To consider agenda items 6, 7, 10 and those parts of items 4 and 9 relating to GDPS and codes. Mr. R. B. Crowder (Australia) was elected chairman and Mr. A. K. Henaidi (Saudi Arabia) vice-chairman of the committee;

(b) Committee B: To consider agenda items 5, 8 and those parts of items 4 and 9 relating to GOS and GTS. Mr. P. I. Johns (Canada) was elected chairman and Mr. E. A. A. Mukolwe (Kenya) vice-chairman of the committee.

2.3.2 Co-ordination Committee

In accordance with WMO General Regulation 27, a Co-ordination Committee was set up consisting of the president and vice-president of CBS, the chairmen and vice-chairmen of the two working committees and the representative of the Secretary-General.

2.4 Other organizational questions (Agenda item 2.4)

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

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

The Commission noted with appreciation the report submitted by the president on the activities of CBS since its seventh session. All items in this report requiring action by the Commission were considered under the relevant parts of the agenda.

4. THE INTEGRATED WWW SYSTEM STUDY (Agenda item 4)

The Commission noted that since its seventh session, Eighth Congress had agreed to the proposal for an Integrated WWW System Study and the Executive Committee had endorsed the overall objectives of the study. In this connexion, the Commission took special note of the emphasis placed by the Executive Committee on the need to plan an improved WWW with a time-frame which would allow the full participation of Members. During a lengthy discussion on the Integrated WWW System Study, several important points were mooted:

(a) The basic purpose of the Integrated WWW System Study is not to create a new WWW system but to fulfil more completely the objectives in the WWW plan through careful co-ordination of the further implementation of new facilities for observation, collection, processing and transmission of data for the benefit of all Members. The study will thus provide a realistic long-term plan or guide to be used by Members in developing their national programmes for future improvements in the WWW;

(b) Strong emphasis was placed on the need to narrow the gap in implementation and operation of the WWW which now exists between developed and developing countries. Appropriate approaches must be found for transferring technology to the developing countries and assisting them in the implementation and operation of the WWW;

(c) A substantial part of the work of the WWW system study is expected to be carried out over the next two years. Some Members commented that this schedule of work might be too ambitious in view of resources available for the study;

(d) The actual implementation of the study will be carried out in a step-by-step fashion over many years, perhaps a decade, following the acceptance by Congress of the results of studies and tests of the

improved system. Many Members strongly emphasized the need to maintain continuity in the operation of the current system and to introduce improvements to eliminate existing shortcomings in the WWW.

4.1 Preliminary specification of the design studies (Agenda item 4.1)

4.1.1 Before considering the study areas for the Integrated WWW System Study, the Commission reviewed the basic principles and guidance information which had been elaborated by the IPM on the Integrated WWW System Study (Geneva, September 1980). The Commission introduced some amendments to clarify their meaning, and approved these lists of principles and guidelines, as given in Annex I. The Commission agreed that they should be used as a basis for carrying out the Integrated WWW System Study.

4.1.2 The Commission reviewed the study areas proposed by the IPM on the Integrated WWW System Study (Geneva, September 1980). The Commission agreed that studies on the optimized observing system should have the highest priority among the study areas. It was also agreed that the study areas on preparation of output products and user interface function should be combined into one study area, and that a study area on technology transfer should be added to the list. The Commission agreed that the study areas and the regional observing system experiments, as given in Annex I, should be used as a basis for elaborating the detailed studies to be carried out under the Integrated WWW System Study.

4.2 Arrangements for carrying out the integrated study (Agenda item 4.2)

4.2.1 The Commission reviewed the arrangements for carrying out the integrated study, as elaborated by the IPM on the Integrated WWW System Study (Geneva, September 1980). Taking into consideration the study areas which were identified under agenda item 4.1, the Commission agreed on the course of action and time limits outlined in the following paragraphs.

4.2.2 The overall co-ordination of the conduct of the Integrated WWW System Study should be carried out by the president of CBS with the assistance of the CBS Advisory Working Group and the WMO Secretariat. Individual studies may draw on national or multilateral studies being conducted by Members or the services of experts seconded by Members to the WMO Secretariat may be required. The Commission noted the decision of the thirty-second session of the Executive Committee that the Joint Scientific Committee of GARP and the WCP will play a major role in the planning of the optimized observing system, in particular, in Phases I and II (reference EC-XXXII, general summary, paragraph 3.1.3.5). The Commission also recognized that there may be certain urgent individual studies which need to be conducted in 1981 and felt that arrangements for these studies should be decided by the president of CBS.

4.2.3 The CBS working groups should be asked to further define and review the various study areas for an improved WWW system. These tasks would be assigned as follows:

(a) Optimized Observing System — WG on the GOS

(b)	Interrelation of data processing/ data communications	WGs on the GDPS and GTS
(c)	Improvement of the GTS	WG on the GTS
(d)	Information exchange formats	WGs on Codes, GDPS and GTS
(e)	Output products and user interface	WGs on GDPS and GTS
(f)	Technology transfer	Advisory Working Group

4.2.4 Since the report of this extraordinary (1980) session of the Commission would be considered by the Executive Committee at its thirty-third session, the decisions of the Committee concerning the study, and in particular the arrangements for carrying it out, would also be considered in the further development of plans for the study.

4.2.5 The individual studies to be carried out within each study area, as well as their priorities, should be identified by the appropriate CBS working groups as a matter of urgency, preferably by the end of March 1981. This work would be carried out mainly by correspondence.

4.2.6 The WMO Secretariat should co-ordinate the responses from the working groups and prepare a consolidated list of the proposed individual studies and circulate it, at the latest by mid-May, to all WMO Members with a view to obtaining information on whether any of the studies is already being, or is intended to be, undertaken by one or more Members, as well as on the willingness of Members to contribute to any of the studies. It was agreed that all Members should be invited to contribute to the studies. The replies should be available in the Secretariat, if possible, by the end of June 1981.

4.2.7 The information available at the end of June 1981 should be submitted by the Secretariat to the president of CBS and the sixth session of the CBS Advisory Working Group, provisionally scheduled for September 1981. The Advisory Working Group would then:

(a) Establish an overall priority of the proposed individual studies;

(b) Propose the experts or bodies (e.g. JSC, EC Panel of Experts on Satellites) for drafting the specifications and for supervision of each individual study in co-ordination with the WMO Secretariat;

(c) Propose the experts or body who will conduct the study.

4.2.8 Progress in the conduct of the individual studies should be reviewed by the session of the Advisory Working Group of CBS to be held in June 1982.

4.2.9 The results of the individual studies, as available, should be consolidated into a draft overall improved WWW system design by an informal planning meeting, to be held at the latest in September 1982 (ten working days). The draft should then be submitted for consideration by the eighth session of CBS, provisionally scheduled for the second half of 1982.

4.2.10 The Commission also requested the Secretary-General to publish technical reports of the results of individual studies as they became available. In this connexion, it was emphasized that complex technical matters should be clearly discussed, and that the meaning of special terminology should be described or defined somewhere in the text of the report.

5. GLOBAL OBSERVING SYSTEM (Agenda item 5)

5.1 Report by the chairman of the Working Group on the GOS (Agenda item 5.1)

The Commission noted with appreciation the report of the chairman of the Working Group on the Global Observing System, Dr. T. Mohr (Federal Republic of Germany). In his report, the chairman expressed his warm thanks to the members of the Study Group on the Manual and the Guide on the GOS for the valuable task they accomplished on the occasion of the first session of the study group in August 1980 in Geneva. He also explained that the second study group established within the working group - on the best mix of observing systems - had so far conducted its work entirely by correspondence, and that it took into account the conclusions reached at a number of meetings of direct interest to its work, such as the Informal Planning Meeting on New Observing Systems (Geneva, 3-10 December 1979) and the ASDAR Preparatory Meeting of Experts (Montreal, 10-14 March 1980). The Commission concurred with the views expressed by the chairman of the Working Group on the GOS that a session of the Study Group on the Best Mix of Observing Systems should be held and noted that the first session is foreseen for 1981 as well as the Working Group on the GOS later in the same year.

5.2 Amendments to the Manual on the Global Observing System (Agenda item 5.2)

5.2.1 The Commission examined the part of the report of the Study Group on the Manual and the Guide on the Global Observing System concerning the Manual. The study group had to transfer from Volume I of the WMO Technical Regulations to the Manual on the GOS most of the regulations pertaining to the Global Observing System contained in this volume, as well as a number of the definitions. When needed, they were reviewed and those concerning terms no longer used in the publication were deleted and proposals made for new ones.

5.2.2 The Commission agreed that almost all the regulations so far contained in Chapters A.1.1 to A.1.3 of Volume I of the WMO Technical Regulations are to be transferred to the Manual and that Volume I of the Technical Regulations should only contain a very short chapter composed of fundamental regulations concerning the Global Observing System. Consequently, it decided that such a chapter should contain four new regulations and that the introductory section should be amended as well as the definitions section and the appendices. Recommendation 1 (CBS-Ext.(80)) was adopted.

5.2.3 The Commission then examined the Manual on the GOS, having transferred the regulations hitherto contained in Volume I of the Technical Regulations, and considered the proposals for amendments made by the study group as regards the definitions on the one hand and the regulations themselves on the other.

5.2.4 In reviewing the definitions of the terms used in the Manual and in formulating proposals for additional ones, the study group used in some cases information contained in the Guide to Meteorological Instrument and Observing Practices and also definitions contained in the International Meteorological Vocabulary. The Commission carefully examined the definitions submitted by the study group and found most of them to be adequate. However, it considered that a number of the proposed definitions needed to be revised and re-formulated as they sometimes also involved other WMO technical commissions. These definitions were in particular those on "Related environmental observation", "Weather" and "Weather radar". It also felt that the terms "accuracy" and "resolution" as used in Attachments II-2 and II-3 should be defined. It was reported that these terms as applied to instrument measurements would be defined in the new edition of the Guide to Meteorological Instrument and Observing Practices, but a definition of the term "resolution" in the sense used in the attachments should be requested from the Working Group on the Global Data-processing System.

5.2.5 The Commission also considered that a number of terms defined in the International Meteorological Vocabulary (WMO Publication No. 182) were no longer up to date and needed to be re-examined. Such terms are the following:

- Aircraft meteorological station
- Meteorological element
- Observational network (Meteorological network)
- Planetary boundary layer (Friction layer)
- Surface observation
- Upper-air observation
- Weather

5.2.6 The Commission was informed that different technical commissions were considering the meaning of meteorological terms and definitions and that the International Meteorological Vocabulary is being reviewed. The Commission agreed to invite the Executive Committee to consider the question of the definitions of meteorological terms and other related terms used in WMO publications as a whole and, if possible, to establish a mechanism within WMO aiming at obtaining uniformity of the definitions of all terms used in all WMO programmes and the relevant WMO publications and documents.

5.2.7 The Commission expressed the view that the present organization of the Manual was difficult to follow and might need to be restructured. In this connexion, the Commission was of the opinion that the observational requirements expressed in Attachment II-2 to Part II needed to be reconsidered and, more specifically,

defined for surface and upper-air observations. It also considered that the requirements expressed in this attachment only concerned numerical modelling and that requirements for spatial and temporal resolution and accuracy of data from other observational networks should be incorporated in the Manual. As far as Attachment VI-1 was concerned, the Commission decided that it should be eliminated from the Manual as soon as the information it contains is incorporated in the Manual on the Global Data-processing System.

5.2.8 The Commission considered that at a later date a number of sections of the Manual could be expanded so as to include more detailed information on certain types of meteorological observing stations, the elements these stations should observe, the time and the frequency of these observations and the supervision required. It noted that the section concerning equipment and methods of observation referred only to surface observations and that in the future a similar section should be developed for upper-air observations as well as for observations made by meteorological reconnaissance aircraft stations and by aircraft meteorological stations.

5.2.9 The Commission agreed that, with respect to wind speed and direction measurements, the Commission for Climatology and Applications of Meteorology (CCAM) be requested to specify the period over which the observation of wind for climatological purposes should be averaged.

5.2.10 The Commission agreed that information on the frequency of comparisons of radiosondes and of radiation instruments be obtained from the Commission for Instruments and Methods of Observation (CIMO) for later inclusion in the Manual.

5.2.11 The observer from the International Civil Aviation Organization (ICAO) expressed the view that aeronautical meteorological stations should only be part of the Global Observing System if they also make meteorological observations for synoptic purposes and that such stations should be excluded from the GOS when they are intended for aeronautical purposes only. Some Members pointed out that all stations carrying out meteorological observations participate in the Global Observing System; it was for this reason that this category of station had long been included in the WMO Technical Regulations and was also included in the WWW plan for 1980-1983. Consequently, it was agreed that the question be referred to the Executive Committee for consideration.

5.2.12 Recommendation 2 (CBS-Ext.(80)) was adopted.

5.3 Amendments to the Guide on the Global Observing System (Agenda item 5.3)

Noting that a considerable portion of the contents of the Guide on the Global Observing System had been transferred to the Manual, the Commission was of the opinion that the Guide should be redrafted in such a way as to contain the necessary complementary information which will assist Members in the implementation and operation of the GOS.

5.4 Operational Aircraft to Satellite Data Relay (ASDAR) programme

5.4.1 The Commission examined a document submitted by the U.S.A. on the progress being made in that country to develop an Automated Aircraft Reporting System

(AARS) for wide-bodied aircraft which incorporates both the Aircraft to Satellite Data Relay (ASDAR) system and ARINC Communications Addressing and Reporting System (ACARS). The meeting called for urgent action in support of the Operational ASDAR System Plan and Implementation Programme, as adopted by the Executive Committee (Resolution 1 (EC-XXXII)) and stressed the importance of maintaining the momentum achieved with the experimental ASDAR programme for FGGE from which 13 ASDAR units are still in operation and are expected to continue in operation in 1981.

5.4.2 The Commission welcomed the information on the development of an Automated Aircraft Reporting System (AARS) for wide-bodied jets incorporating both ASDAR and ACARS, and expressed interest and support for the introduction of a combined ASDAR-ACARS/MOAT concept in the WWW. Consequently the Commission agreed to request the Secretary-General to inquire as to:

(a) The nature and extent of any possible participation on the part of Members or airline operators and the kinds of funding arrangements which might be possible;

(b) The desire of Members or airline operators to participate in obtaining and certifying pre-production models on any of the suitable aircraft (such as the B-747, DC-10 or L-1011);

(c) The interest that might be present in Members' countries to purchase and operate any of the three versions offered:

(i) Which version and how many;

(ii) Over what time-frame;

(iii) Which types of aircraft might be used and over which routes.

5.4.3 The Commission noted with satisfaction the information provided by the observer from ICAO on his organization's interest in the Operational Aircraft to Satellite Data Relay (ASDAR) Programme.

5.5 Drifting buoy programme

5.5.1 The Commission also examined a document submitted by the U.S.A. on drifting buoys as a new observing system to be incorporated in the Global Observing System. Many delegations expressed their interest in this system, which had been successfully tested during the recent FGGE. The Commission welcomed the assurance given by both the U.S.A. and France that ARGOS facilities required for the operation of a buoy system will be continued at least until 1987. Mention was made in this connexion of an inquiry conducted by the Secretariat among Members on their activities in the field of drifting buoys. In addition, some delegations informed the session of their plans for the deployment of fixed or drifting buoys in the near future. The Commission noted with appreciation the efforts of some Members in continuing to deploy drifting buoys, stressed the importance of maintaining the momentum achieved during the buoy programme for FGGE and agreed to encourage Members to continue national buoy programmes, to expand them and to establish new programmes as contributions to the GOS.

5.5.2 The observer from the Intergovernmental Oceanographic Commission (IOC) informed the Commission that the oceanographic community found the data from drifting buoys during FGGE valuable both for research and for services such as IGOSS. Meteorologists and oceanographers need to co-operate so that the parameters and the distribution of the drifting buoy system will serve the needs of both communities.

5.6 Future work programme of the GOS

The Commission reviewed the future work programme of the Working Group on the Global Observing System as drawn up at the last session of the Commission and reviewed at the fifth session of the CBS Advisory Working Group. It was agreed that the following tasks would constitute, in this order of priority, the reviewed future work programme to be accomplished by the working group.

(a)* Study of the best mix of observing systems;

(b)* Study of new observing technology and methods for inclusion in the GOS;

(c)* Increased use of aircraft data, including the use of new automated observation methods and techniques;

(d) Monitoring of the operation of the GOS;

(e) Quality control of observational data;

(f) Review of the Manual on the Global Observing System so as to include in it the sections referred to in paragraph 5.2.8 above and also the additional information to be provided by CCAM and CIMO;

(g) Redraft of the Guide on the Global Observing System in accordance with the views expressed in paragraph 5.3;

(h) Study of methods for reduction of Level-I data from automatic weather stations.

6. CODES (Agenda item 6)

6.1 Report by the chairman of the Working Group on Codes (Agenda item 6.1)

6.1.1 The Commission noted with appreciation the report by the chairman of the Working Group on Codes, Mr. G. Doumont (Belgium). The report reviewed the activities of the working group since the seventh session of CBS in November 1978, including its future work programme. The items listed in the report are discussed under the appropriate agenda items.

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* The studies required for the Integrated WWW System Study will be undertaken with the tasks (a), (b) and (c) above.

Future work programme

6.1.2 The Commission reviewed the future work programme of the Working Group on Codes and felt that coding problems would remain an important area of concern in CBS activities. The routine maintenance of existing code forms must continue. This effort would include the improvement and correction of difficulties with the new common surface code (e.g. elimination of artificialities, such as addition of "50" in coding wind speeds above 99 kt). Special efforts would be required for the complete editorial revision of Volume I of the Manual on Codes and for the development of a layout of a guide or special section on coding procedures in Volume I of the Manual on Codes. The working group also has important work to accomplish in the development of a proposal for a new generation of codes or formats to be used in an improved integrated WWW system.

6.1.3 The Commission also noted the decision of the thirty-second session of the Executive Committee to continue consultations with ICAO and other users of meteorological information to reach agreement on the units of wind speed to be used in international exchange or for meteorological applications. Since these consultations were still in progress, the Commission felt that it was therefore premature for the working group to begin work on the revision of aviation code forms and regulations.

6.2 Implementation aspects of common surface code FM 12-VII and FM 13-VII (Agenda item 6.2)

Regional coding procedures and coding procedures for use in Antarctica

6.2.1 The Commission noted that regional coding procedures for FM 12-VII SYNOP and FM 13-VII SHIP had been approved by the six regional associations. The Commission further noted that a draft of "regional" coding procedures for use in Antarctica would be brought to the attention of EC-XXXIII for approval. This draft includes a revision of the regional code MOBIL which has been adapted to the new common code.

Implementation and testing of the new code

6.2.2 The Commission was informed of the decision of the thirty-second session of the Executive Committee to conduct a programme of roving seminars to assist Members in the preparation of national instructions and procedures for implementation of the new common code. The Commission emphasized the great importance of such seminars, and requested the Secretary-General to proceed with the programme as soon as possible. In this connexion, the Commission also emphasized the need to contact all Members, especially those from developing countries, concerning their needs for assistance in implementing the new common code.

6.2.3 The Commission was also informed of the intent of thirty-five Members to make operational transmission and processing tests using the new common code, in response to a request by the Executive Committee. The Commission agreed that any results of these tests which reveal problems with the global parts of the code form and its regulations should also be brought to the attention of the Working Group on Codes (see paragraph 6.1.2).

6.2.4 The Commission considered a proposal, submitted by one Member, concerning the reduction of the amount of information exchanged regionally by means of Section 3 of the new common surface code. This matter was also discussed under item 8. The Commission realized that there might be a temporary requirement to reduce the volume of data exchanged in the regional section of the new code before GTS centres are capable of separating the regional section of the code from the global section. Accordingly, the Commission requested its president to bring this matter to the attention of the presidents of the regional associations, with a view to their consideration of further action on the matter. Some Members expressed the need of certain large data-processing centres for information contained in Section 3 of the code (e.g. state of the ground and snow cover).

Deletion of FM 26-IV SPESH

6.2.5 The Commission noted that the code FM 26-IV SPESH was not included in the list of codes to be deleted from the Manual on Codes on 1 January 1982. The Commission was informed that an inquiry among Members had shown that this code was rarely used and that there was no need to continue using it. Recommendation 3 (CBS-Ext.(80)) was adopted.

6.3 Amendments to existing WMO codes (Agenda item 6.3)

6.3.1 The Commission considered several proposals for minor amendments to existing codes which had been studied by the restricted session of the Working Group on Codes and had been reviewed by the presidents of the technical commissions concerned. Recommendation 4 (CBS-Ext.(80)) was adopted.

Amendments to aeronautical codes

6.3.2 The Commission considered a proposal of ICAO to amend Regulation 48.5 of FM 48-V ARMET and the specification for code figure 86 in code table 4678 to make the Manual on Codes consistent with the WMO Technical Regulations. Furthermore, it considered the proposal of a Member to insert the definition of "highest minimum sector altitude" as given in ICAO PANS-OPS in a note to Regulation 15.9 of FM 15-V METAR and Regulation 51.7 of FM 51-V TAF. Recommendation 5 (CBS-Ext.(80)) was adopted.

Amendment to codes FM 35-V TEMP, FM 36-V TEMP SHIP and FM 37-VII TEMP DROP

6.3.3 The Commission considered a proposal to amend Regulation 35.2.4.3 in order to clarify the interpretation of the indicator figures 66 and 77. Recommendation 6 (CBS-Ext.(80)) was adopted.

Amendment to code table 4677

6.3.4 The Commission noted that the specification for code figure 19 in code table 4677 - Present weather - was not sufficient. However, the Commission felt that there was a need for further study of definitions of the weather phenomena involved and for consultations with ICAO, since this terminology is also used in ICAO regulatory material. Accordingly, the Commission requested its Working Group on GOS to study

the matter, prior to its consideration by the Working Group on Codes. The Secretary-General was also requested to co-ordinate the resulting proposals with ICAO.

7. GLOBAL DATA-PROCESSING SYSTEM (Agenda item 7)

The Commission was informed of the action by Regional Association II following the expression by several Members at its seventh session (Geneva, June 1980) of the need for an RMC in south-west Asia, and of the agreement by Saudi Arabia to establish an RMC in Jeddah. The Commission also noted that Regional Association II had adopted a recommendation to establish an RMC in Jeddah and gave its support to this recommendation.

7.1 Report by the chairman of the Working Group on the GDPS and the report of the fifth session of the working group (Agenda item 7.1)

In the absence of the chairman of the Working Group on the GDPS, the chairman's report was presented by Dr. V. Jurčec (Yugoslavia). The Commission noted with appreciation the report which reviewed the working group's activities since the seventh session of CBS in November 1978, including its future work programme. The items listed in the report are discussed under the appropriate agenda items.

Amendments to the Manual on the GDPS

7.1.1 The Commission reviewed Volume I of the Manual on the GDPS in the light of the decisions of Eighth Congress concerning the inclusion of RMCs at Lagos (Nigeria), Antananarivo (Madagascar) and Beijing (China) in the WWW plan 1980 - 1983. The Commission therefore made the necessary changes in Attachment I.1 to Volume I - Location of WMCs and RMCs. These are included in the annex to Recommendation 7 (CBS-Ext(80)), given in paragraph 7.1.3.

7.1.2 The Commission considered a proposal of the Working Group on the GDPS to bring the plotting model for surface observations, which is included in Attachment II.4 to Volume I of the Manual on the GDPS, into line with the new common code FM 12-VII SYNOP and FM 13-VII SHIP. The provisional text of these amendments had been sent to Members for comments and operational testing with the new code, as called for by EC-XXXI. After reviewing all the comments received from Members, the Commission decided that among these there were certain minor amendments, some of an editorial nature, which would improve the proposal of the working group. The Commission also agreed that the Working Group on the GDPS should carry out further studies on plotting models, taking into consideration:

(a) Results of tests on the proposed model to be completed by April 1981;

(b) Other models used in various countries after the introduction of the new common code FM 12-VII and FM 13-VII;

(c) The need for standardization of plotted charts for international exchange (e.g. facsimile transmissions), having regard for the scale of the charts and the requirements of users;

(d) Comments made by Members prior to and during the extraordinary session (1980) of CBS.

7.1.3 The Commission adopted Recommendation 7 (CBS-Ext.(80)).

Marine Environmental Data Information Referral System

7.1.4 The Commission recalled the decision taken at its seventh session to request the working group to study the matter of the technical aspects of WMO participation in MEDI further, in view of the need to elaborate a referral system for data stored within WMO programmes. Having considered the views expressed on this matter at the fifth session of the Working Group on the GDPS, the Commission agreed that the Working Group on the GDPS should participate in the development of a viable WMO referral system which can interface with referral systems of other bodies, such as IOC. In the meantime, the Commission encouraged participation in MEDI by appropriate and interested WWW centres. Accordingly, the Commission requested the Secretary-General, with the assistance of IOC, to invite certain Members operating WMCs, RMCs and large NMCs to participate in MEDI.

Report of the Executive Committee Panel of Experts on Satellites

7.1.5 The Commission was informed of the discussion at the fifth session of the EC Panel of Experts on Satellites concerning requirements of Members, WMO programmes and other organizations and bodies for satellite data. It was recognized that satellite data are playing an increasingly important role in both WWW real-time and non-real-time operations. However, some delegates expressed their deep concern that the changes in on-board hardware made by the satellite operators caused expensive receiving equipment used by the Members to become obsolete. Recognizing that changes are sometimes inevitable, the Commission requested the representatives of the satellite operators to give due consideration to the impact of satellite changes on the ground systems and to minimize, as far as is feasible, such impacts. The Commission supported the proposal by the EC Panel of Experts on Satellites that a small informal working group consisting of experts from satellite operators and interested Members take the responsibility of reviewing and updating requirements for satellite data in support of continuing WWW needs. The Commission requested its president to keep it informed of developments in this area.

Future work programme

7.1.6 The Commission reviewed the future work programme of the Working Group on the Global Data-processing System as drawn up at the fifth session of the working group. The Commission agreed that the following important tasks would need to be accomplished:

(a) Review and updating of the Guide on the GDPS;

(b) Draft of the Guide on Automation of GDPS Centres;

(c) Development of non-real-time data-processing procedures, including those for satellite data, as well as a referral system and

tape formats to meet requirements of other WMO technical commissions and programmes;

(d) Data-processing aspects of the Integrated WWW System Study;

(e) Co-operation with CAS on NWP methods, including studies of verification methods, the impact of numerical forecasts on public forecasts and the cost-benefit of public forecasts;

(f) Further development of surface plotting models;

(g) Co-ordination of the WMO Integrated WWW System Study and the review of the Area Forecast System.

In connexion with task (g), the Commission emphasized the need for close co-operation and exchange of views during all stages of the planning of the improved integrated WWW system and Area Forecast System.

7.2 Plan for storage and retrieval of satellite data (Agenda item 7.2)

The Commission reviewed the draft guidelines for storage and retrieval of satellite data developed by the fifth session of the Working Group on the GDPS. It was agreed that these guidelines could be used as a basis for elaborating arrangements and techniques for storage of satellite data at WWW centres and should be included in Volume I of the Manual on the GDPS. Accordingly, Recommendation 8 (CBS-Ext.(80)) was adopted.

7.3 Consideration of layout of the Guide on Automation of GDPS Centres (Agenda item 7.3)

The Commission examined a layout of the Guide on the Automation of Data-processing Centres elaborated by the Working Group on the GDPS. The Commission considered that publication of such a Guide would be very helpful to those Members planning to automate their data-processing centres or to upgrade and replace their hardware and software. Accordingly, Recommendation 9 (CBS-Ext.(80)) was adopted.

7.4 Guide on the GDPS (Agenda item 7.4)

The Commission reviewed the progress made in the reissuing of the Guide on the GDPS as a one-volume edition, using a loose-leaf format similar to that used in the present Manual on the GDPS. The Commission noted with appreciation the work accomplished by the Working Group on the GDPS, and in particular its Study Group on the Guide, in editing the new Guide. The Commission was informed that two chapters on methods of analysis and forecasting in the tropics and on quality-control techniques remain to be completed before the final editing and publication of the Guide in 1981. The Commission noted that the Guide would require continued review and updating and requested its Working Group on the GDPS to include this matter in its future work programme (see also paragraph 7.1.6).

7.5 Units of wind speed and pressure (Agenda item 7.5)

7.5.1 The Commission was informed of the decision by the ICAO Council to adopt the units kilometres per hour for wind speed and hectopascal for atmospheric pressure as from 26 November 1981. The ICAO Annex 5 to the Convention on International Civil Aviation also states that the termination dates for the use of the units knot and bar, for planning purposes, will not be before 31 December 1990 for the former, and 31 December 1985 for the latter. The exact termination dates will be decided by ICAO in due course. The Commission also noted that, at the request of the Executive Committee, the Secretary-General of WMO had informed the Secretary-General of ICAO concerning WMO's inability to review this matter and amend its Technical Regulations by 26 November 1981.

7.5.2 The Commission further noted that the decision of ICAO did not provide for a single unit of wind speed as desired by Eighth Congress, at least during the transition period, until the above-mentioned termination dates (i.e 26 November 1981 to 31 December 1990). In this connexion, several Members expressed concern about the impact of the proliferation of wind-speed units in meteorological operations and instrument design. It was pointed out that three units, namely, metres per second, knots and kilometres per hour, might be in use in future meteorological messages. A document was submitted on the unit of wind speed. In this connexion, some Members pointed out that Congress had decided that metres per second would be the basic unit in messages for international exchange, and therefore that conversion to other units would be necessary to meet specific user requirements. However, in some cases (e.g. reports of meteorological observations for direct aeronautical use) this might not be possible.

7.5.3 The Commission agreed that the unit of wind speed is a serious operational matter which needs further study by the Secretary-General, in consultation with CAeM/ICAO, CMM/IMCO and CIMO, to determine the requirements for providing wind speeds in the appropriate unit. Once the views of CAeM and ICAO concerning the requirements for wind-speed units have been thoroughly determined, the Commission agreed that appropriate adjustments in the WMO aeronautical codes (e.g. METAR and TAF) would have to be considered by its Working Group on Codes.

7.6 Processing of basic climatological data (Agenda item 7.6)

The Commission was informed of the work in progress in the Working Group on the GDPS with regard to the non-real-time aspects of data processing. The Commission agreed that this work should continue and thus be included in the future work programme of the working group (see paragraph 7.1.6(c)). In this connexion, the Commission requested its president to keep the Working Group on the GDPS informed of developments in the World Climate Data Programme as they might affect the development of processing of basic climatological data in the WWW (see also paragraph 10.5).

8. GLOBAL TELECOMMUNICATION SYSTEM (Agenda item 8)

8.1 Report of the chairman of the Working Group on the GTS (Agenda item 8.1)

The Commission noted with appreciation the report by the chairman of the Working Group on the Global Telecommunication System, Mr. I. A. Ravdin (U.S.S.R.). The details of the chairman's report were discussed under the various paragraphs of the agenda items, as appropriate. It also noted the work accomplished by the working group since the seventh session of CBS and the report of the ninth session of the working group, which had been submitted to this session of CBS as a document. The discussions on this agenda item were based mainly on this report.

8.2 Amendments to the Manual on the GTS (Agenda item 8.2)

8.2.1 Organization of the Global Telecommunication System

8.2.1.1 The Commission reviewed the text appearing in the Manual on the GTS, Volume I (Global Aspects), Part I - Organization of the Global Telecommunication System. It felt that the provisions at present included in the Manual on the GTS needed adjustments. The adjustments were mainly required to incorporate the technological progress made since the seventh session of CBS. It also noted decisions of Eighth Congress and the Executive Committee, which would become effective in the future and which would have an impact on the operation of the GTS.

8.2.1.2 The Commission noted that the WWW plan for 1980-1983 states that meteorological and environmental satellites will play an increasingly important role within the GTS. It further noted that data-collection platforms constitute an integral part of the GTS for the collection of observations made at fixed and mobile platforms and that the analogue direct-broadcast channels of geostationary satellites (e.g. WEFAX) are an important part of the GTS for the distribution of pictorial information directly to users.

8.2.1.3 In view of the above, the Commission felt that the present text of the Manual on the GTS did not fully take into account the role played by these satellites and it was agreed to adjust and update the present text of the Manual, wherever necessary.

8.2.1.4 When considering the responsibility for the transmission of meteorological reports from automatic surface synoptic stations, the Commission observed that no specific mention was made in the Manual on the GTS of the transmission of observational data from drifting buoys. Since these reports are of great value to WMO Members, it was agreed that an appropriate paragraph should be included in the Manual on the GTS. The Commission stressed the importance of these reports being coded in the appropriate international code form before being injected into the GTS and that messages containing these reports should adhere strictly to the WMO meteorological telecommunication procedures.

8.2.1.5 The Commission considered a proposal made by the second session of the Joint IOC/WMO Working Committee for IGOSS (Geneva, October 1980) concerning the amendment to paragraph 5.4, Attachment I-1, Part I of the Manual on the GTS, which reads as follows:

"5.4 BATHY and TESAC reports should be transmitted as soon as possible after the time of observation. However, the reports may be transmitted up to 48 hours after the time of observation in case operational difficulties do not permit their earlier transmission. The international date-time group in the abbreviated heading of the bulletins should be the time of origin of these bulletins* in GMT (see Part II, paragraph 2.3.2.2).

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* Note: The time of origin of bulletins refers to the time of compilation of bulletins by the GTS centres."

The Commission agreed to include the above-mentioned amendment in the Manual on the GTS.

8.2.1.6 The Commission reviewed the target and present routeing of observational data on the Main Trunk Circuit and its branches as included in Figures 1 and 2 respectively in Section I of Attachment I-3 to Volume I of the Manual on the Global Telecommunication System and agreed to make some minor changes in Figure 1.

8.2.1.7 The Commission considered the further development of the MTC and its branches, including its configuration. It was noted that the seventh session of CBS, after discussing the present and future configuration and operation of the MTC and its branches, concluded that a review should be made of the entire operation and configuration of the MTC and its branches, taking into consideration the advanced techniques and the re-routeing capabilities of the different centres.

8.2.1.8 The Commission was informed that, according to a bilateral agreement between China and the Federal Republic of Germany, a duplex telephone-type satellite channel had been set up on 1 August 1980 between the RTH Beijing and the RTH Offenbach with three telegraph channels having a speed of 75 bauds. These channels were used for data transmission, while the remainder of the circuit's pass band was used for analogue facsimile exchange. Operational experience was that the circuit was working very well. It was also pointed out that preparations were being made for increasing the capacity of the circuit to an overall signalling rate of 9 600 bit/s and for using multiplexing equipment to provide data-transmission and digital facsimile sub-channels by the end of 1981.

8.2.1.9 The Commission noted that the Executive Committee, after considering the proposal to include the Beijing-Offenbach circuit in the GTS plan as an additional segment of the MTC, requested the president of CBS to arrange for a study of the above proposal and its impact on the routeing of data on the MTC and its branches to be performed as soon as possible.

8.2.1.10 The Commission noted the concept of the MTC and its branches as defined in the WWW plan and the Manual on the GTS, which states:

(a) The MTC and its branches link together WMCs as well as designated RTHs (ref. Manual on the GTS, Volume I, Part I, paragraph 1.2.2(a));

(b) The configuration of the MTC shall be a segmented closed loop (ref. Manual on the GTS, Volume I, Part III, paragraph 1.1);

(c) WMCs and designated RTHs shall form the terminal ends of adjoining segments of the MTC and its branches (ref. Manual on the GTS, Volume I, Part III, paragraph 1.2).

The WMCs and RTHs on the MTC and its branches are listed in the WWW plan and in the Manual on the GTS respectively. The routeing of the MTC and its branches has been developed by CBS in the past 15 years to meet WWW requirements, taking into account the technical and financial possibilities of Members concerned. The volume of observational data and processed information has increased considerably over recent years. An annual growth rate on MTC traffic of about 30 per cent over the next two years on portions/segments of the MTC has been estimated. The need for alternate routeing of traffic between centres on the MTC is recognized as a requirement, and should be met as soon as possible. Major outages of MTC segments or centres on the MTC may have serious repercussions on the supply of observational data and, to an increasing extent, on the availability of processed information.

8.2.1.11 Therefore, the Commission felt that some improvements in the re-routeing of the MTC and its branches could be achieved quite soon if existing circuits established directly between WMCs and RTHs or between RTHs on the MTC and its branches were included upon agreement between Members concerned, as segments of the MTC or as additional branches. However, prior to its inclusion in the routeing plan of the MTC and its branches, these circuits should, in general, conform with Part III-1 (Technical Characteristics and Specifications of the GTS-MTC) of Volume I of the Manual on the GTS. The Commission agreed to propose on appropriate amendment to paragraph 3.1.2 of Part I, Volume I, of the Manual on the GTS.

8.2.1.12 In response to the Executive Committee's request in paragraph 8.2.1.9 above, the Commission agreed to include the circuit between Offenbach and Beijing as a new segment of the MTC and its branches. In this respect, a view was expressed that the present data-signalling rate of this segment was not in conformity with the provision specified for the MTC in the Manual on the GTS and it was suggested to defer the decision on this matter until the relevant specifications were met. In this respect, the Commission also noted that some segments of the MTC and its branches are still operated on low speeds. However, the Commission noted that the plan for upgrading this segment was already established and corresponded fully with the provisions of the Manual on the GTS.

8.2.1.13 The Commission adopted Recommendation 10 (CBS-Ext.(80)).

Inter-regional and supplementary inter-regional circuits

8.2.1.14 The Commission considered a request from the RA I Working Group on Meteorological Telecommunications that the provisions for the establishment of inter-regional and supplementary inter-regional circuits other than those contained

in the Manual on the GTS, Volume I, be clarified. In particular, it was requested that a distinction be made between circuits connecting different centres in different Regions which are required and recommended by the Region and circuits which are established on a purely bilateral or multilateral basis. The Commission reaffirmed the provisions contained in the Manual on the GTS, namely that interregional and supplementary interregional circuits should be decided upon by the regional associations concerned to meet their requirements. In addition, the Commission stressed that such circuits should be operated around the clock (24 hours) for WWW purposes and in accordance with the GTS procedures.

8.2.1.15 The delegates from Jordan and Saudi Arabia informed the Commission of the status and future plans of the meteorological telecommunication network in the Arab countries, developed under the auspices of the Arab League. These plans are in conformity with the GTS plan in Regional Associations I, II and VI and are operated in accordance with the GTS procedures. However, due to the unsatisfactory availability of data from north-eastern parts of RA I and the south-eastern part of RA VI, plans are being considered for additional circuits as follows:

(a) Circuit between NMC Amman (Region VI) and RTH Jeddah (Region II);

(b) Circuit between NMC Tunis (Region I) and RTH Jeddah (Region II);

(c) Circuit between NMC Khartoum (Region I) and RTH Jeddah (Region II);

(d) Circuit between NMC Seeb (Muscat), (Region II) and RTH Jeddah (Region II).

8.2.1.16 The Commission noted that the first three of the four above-mentioned circuits would fall into the category of supplementary interregional circuits and the fourth circuit would fall into the category of regional circuits. The Commission was of the opinion that the establishment of such circuits would, no doubt, expedite the exchange of data between the Regions concerned and might also serve as back-up circuits for the re-routeing of traffic in cases of outages of centres and circuits. Therefore, the Commission requested Regional Associations I, II and VI to consider, as a matter of urgency, the necessity for introducing the above-mentioned circuits in their regional meteorological telecommunication plans. Furthermore, the Commission requested the Secretary-General to assist in organizing, as soon as possible, a meeting to co-ordinate the implementation of the GTS in the neighbouring areas of RA I, RA II and RA VI.

8.2.1.17 In this respect, the Commission also noted with appreciation the Arab Space Communication Organization's plans to launch a communications satellite and that the future plans for the above-mentioned circuits are to make use of satellite links.

8.2.2 Telecommunication procedures

8.2.2.1 The Commission noted that the number of bulletins exchanged over the GTS had increased over the last few years and would continue to increase. It also noted that the availability of catalogue numbers (CLLLL) was not sufficient to meet the

increasing requirement to distribute a number of meteorological bulletins. Furthermore, the overheads (the starting line, the abbreviated headings, etc.) of meteorological messages sometimes reached 50 per cent of the whole length if the messages contained only a few observational reports. Short messages inevitably caused an increase in the number of messages to be exchanged on the GTS. They also greatly increased the difficulties in handling and checking bulletins during operational work.

8.2.2.2 In view of the above, the Commission considered the possibility of introducing measures which would reduce the number of meteorological messages by combining, as far as practical, several bulletins containing observational reports in order to compile efficient meteorological bulletins of a reasonable length for transmission on the GTS, particularly on the Main Trunk Circuit and its branches. However, concern was expressed that the above-mentioned procedures would cause a delay in the transmission of meteorological messages and that some bulletins compiled into larger units would be transmitted in addition to the other bulletins and so result in an increase in the number of retard (RTD) bulletins in some parts of the GTS. It was pointed out, however, that each centre would maintain a suitable balance in adjusting the transmission times and suitable lengths of message.

8.2.2.3 The Commission agreed to introduce the following changes to the Manual on the GTS:

> "The length of messages should never exceed 3 800 characters, but where practical and convenient, should preferably be as close as possible to 3 800 characters.
>
> Meteorological data should not be unnecessarily held up for transmission merely for the purpose of retaining until a message of appropriate length can be compiled."

The number of bulletins containing aircraft and ships' weather reports

8.2.2.4 The Commission noted that more than six bulletins containing aircraft and ships' weather reports are at present injected by some centres, although the Manual on the GTS, Volume I, Part II, paragraph 2.3.2.2 prescribes that in the case of bulletins containing ships' weather reports and aircraft weather reports, the number "ii" should be limited to a maximum of six for the same observation time. It was also noted that the ASDAR system is producing increasing numbers of reports and that, in addition, SHIP observations collected by satellite would increase in the near future. The Commission therefore agreed to modify the present text of the Manual on the GTS.

Updating of hardware error-control procedures in respect of data transmissions

8.2.2.5 The Commission agreed to update the hardware error-control procedures for data transmission in order to reflect the present situation in this respect. The session agreed that modified procedures be included in the Manual on the GTS, Volume I, Part II, Attachment II-8, paragraph 5.3.

High-Level Data-Link Control (HDLC) procedures

8.2.2.6 The Commission was informed of the development and standardization of HDLC procedures introduced by the ISO and CCITT as well as of the co-operation between WMO and those organizations in that field.

8.2.2.7 The Commission noted with satisfaction that CCITT, at its VIIth Plenary Assembly (Geneva, November 1980), adopted its revision of Recommendation X.25 - Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for terminals operating in the packet mode on public data networks.

8.2.2.8 Considering the view of the seventh session of CBS that the future GTS procedures should be based on HDLC procedures, the Commission agreed to the use on the GTS of the Link Access Procedure Balanced class (LAPB) laid down in CCITT Recommendation X.25. At the same time, the Commission considered that the existing error-control procedures for software/hardware systems and for HF radio transmissions were to be a WMO standard as before and would be used in the GTS as long as necessary. The Commission agreed to make the corresponding changes to the Manual on the GTS, Volume I, Part II.

8.2.2.9 The Commission requested the Working Group on the Global Telecommunication System to make an urgent detailed study of questions related to the use of CCITT Recommendation X.25 in the GTS. The Commission requested the Secretary-General to assist the working group in the conduct of this study and, if necessary, to hold a meeting of a study group on this matter in 1981.

8.2.2.10 The Commission adopted Recommendation 11 (CBS-Ext(80)).

New common code

8.2.2.11 The Commission discussed two problems concerning the implications for telecommunication of the introduction of the new common code for surface observations, which would be as follows:

(a) Separation of the code into its global, regional and national parts; and

(b) Increase in the volume of traffic on the GTS.

8.2.2.12 The Commission considered that the separation of bulletins into three parts (global, regional and national) would lead to a larger number of bulletins, the need to assign additional CLLLL numbers which are at present exhausted, and an increase in the amount of traffic. Furthermore, separate bulletins for global and regional parts would cause great difficulties for handling meteorological messages at telecommunication centres. The Commission therefore recommended that the global and regional sections of the code be transmitted together. In that way, bulletins for global and regional exchange would be transmitted over the GTS containing the sections of the code intended for international exchange (global and regional sections).

8.2.2.13 However, concern was expressed that transmissions of bulletins for global and regional sections together would create a substantial increase in the flow of traffic on certain parts of the GTS and a possible delay in reception of bulletins. In view of the above, certain centres which are capable of separating the regional section from the global section should take the necessary measures to do so.

8.2.2.14 The Commission adopted Recommendation 12 (CBS-Ext.(80)).

8.2.3 Technical problems of the Global Telecommunication System

Multiplexing techniques applied on the MTC

8.2.3.1 The Commission considered that the multiplexing of circuits on the GTS as a whole and on the MTC in particular enabled the transmission of data and digital facsimile to be carried out more efficiently through the creation of completely independent channels. Consequently, the use of multiplexing methods should be encouraged wherever possible and appropriate.

8.2.3.2 The Commission requested the Working Group on the Global Telecommunication System to carry out a corresponding study with a view to developing standards for use on the GTS.

Modems

8.2.3.3 The Commission was informed that certain segments of the GTS, using a modem as specified in CCITT Recommendation V.26, applied the modulation code Alternative B, provided for in the above-mentioned CCITT recommendation, that was not mentioned in the Manual on the GTS, Volume I, Part III, paragraph 2.2.1.4.

8.2.3.4 In view of the fact that Alternatives A and B of the modulation code were contained in the text of Recommendation V.26, the session agreed to leave a table in the Manual on the GTS, Volume I, Part III, paragraph 2.2.1.4 explaining only modulation code A2 which was not provided for by Recommendation V.26 but was still used on the GTS. The Commission agreed to make the necessary changes in the relevant place in the Manual.

Relevant CCITT recommendations

8.2.3.5 The Commission was informed that the CCITT VIIth Plenary Assembly had adopted the Series V recommendations. The Commission therefore requested the Secretary-General to revise page III-2 of Part III, Volume I, Manual on the GTS, in accordance with the decisions taken by CCITT in that respect.

Digital facsimile transmissions

8.2.3.6 The Commission noted that the CCITT VIIth Plenary Assembly adopted Recommendation T.4 concerning standardization of Group 3 facsimile apparatus for document transmission. The Commission agreed to adopt the code for black-and-white digital facsimile transmission which is specified in CCITT Recommendation T.4.

8.2.3.7 The Commission also noted that, following a lengthy discussion at the ninth session of the CBS Working Group on the GTS, the great majority of the experts participating were in favour of the WMO standard for scanning/recording digital facsimile systems being fully compatible with the CCITT Group 3 equipment described in CCITT Recommendation T.4.

8.2.3.8 The Commission adopted Recommendation 13 (CBS-Ext.(80)).

8.2.4 Problems in the collection of SHIP reports

8.2.4.1 The Commission noted the difficulties which are experienced by many Meteorological Services concerning the costs of operational coastal radio stations for the reception of SHIP reports and of paying the increasing costs of transmitting telegrams for ships at sea. It was further noted that these costs fall largely on countries having long coastlines, particularly in areas with dense maritime traffic. The Commission recognized that considerable improvements in the receipt of SHIP reports could result from the use of telecommunication capabilities of meteorological satellites.

8.2.4.2 The Commission considered a proposal from the Working Group on the GTS aimed at reducing the cost of telegrams from ships to NMCs via coastal radio stations. In accordance with the ITU Instructions for the Operation of the International Public Telegram Service, 1977 edition (paragraphs A140, A150 and A284), the charges for telegrams from ships are based on the number of words, groups of characters or expressions which do not exceed 10 characters. Therefore, the possibility of SHIP reports being transmitted from ships to NMCs in groups containing more than five characters was considered, which would mean a very considerable economy in collecting SHIP reports. The Commission requested the Secretary-General to examine the above-mentioned possibility with ITU and to transmit the results to the CBS Working Groups on Codes, GDPS and GTS for further study within their respective terms of reference.

8.2.5 Priority items on the work programme of the Working Group on the GTS

The Commission reviewed the tasks on the work programme of the Working Group on the GTS. It agreed that the following tasks should have the highest priority:

- Digital facsimile transmission;
- Error detection and correction procedures and switching procedures, based on the recommendations of the CCITT and ISO;
- Channel multiplexing for data and digital facsimile transmission;
- Review of the configuration and operation of the MTC and its branches;
- Plan for the exchange of processed information on the MTC and its branches;

- Monitoring of the operation of the GTS;
- Telecommunications aspects of the Integrated WWW System Study;
- Co-ordination of the Integrated WWW System Study and the review of the Area Forecast System dissemination aspects.

8.3 Exchange of processed information on the MTC and its branches (Agenda item 8.3)

8.3.1 The Commission noted that one of the priority items on the work programme of the Working Group on the GTS was the development of a plan for the exchange of processed information on the MTC and its branches. The Commission was of the opinion that the development of such a routeing plan would need to be based on the following telecommunication considerations:

(a) Capabilities and capacities of centres and segments of the MTC and its branches for the transmission and relay of processed data between those centres located on the MTC and its branches, as well as those centres not located on the MTC and its branches;

(b) Transmission systems to be used on the MTC and its branches for exchange of processed information (e.g. analogue or coded digital facsimile and GRID code form);

(c) Priorities for observational and processed data, acceptable time delays, and other scheduling matters of concern in case of traffic congestion on specific segments of the MTC;

(d) Ability of centres to receive, use and convert GRID/GRAF code data into pictorial form.

8.3.2 The Commission noted that the latest inquiry carried out by the Secretariat concerning the requirements of Members for processed products from WMCs and RMCs dated back to 1978. It was agreed that the development of a routeing plan for processed information should be based on up-to-date requirements. Therefore, the Commission requested the Secretary-General to initiate a new inquiry to ascertain the requirements of Members for WMC and RMC products, as well as requirements for other products such as those from AFCs.

8.3.3 The Commission also requested the Secretary-General to convene an Informal Planning Meeting (IPM), upon completion of the above-mentioned inquiry, in which data-processing and telecommunications experts would participate and which would:

(a) Review and rationalize the lists of transmission priorities given in Volumes I and II of the Manual on the GDPS, as well as the lists of requirements stemming from the above-mentioned new inquiry;

(b) Establish lists of products to be transmitted on the MTC in pictorial form, GRID/GRAF code form and in coded digital form;

(c) Draft, in view of the work accomplished in (a) and (b) above, a global plan for routeing products in both alpha-numerical and pictorial form on the segments of the MTC and its branches along similar lines to the present routeing plan for observational data, taking account of existing and planned circuit capacity. This plan would be considered by the Working Groups on the GDPS and on the GTS before consideration by the Commission for eventual inclusion in the Manual on the GTS.

8.3.4 The Commission noted with appreciation an offer from the European Centre for Medium-range Weather Forecasts (ECMWF) to make available, as from 1 April 1981, to non-Member States of the ECMWF the following products of the European Centre via the WMO Global Telecommunication System:

(a) For northern and southern hemisphere domaines (poleward of latitude 20°N or S), surface pressure and 500 mb geopotential height from 0 to 5 days at daily intervals on a 5° by 5° latitude/longitude grid;

(b) For the tropical belt (35°S to 35°N), 850 and 200 mb winds (in the form ddfff) from 0 to 4 days at daily intervals on a 5° by 5° latitude/longitude grid.

Some of the products of this set of charts, particularly for the tropical belt, would only be distributed when their quality was judged to be acceptable by the ECMWF.

8.3.5 In this respect, the Commission requested the Secretary-General to:

(a) Co-ordinate with the ECMWF concerning the bulletin identification, code forms, areas to be used, entry points to the GTS and any other relevant points;

(b) Initiate an inquiry amongst WMO Members to identify their requirements for the products of the ECMWF;

(c) Communicate the requirements to the ECMWF and the WMCs/RTHs concerned for the dissemination of the products on the GTS and, in consultation with the chairman of the CBS Working Group on the GTS, assist in the organization;

(d) Communicate the requirements to the IPM referred to in paragraph 8.3.3 above.

9. MONITORING OF THE OPERATION OF THE WWW (Agenda item 9)

9.1 Consideration of monitoring results (Agenda item 9.1)

9.1.1 The Commission noted a document submitted by the Secretary-General containing the results of the monitoring of the operation of the WWW carried out in June 1980 and their comparison with previous monitoring results, carried out in 1978 and 1979. According to the monitoring carried out in June 1980, the total number of SYNOP reports exchanged globally reached about 2 000 for each main synoptic observation time and TEMP reports reached 600 for each observation time. These figures indicate an increase of about 10 per cent over the daily total number of global exchange reports during 1979-1980. Furthermore, about 2 400 SHIP reports and 2 500 AIREPs were exchanged globally on a daily basis. About 90 per cent of the total number of SYNOP and TEMP data available at the MTC centres were received within six hours of observation time. However, the Commission also noted that deficiencies in the operation of the WWW still existed in some parts of the tropical zone and the southern hemisphere. Deep concern was expressed at the deterioration in the operation of the WWW in some of these areas.

9.1.2 The Commission was informed of the follow-up action whereby Members concerned were requested to take remedial action to eliminate the deficiencies revealed by the monitoring analysis carried out by the Secretariat. In many instances Members responded, outlining the action taken within their countries or informing the Secretariat of the reasons for the deficiencies (permanent or temporary), e.g. equipment breakdown, shortage of staff to operate and maintain observing equipment and telecommunication facilities, or lack of expendables to carry out observations.

9.1.3 The Commission further noted that a specific monitoring survey was carried out in the period 11-14 November 1980 in order to evaluate the efficiency of the operation of the MTC segments and circuits between WMC Moscow, and the RTHs Cairo, Jeddah and New Delhi. Monitoring could not be carried out by the RTH Cairo because of interruptions in the links during the period between it and its radio transmitting station. However, monitoring results available for the other three centres indicated that the data from the RTH Cairo were received unsatisfactorily during periods when the circuit was operating normally. The RTH Cairo has since proposed that another monitoring survey be carried out after the above-mentioned technical difficulties are rectified. The Commission requested the Secretary-General to conduct the monitoring in this area in the very near future and to make the results available to the Members concerned.

9.1.4 The Commission noted that the deficiencies existing in the operation of the WWW, in particular the GOS and the GTS, were due mainly to economic problems of certain countries. The Commission was of the opinion that in order to overcome the deficiencies, Members concerned should spare no effort in taking remedial action, if necessary with the assistance of WMO, the VCP and bilateral or multilateral assistance programmes.

9.1.5 The Commission realized that the plan for monitoring the operation of the WWW which was adopted by CBS-Ext.(76) had not yet been fully implemented by all centres. At present, the main activity of the monitoring is largely carried out in the field of the GOS and GTS. Few centres carry out real-time monitoring and send summarized reports to the Secretariat. The non-real-time monitoring mainly based on the internationally co-ordinated monitoring which is carried out in June and December each year.

9.1.6 The Commission reaffirmed the decision made by EC-XXXII that, in order to eliminate the deficiencies in the operation of the WWW, the real-time monitoring should be implemented at every centre in order to initiate follow-up action on the spot. The Commission emphasized that the basic responsibilities for monitoring the operation of the WWW rest with Members as prescribed in the plan for monitoring the operation of the WWW. In fact, if the plan is not fully implemented by all centres, the areas where deficiencies exist could not be indentified in sufficient detail and immediate remedial action could not be initiated by the centres concerned. The Commission urged Members to implement fully the plan for monitoring the operation of the WWW.

9.2 Review of the monitoring procedures (Agenda item 9.2)

9.2.1 The Commission reviewed the plan for monitoring the operation of the WWW presently in force (Manual on the GTS, Volume I, Part I, Attachment I-5), with a view to increasing the overall efficiency of the monitoring. In respect of non-real-time monitoring, this activity would include making the results of the monitoring analysis available shortly after the monitoring periods. This would improve the efficiency of remedial action considerably.

9.2.2 The Commission felt that the workload of the centres concerned had to be reduced in order to concentrate on real-time monitoring and follow-up action. The Commission, therefore, agreed that the frequency of non-real-time internationally co-ordinated monitoring on a global basis be reduced from twice to once a year.

9.2.3 The Commission requested the Secretary-General to revise, as necessary, the present methods used for the analysis and presentation of the monitoring results with a view to making the monitoring more efficient and pinpointing the specific deficiencies in the operation of the GOS and GTS so that appropriate remedial action can be taken as quickly as possible.

9.2.4 Furthermore, in order to make faster progress, the Commission agreed to concentrate the monitoring efforts into problem areas recognized from previous monitoring periods. One problem area should be determined at each monitoring period. The results obtained should concentrate on the deficiencies noted during the monitoring periods.

9.2.5 The Commission recognized that the analysis of the previous monitoring results showed some significant discrepancies amongst the availability of observational data at various centres, in particular the various MTC centres. It considered

that a number of discrepancies in availability of data at different centres were due to different methods and criteria for accepting observational reports using either the telecommunication or data-processing computer. Thus, the monitoring results are not comparable and do not in fact indicate whether the loss of data depends on deficiencies in the Global Observing System or the Global Telecommunication System. The Commission considered the monitoring results were less useful than desired because of these problems.

9.2.6 The Commission was of the opinion that the deficiencies caused by different criteria for accepting reports or bulletins would be diminished by asking monitoring centres to provide the Secretariat with detailed information on:

(a) The method used for monitoring (telecommunications or data-processing computer);

(b) Number of reports actually made.

9.2.7 The Commission agreed on the modified plan for monitoring the operation of the WWW and also agreed that the revised plan, as given in the annex to Recommendation 10 (CBS-Ext.(80)), should be included in the relevant part of the Manual on the GTS.

9.2.8 The Commission considered that in order to cope with the deficiencies caused by the inadequate routeing instructions at the MTC centres, the following action should be taken:

(a) Development of a dynamic system for updating switching instructions and directories;

(b) Efficient real-time monitoring on the MTC level to ensure that each centre on the MTC obtains all global data.

9.2.9 For this purpose, the centres on the MTC will have to play a more active role in improving the availability of data by inserting on the MTC all available data at their centres, whether received in accordance with the routeing arrangements specified in Attachment I-3 of the Manual on the GTS or through other bilateral or multilateral arrangements and by ad hoc re-routeing arrangements, as appropriate. The Commission urged the Members responsible for the operation of WMCs or RTHs on the MTC to take the necessary measures in this respect, as a matter of urgency. The Commission also requested the Secretary-General to take the initiative for co-ordinating the implementation of these actions with centres concerned as required.

10. CONTRIBUTION OF CBS TO THE WORLD CLIMATE PROGRAMME (WCP), IN PARTICULAR THE CLIMATE DATA COMPONENT (Agenda item 10)

10.1 The Commission recalled that, according to decisions of Eighth Congress, elaborated further by EC-XXXII, the World Climate Programme (WCP) has four components as follows:

- World Climate Research Programme (WCRP) (WMO/ICSU);

- World Climate Application Programme (WCAP) (WMO);
- World Climate Impact Studies Programme (WCIP) (UNEP);
- World Climate Data Programme (WCDP) (WMO).

WMO has the major responsibility for the overall planning and co-ordination of the WCP. As regards the World Climate Research Programme (WCRP), the WMO/ICSU Joint Scientific Committee (JSC) has been assigned responsibility for the formation of overall scientific concepts and the co-ordination of efforts at the international level within WCRP. UNEP has assumed responsibility for the implementation of WCIP. The Executive Committee will continue to provide overall co-ordination and specific guidance for the WCAP and WCDP which are WMO responsibilities. These components should furthermore be developed in close co-ordination with relevant work programmes of the various technical commissions, in particular CBS, with regard to the WCDP.

10.2 The Commission was informed that at the request of EC-XXXII a plan of action for the WCDP was being developed which should describe activities leading towards the general goal of this component, namely to improve the availability of reliable data required for WCP. The Commission, realizing the complexity of the data problem, stressed that, in parallel with activities to improve the availability of data, action should be pursued to obtain consolidated statements of data requirements for use in climate studies and applications.

10.3 The Commission was aware of the fact that much of the climatological data of land stations was not available in computer-compatible form and was also not easily retrievable for applications and other studies. To meet the strong demands for climatological data which exist in all countries, the Commission urged Members to make special efforts in establishing and/or updating national data banks, preferably in computer-compatible form. The WCDP should include in its plan of action various international projects which are aimed at assisting Members in their efforts.

10.4 The Commission recognized the fact that, as long as climatological data are not yet easily available in computer-compatible form, there is a need for using synoptic surface observations for climatological purposes. The Commission stressed the importance of quality control on the use of synoptic data to this end. In order to promote the availability of good-quality synoptic data, compatible formats and catalogues of data should be further developed by the Members.

10.5 In this regard, it was noted that the Manual on the GDPS specified procedures for storage of synoptic data for non-real-time uses (data centres, and media for storage). Also, work had been started by the Commission with respect to specifying standards for quality control of stored data. A problem which needs to be considered is the requirement for retrieval of data in the form of time-series, rather than in synoptic array.

10.6 With regard to the development of a WMO referral system to facilitate access to information on data sources, the Commission emphasized that there should be one referral system in WMO whose overall structure should be clearly defined by the Executive Committee as well as its relation to data-referral systems in other

disciplines, such as MEDI. Suitable proposals regarding the mechanism of the WMO data-referral system, including national inputs therein, would therefore be contained in the draft plan of action for the WCDP to be submitted to EC-XXXIII.

11. REVIEW OF PREVIOUS RESOLUTIONS AND RECOMMENDATIONS OF THE COMMISSION AND RELEVANT EXECUTIVE COMMITTEE RESOLUTIONS (Agenda item 11)

11.1 In accordance with current practice, the Commission examined those resolutions and recommendations adopted prior to the present extraordinary session and which were still in force.

11.2 The Commission decided to cancel a number of recommendations related to action already taken and completed. However, it agreed to maintain in force the intent of Recommendations 6 (CBS-VI) and 18 (CBS-VII) and therefore replace them by two new Recommendations, 14 and 15 (CBS-Ext.(80)) respectively. Resolution 1 (CBS-Ext.(80)) was adopted.

11.3 The Commission then examined the Executive Committee's resolutions within the field of activity of CBS and agreed that Resolution 3 (EC-XXVI) and Resolution 3 (EC-XXIX) need no longer be kept in force. Recommendation 16 (CBS-Ext.(80)) was adopted.

12. DATE AND PLACE OF THE EIGHTH SESSION (Agenda item 12)

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

13. CLOSURE OF THE SESSION (Agenda item 13)

13.1 The president of the Commission, Mr. J. R. Neilon, in his closing address, reviewed the major results accomplished by the session. He thanked all the participants for all the hard work which had been accomplished in a spirit of friendly co-operation at the session as well as during the preceding two years. The president also expressed his thanks to the chairmen and rapporteurs of the different working groups of the Commission as well as to the chairmen and vice-chairmen of the working committees. Finally, he thanked the Secretary-General of WMO for the arrangements made for the session and the staff who had supported the work of the session.

13.2 Mr. P. K. Rohan (Ireland), on behalf of all participants, congratulated the president for the excellent manner in which he had presided the session and wished him further success in leading the work of the Commission as well as in his work at home. Mr. A. K. Henaidi (Saudi Arabia), Mr. A. L. Huneidi (Oman) and Mr. F. O. Okulaja (Nigeria) supported and associated themselves with the expression

of thanks addressed to the president of the Commission, to the participants and to the WMO Secretariat and underlined the desire of developing countries to participate, to the fullest possible extent, in the Integrated WWW System Study.

13.3 The session closed at 11.08 a.m. on Wednesday, 10 December 1980.

RESOLUTION ADOPTED BY THE SESSION

Res. 1 (CBS-Ext.(80)) - REVIEW OF THE PREVIOUS RESOLUTIONS AND RECOMMENDATIONS OF THE COMMISSION FOR BASIC SYSTEMS

THE COMMISSION FOR BASIC SYSTEMS,

CONSIDERING that Resolution 6 (CBS-VII) should be reviewed,

NOTING the action taken on several recommendations adopted prior to the extraordinary session,

DECIDES:

(1) To keep in force Resolutions 1, 2, 3, 4 and 5 (CBS-VII);

(2) To keep in force Recommendations 10, 11, 12, 14 and 20 (CBS-VII);

(3) To publish the texts of the resolutions and recommendations which were kept in force in the final report of the extraordinary session.*

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* These recommendations are reproduced on page 135.

RECOMMENDATIONS ADOPTED BY THE SESSION

Rec. 1 (CBS-Ext.(80)) - PROPOSED AMENDMENTS TO VOLUMES I, II AND III OF THE TECHNICAL REGULATIONS

THE COMMISSION FOR BASIC SYSTEMS,

NOTING:

(1) Paragraphs 2.4.4 and 2.4.5 of the general summary of the abridged final report of Cg-VIII,

(2) The decision of the Executive Committee on Recommendation 1 (CBS-VII) as contained in Resolution 4 (EC-XXXI) - Report of the seventh session of the Commission for Basic Systems,

CONSIDERING the need for amending the Technical Regulations (WMO-No. 49) in order to ensure their compatibility with the Manual on the GOS (WMO-No. 544) and to avoid unnecessary duplication between the two publications,

RECOMMENDS that the Executive Committee:

(1) Approve the proposed amendments to the Technical Regulations as contained in the annex* to this recommendation, with effect from 1 January 1982;

(2) Authorize the Secretary-General to make other purely editorial changes, as may be required, when introducing the above-mentioned amendments in the Technical Regulations.

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* See Annex II.

Rec. 2 (CBS-Ext.(80)) - PROPOSED AMENDMENTS TO THE MANUAL ON THE GLOBAL OBSERVING SYSTEM, VOLUME I (GLOBAL ASPECTS)

THE COMMISSION FOR BASIC SYSTEMS,

NOTING Recommendation 1 (CBS-Ext.(80)) - Proposed amendments to Volumes I, II and III of the Technical Regulations,

CONSIDERING the need for adjustments to be made to the Manual on the GOS, in particular in conjunction with the proposed amendments to the Technical Regulations (WMO-No. 49),

RECOMMENDS that the Executive Committee:

(1) Approve the proposed amendments to the Manual on the Global Observing System as contained in the annex* to this recommendation, with effect from 1 January 1982;

(2) Authorize the Secretary-General to make other, purely editorial, changes as may be required, when introducing the above-mentioned amendments in the Manual.

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* See Annex III.

Rec. 3 (CBS-Ext.(80)) - DELETION OF FM 26-IV SPESH FROM VOLUME I OF THE MANUAL ON CODES

THE COMMISSION FOR BASIC SYSTEMS,

NOTING:

(1) The code FM 26-IV SPESH - Special weather report from a sea station, as included in Volume I of the Manual on Codes,

(2) Recommendation 14 (CBS-VII) - Common code for reporting surface observations from different types of surface station, approved by Resolution 5 (EC-XXXI),

CONSIDERING:

(1) That code FM 26-IV SPESH is rarely used and is no longer necessary,

(2) That the new common surface code will be used for reporting of all kinds of surface observations,

RECOMMENDS that code FM 26-IV SPESH be deleted from Volume I of the Manual on Codes as from 1 January 1982;

REQUESTS the Secretary-General to make the necessary arrangements for the deletion of FM 26-IV SPESH from Volume I of the Manual on Codes.

Rec. 4 (CBS-Ext.(80)) - AMENDMENTS TO THE MANUAL ON CODES, VOLUME I

THE COMMISSION FOR BASIC SYSTEMS,

NOTING the report of the restricted session of the CBS Working Group on Codes (Geneva, January 1980),

CONSIDERING that there is a need for technical improvements to Volume I of the Manual on Codes;

RECOMMENDS that the amendments as given in the annex* to this recommendation be included in Volume I of the Manual on Codes;

REQUESTS the Secretary-General to arrange for the inclusion of these amendments in Volume I of the Manual on Codes.

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* See Annex IV.

Rec. 5 (CBS-Ext.(80)) - CORRECTIONS IN AERONAUTICAL CODES

THE COMMISSION FOR BASIC SYSTEMS,

NOTING:

(1) The WMO Technical Regulations, Volume II, Meteorological Service for International Air Navigation,

(2) Annex II to WMO Technical Regulations, the Manual on Codes, Volume I,

CONSIDERING that Annex II should be consistent with the WMO Technical Regulations,

RECOMMENDS that the amendments as given in the annex* to this recommendation be included in Volume I of the Manual on Codes;

REQUESTS the Secretary-General to arrange for the inclusion of these amendments in Volume I of the Manual on Codes.

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* See Annex V.

Rec. 6 (CBS-Ext.(80)) - AMENDMENT TO CODE FM 35-V TEMP, FM 36-V TEMP SHIP AND FM 37-VII TEMP DROP

THE COMMISSION FOR BASIC SYSTEMS,

NOTING a proposal by a WMO Member to clarify the use of indicator figures 66 and 77 in the above-mentioned code forms,

CONSIDERING that it is necessary to forecast height and speed of jet-streams correctly,

RECOMMENDS that Regulation 35.2.4.3 in the Manual on Codes be amended to read: "Indicator figures 77 shall be used when the level(s) for which maximum wind data is (are) reported does (do) not coincide with the top of the wind sounding. Indicator figure 66 shall be used in the opposite case, i.e. whenever the top of the wind sounding corresponds to the highest wind speed observed throughout the ascent. Note: For the purpose of the above Regulation, the top of the wind sounding is to be understood as the highest level for which wind data are available.";

REQUESTS the Secretary-General to arrange for the necessary amendments to be included in Volume I of the Manual on Codes.

Rec. 7 (CBS-Ext.(80)) - AMENDMENTS TO THE MANUAL ON THE GDPS, VOLUME I

THE COMMISSION FOR BASIC SYSTEMS,

NOTING:

(1) Resolution 5 (Cg-VIII),

(2) Resolution 5 (EC-XXXI),

CONSIDERING that the Manual on the Global Data-processing System should reflect the latest decisions of Congress on the WWW plan, and the decisions of the Executive Committee concerning the new common code (FM 12-VII SYNOP and FM 13-VII SHIP),

RECOMMENDS that the amended texts to Attachments I.1 and II.4 to Volume I of the Manual on the GDPS, as given in the annex* to this recommendation, be included in Volume I of the Manual on the GDPS (WMO-No. 485);

REQUESTS the Secretary-General to make necessary arrangements for final publication of these amendments as soon as possible but not later than 1 January 1982.

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* See Annex VI.

Rec. 8 (CBS-Ext(80)) - GUIDELINES FOR STORAGE AND RETRIEVAL OF SATELLITE DATA

THE COMMISSION FOR BASIC SYSTEMS,

NOTING:

(1) Paragraph 3.1.29 of the general summary, abridged report with resolutions, EC-XXX,

(2) Paragraphs 7.6.1 and 7.6.2 of the abridged final report of CBS-VII,

CONSIDERING that a global plan for storage and retrieval of satellite data is needed for the information of RMCs and NMCs which have the capability to receive, process and store satellite data in order to facilitate extraction of all types of satellite information,

RECOMMENDS that the guidelines for storage and retrieval of satellite data in the annex be included in Volume I of the Manual on the GDPS;

REQUESTS the Secretary-General to make the necessary arrangements for inclusion and publication of the guidelines for storage and retrieval of satellite data in an appropriate part of Volume I of the Manual on the GDPS.

A N N E X

GUIDELINES FOR STORAGE AND RETRIEVAL OF SATELLITE DATA

(a) RMCs and NMCs should store a representative set of satellite observations and derived products which they are able to receive and process with their available facilities.
(NOTE: Some duplication with the data stored in the larger archives of the satellite operators may be necessary.);

(b) Data stored at RMCs and NMCs should include imagery (digital or photos), raw radiance data for SATEM or SATOB messages and high-resolution sounding data;

(c) Media for exchange of satellite data should be standardized insofar as possible;

(d) Catalogue of archived satellite data should be published and updated by the Meteorological Service operating the centre.

Rec. 9 (CBS-Ext.(80)) - DETAILED LAYOUT OF GUIDE ON AUTOMATION OF DATA-PROCESSING CENTRES

THE COMMISSION FOR BASIC SYSTEMS,

NOTING:

(1) Paragraphs 5.1.3 and 12.4 of the final report of the fifth session of the Working Group on the GDPS,

(2) Paragraphs 7.2.1.3 of the abridged final report of CBS-VII,

CONSIDERING the need for such a Guide to assist Members in the automation of operations at WWW centres:

(1) Currently using manual techniques, or

(2) Requiring upgrading or replacement of computer systems,

RECOMMENDS that the detailed layout for the Guide on the Automation of Data-processing Centres, as given in the annex* to this recommendation, be used as a basis for elaborating the full text of the Guide;

REQUESTS the Secretary-General to make the necessary arrangements for drafting the full text of the Guide on the Automation of Data-processing Centres.

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* See Annex VII.

Rec. 10 (CBS-Ext.(80)) - PROPOSED AMENDMENTS TO THE MANUAL ON THE GLOBAL TELECOMMUNICATION SYSTEM, VOLUME I (GLOBAL ASPECTS), PART I - ORGANIZATION OF THE GLOBAL TELECOMMUNICATION SYSTEM

THE COMMISSION FOR BASIC SYSTEMS,

NOTING:

(1) Resolution 5 (Cg-VIII) - World Weather Watch,

(2) The WWW Plan for 1980-1983 (WMO-No. 535),

RECOMMENDS the approval of the amendments to the Manual on the Global Telecommunication System, Volume I (Global Aspects), Part I - Organization of the Global Telecommunication System, given in the annex* to this recommendation;

REQUESTS the Secretary-General to make the appropriate changes as given in the annex to this recommendation to the Manual on the Global Telecommunication System, Volume I (Global Aspects), Part I - Organization of the Global Telecommunication System.

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* See Annex VIII.

Rec. 11 (CBS-Ext.(80)) - PROPOSED AMENDMENTS TO THE MANUAL ON THE GLOBAL TELECOMMUNICATION SYSTEM, VOLUME I (GLOBAL ASPECTS), PART II - METEOROLOGICAL TELECOMMUNICATION PROCEDURES FOR THE GLOBAL TELECOMMUNICATION SYSTEM

THE COMMISSION FOR BASIC SYSTEMS,

NOTING:

(1) Resolution 5 (Cg-VIII) - World Weather Watch,

(2) Manual on the Global Telecommunication System, Volume I (Global Aspects), Part II - Meteorological Telecommunication Procedures for the Global Telecommunication System,

RECOMMENDS:

(1) The approval of the amendments to the Manual on the Global Telecommunication System, Volume I, Part II - Meteorological Telecommunication Procedures for the Global Telecommunication System, given in the annex* to this recommendation;

(2) That the amendments given in the annex to this recommendation be implemented as soon as possible;

REQUESTS the Secretary-General to include the amendments given in the annex to this recommendation in the Manual on the Global Telecommunication System, Volume I, Part II - Meteorological Telecommunication Procedures for the Global Telecommunication System.

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* See Annex IX.

Rec. 12 (CBS-Ext.(80)) - COMPILATION OF METEOROLOGICAL REPORTS CONTAINING SURFACE OBSERVATIONS - FM 12-VII AND FM 13-VII

THE COMMISSION FOR BASIC SYSTEMS,

NOTING Resolution 5 (EC-XXXI) - Common code for reporting surface observations from different types of surface station,

CONSIDERING that the efficient operation of the Global Telecommunication System for handling meteorological reports containing surface observations FM 12-VII and FM 13-VII should be ensured,

RECOMMENDS that meteorological telecommunication centres (WMCs, RMCs, RTHs and NMCs) which, presently, are not capable of separating the regional section of the report from the global section, should compile bulletins for international exchange containing reports in which the global and regional sections of the code for surface observations, FM 12-VII and FM 13-VII, are included;

REQUESTS the Secretary-General to urge Members to spare no efforts to complete all the necessary arrangements to implement the procedures mentioned above well in advance with a view to ensuring the worldwide introduction of the procedures for compilation of bulletins containing surface observations FM 12-VII and FM 13-VII for both global and regional distribution as from 1 January 1982.

Rec. 13 (CBS-Ext.(80)) - PROPOSED AMENDMENTS TO THE MANUAL ON THE GLOBAL TELECOMMUNICATION SYSTEM, VOLUME I (GLOBAL ASPECTS), PART III - TECHNICAL CHARACTERISTICS AND SPECIFICATIONS FOR THE GLOBAL TELECOMMUNICATION SYSTEM

THE COMMISSION FOR BASIC SYSTEMS,

NOTING:

(1) Resolution 5 (Cg-VIII) - World Weather Watch,

(2) The WWW Plan for 1980-1983 (WMO-No. 535),

RECOMMENDS the approval of the amendments to the Manual on the Global Telecommunication System, Volume I (Global Aspects), Part III - Technical characteristics and specifications for the Global Telecommunication System, contained in the annex* to this recommendation;

REQUESTS the Secretary-General to make the appropriate changes, as given in the annex* to this recommendation, to the Manual on the Global Telecommunication System, Volume I (Global Aspects), Part III - Technical characteristiscs and specifications for the Global Telecommunication System.

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* See Annex X.

Rec. 14 (CBS-Ext.(80)) - AIRCRAFT WEATHER REPORTS

THE COMMISSION FOR BASIC SYSTEMS,

CONSIDERING the need for aircraft weather reports for analyses and prognoses,

RECOMMENDS:

(1) That efforts should be continued for making available an increased number of aircraft weather reports to processing centres;

(2) That, at all stages of distribution, the elimination of aircraft reports should be kept to a minimum;

(3) That, whenever practicable, WMCs and RMCs should apply quality-control procedures prior to transmission of aircraft weather reports on the GTS;

REQUESTS the Secretary-General to invite ICAO and CAeM to take action on RECOMMENDS (1) and (2) as appropriate.

Rec. 15 (CBS-Ext.(80)) - IMPLEMENTATION OF THE WORLD WEATHER WATCH

THE COMMISSION FOR BASIC SYSTEMS,

NOTING:

(1) Resolution 5 (Cg-VIII) - World Weather Watch,

(2) The shortcomings identified by Members and the Secretary-General (observational data and processed information) during the various surveys for monitoring the operation of the WWW, the results of which are being published in the Status Reports on the Implementation of the WWW, and the action taken by the Secretary-General with the Members concerned,

(3) The serious shortcomings in the availability of observational data from:

Region I	(several parts in the Region)
Region II	(some parts in the south-east and south-west of the Region)
Region III	(the northern and central parts)
Region IV	(the southern part)
Region V	(some parts in the Region)
Region VI	(the south-eastern part)

due to parts of the GOS and GTS not yet being fully implemented,

CONSIDERING the financial and technical difficulties that certain Members will continue to have in implementing and operating the different facilities of the WWW plan,

RECOMMENDS that the following measures should be taken in order to implement and improve further the operation of the WWW:

(a) More realistic assessment of possibilities of Members to set up and operate important WWW facilities;

(b) Formulation of assistance programmes based on system needs and capabilities of Members to accept the commitments of operation after expiry of the external assistance programme;

(c) Further focus of the VCP(ES) and (F) support to vital elements of the WWW programme, namely to the surface-based sub-system of the GOS and the GTS (including the reception of the WMC and RMC products needed for application programmes);

(d) Urging of Members to provide increased assistance through VCP, in particular by providing the equipment required to maintain surface and upper-air observing stations and the associated telecommunications facilities, as well as expert assistance for installation and maintenance of equipment and on-the-spot training;

(e) Expanded training programmes and courses for use of advanced technical, practical applications, operation and maintenance of equipment, tailored to the need of WWW based on experience obtained in the past;

(f) Strict adherence by Members to the standard procedures developed for the GOS, GDPS and the GTS;

(g) Introduction by Members of the plan for monitoring the operation of the WWW at the earliest possible date, in particular the real-time monitoring as prescribed in the monitoring plan;

(h) Continuation and intensification of the present activities of the Secretariat for monitoring the operation of the WWW on a non-real-time basis;

(i) Based on the thorough analysis of the results of the monitoring of the operation of the WWW, missions of experts to specific areas where shortcomings exist, with a view to identifying the exact difficulties and recommending specific remedial action by the countries concerned and the Secretary-General;

(j) Convening of co-ordination meetings, as required between RTHs/WMCs and associated NMCs, in order to remedy any existing deficiencies in the operation of the WWW between the centres concerned.

Rec. 16 (CBS-Ext.(80)) - REVIEW OF THE RESOLUTIONS OF THE EXECUTIVE COMMITTEE BASED ON PREVIOUS RECOMMENDATIONS OF THE COMMISSION FOR BASIC SYSTEMS

THE COMMISSION FOR BASIC SYSTEMS,

NOTING with satisfaction the action taken by the Executive Committee on the recommendations from the seventh session of the Commission,

CONSIDERING that some of the previous Executive Committee resolutions are still to be implemented,

RECOMMENDS:

(1) That the following Executive Committee resolutions should be kept in force:

Resolution 4 (EC-XXXI);
Resolution 5 (EC-XXXI);

(2) That the following Executive Committee resolutions, being no longer needed, should not be kept in force:

Resolution 3 (EC-XXVI);
Resolution 3 (EC-XXIX).

A N N E X I

Annex to paragraph 4.1 of the general summary

BASIC PRINCIPLES AND GUIDELINES FOR DETERMINING THE EVOLUTION OF THE WWW THROUGH THE INTEGRATED STUDY, STUDY AREAS FOR AN IMPROVED WWW, AND REGIONAL SYSTEM EXPERIMENTS

Basic principles for determining the evolution of the WWW through the integrated study

1. The design of the improved WWW system must include features giving priority to measures which will help remedy the known deficiencies of the present system (e.g. in the GOS).

2. The improved system must offer a higher level of implementation in existing services provided by the WWW to WMO Members and allow for expansion to provide new services.

3. The improved system should lead to a higher degree of integration and co-ordination between the main elements of the WWW: that is, in the making of observations, collection of basic data, processing of those data and in the distribution and presentation of basic data, forecast products and other relevant information. The planning of the various elements of the system and their development should be carried out so that these elements can be fully integrated into the WWW system.

4. The design of the improved WWW must allow for an implementation that gives an improved ratio of benefits to costs, at both the regional and global levels, so that each Member may share in the advantages of the WWW.

5. In all parts of the improved system every advantage should be taken of suitable new technology to provide the required functions and services. For example, the design should be based on those international telecommunication standards which are appropriate and available, with the aims of easing implementation and having a firmer base for long-term support. WMO standards should only be developed when such international standards are not applicable.

6. The design and implementation of the improved system must take into account the differing levels of development among Members of WMO. Specifically, it should be within the capability of developing countries to implement, operate and maintain the parts of the system for which they are responsible and to satisfy their national requirements fully through use of the improved system.

7. The improved system should be very flexible both in operation and in its ability to respond rapidly to new and changed requirements, including those of special research experiments.

8. The design of the improved system must allow centres to use either existing or new methods in a way that causes no interruption to services. It should be possible to have a phased implementation of various elements of the improved system at different times and at any location, so as to obtain early benefit from new or upgraded facilities.

9. There must be a gradual introduction of new and improved features with every opportunity for Members to choose their time to implement these features according to their needs and abilities.

10. The improved system must be based on current and future requirements expressed by WMO technical commissions and other organizations and bodies. In particular, all the products of the system must be easily adapted to the needs of users.

Guidelines for determining the evolution of the WWW through the integrated study

1. There must be adequate system-management features built into the improved system, including monitoring of total performance of the system, so that problems and weaknesses can be identified and remedied in real time.

2. Quality-control measures must be strengthened throughout the entire system to ensure that basic data and products are as accurate as possible. Errors should be detected as close to the source as possible and, where possible, corrected at the source. Alternatively, the data should be flagged to indicate that they are suspect or that they have been adjusted. A follow-up mechanism is needed to ensure that recurring errors are reported for corrective action.

3. A very high level of operational readiness is required of the system as a whole. At critical centres substantial duplication of hardware and the highest standards of software resilience should be considered. Cross-connexions, preferably with a facility for automatic re-routeing, will be required to allow for failures at individual centres.

4. The design should provide for an agreed system of priorities for the transmission and processing of data. The highest priority must be given to real-time data. This system of priorities must also be able to support a request-reply service that will not have an adverse effect on operational work.

5. The organization of collecting, processing and distribution centres, and also the connexions between them, must be considered with a view to providing all Members with the information they require in a timely manner.

6. The system should be developed so that all centres present compatible interfaces to each other. In the design, the way in which functions are performed by centres should be transparent to external users. In this connexion, it is important

to have a common system of agreed formats for observing, exchanging and presenting data, which have been co-ordinated with other organizations and bodies using meteorological data.

7. It is recognized that not all data will be well suited to handling through the on-line part of the system and full account must be taken in the future design to allow for the storage, retrieval and exchange of such information.

8. The system must be designed to permit effective use of current and new data, whether synoptic or asynoptic.

9. All elements of the system must work together and the interfaces between current and improved elements of the system will need to be designed so that continued operation of the total system is less difficult, and the gap between developed and developing countries is narrowed.

10. The designers of the improved system should, when practicable, consider whether the possibility exists to arrange for development of software and hardware specifications which may be of general applicability.

11. The design should avoid any unnecessary duplication of storage, processing and dissemination of data.

12. The design of the improved WWW system should take account of other programmes and systems of WMO or those supported by or developed jointly with other organizations, such as the Area Forecast System, which are closely related to and make use of the WWW sub-systems.

Study areas for an improved WWW

1. Optimized observing system (including regional observing system experiments)

According to the decision by EC-XXXII on the planning of the future composite observing system, individual studies will be carried through following the three phase plans established by the Executive Committee. This area should also include a study on the cost-effectiveness of the equipment, and its vulnerability, maintenance and operation.

2. Interrelation of data processing/data communications

Studies should be undertaken aiming at a design of an improved telecommunication network/data-base system which will satisfy global, regional and national requirements for basic data sets as well as those requirements expressed by WMO technical commissions and other organizations and programmes. In a cost-effective manner, this system should make use of relevant ISO and CCITT recommendations and guidance material, and should include provisions for universal quality control and monitoring.

3. Improvement of the GTS

Studies should aim to improve the collection and distribution of information (e.g. observational data and processed products), taking advantage of all available systems and technologies. Studies should seek to obtain more timely and more complete data collection, and to improve the speed and range of processed products (including pictorial information) disseminated to users. The application of new technology and facilities should be investigated to reduce current shorcomings in the GTS.

4. Information-exchange formats

Development of general data format standards for the observing, data communications, data production and user interface functions of the future WWW system.

5. Output products and user interface

Studies should be undertaken, aiming at a design of automated and manual processing methods to be used at the regional or national level to prepare output products such as analyses and forecasts and other derived information as required for direct use of processed products in forecasts, or their modification to meet the requirements of the meteorological community as well as of specialized users, organizations or programmes outside the basic meteorological services.

6. Transfer of technology

Studies will be needed to develop appropriate methods and procedures for providing developing countries with equipment, computer hardware/software, and to train personnel in maintenance of equipment and computers as well as in their use for observing, data-processing and telecommunications operations in an improved WWW system.

Regional observing system experiments

Suggestions for complementary regional observing system experiments, in Phase I of planning the future composite GOS, have been grouped under four main headings, as follows:

(a) Geographical or climatological regions

This heading would include regional observing system experiments, such as:

(i) A review of the value of the current upper-air network;

(ii) A review of the regional value of FGGE observing systems (e.g. drifting buoys and TIROS-N);

(iii) An evaluation of satellite (temperature) soundings and their use as a complement to the surface-based upper-air network;

(iv) Studies relating to data-impact tests on a regional scale to assess the impact of different observing subsystems upon numerical predictions, at grid resolution ranging from 250 km to 60 km.

Study of the need for one versus two radiosonde observations per day in the tropics.

(b) Specific storm or weather phenomena

(i) Typhoon Operational Experiment (TOPEX), which covers the south-west Pacific and east Asian regions;

(ii) Data requirements for tropical cyclone forecasting in such areas as the Indian Ocean and Bay of Bengal;

(c) Short-range forecasting

Studies of observational data requirements (e.g. necessary mix of surface-based and space-based observations) for very short-range forecasting and storm-warning services (e.g. 0-3 hours in advance);

(d) Trade-off studies between various observing systems

(i) Reduction of the density of upper-air stations over land when ASDAR data over nearby oceans become more plentiful and include soundings during take-off and landings, and/or when ACARS data become available in large quantities from overland flights;

(ii) Use of surface-based soundings up to the base of the stratosphere and satellite soundings at higher levels;

(iii) Use of drifting buoys to increase data coverage in certain off-shore coastal areas;

(iv) Use of dropsondes from commercial aircraft on less-travelled routes;

(v) Use of weather radar data to complement data from raingauge networks.

A N N E X II

Annex to Recommendation 1 (CBS-Ext.(80))

PROPOSED AMENDMENTS TO VOLUMES I, II AND III OF THE TECHNICAL REGULATIONS

(1) Replace Chapters A.1.1, A.1.2 and A.1.3 by the following:

"CHAPTER A.1.1

METEOROLOGICAL OBSERVING NETWORKS,
STATIONS AND OBSERVATIONS

/A.1.1./

General

/A.1.1./ 1.1

Scope, purpose and operation of the Global Observing System

/A.1.1./ 1.1.1

The Global Observing System shall be constituted as a co-ordinated system of methods, techniques and facilities for making observations on a world-wide scale and defined as one of the main components of the World Weather Watch.

/A.1.1./ 1.1.2

The purpose of the Global Observing System shall be to provide the meteorological and related environmental observations from all parts of the globe that are required by Members for operational and research purposes.

/A.1.1./ 1.1.3

The Global Observing System shall consist of two sub-systems: the surface-based sub-system and the space-based sub-system, the former being composed of the regional basic synoptic networks of surface and upper-air stations, climatological stations, agricultural meteorological stations, aircraft meteorological stations, and other networks of synoptic stations on land and at sea as detailed in Annex V (Manual on the Global Observing System (WMO-No. 544), Volume I) and the latter of near-polar-orbiting and geostationary meteorological satellites.

/A.1.1./ 1.1.4

The Global Observing System shall be established and operated in accordance with the procedures and practices set out in Annex V (Manual on the Global Observing System (Publication No. 544), Volume I)."

(2) Delete Appendices A and B from Volume I and renumber Appendices C to G as follows:

Appendix C to Appendix A

Appendix D to Appendix B

Appendix E to Appendix C

Appendix F to Appendix D

Appendix G to Appendix E

(3) In the Introduction:

(a) Replace the text of paragraph 10 of the Introduction by the following:

"Texts called "appendices" which are appended to Volume I or Volume III of the Technical Regulations or to Volume I of the Manual on the GOS have the same status as the Technical Regulations to which they refer. In Volume I of the Technical Regulations, Appendices A, B and D are therefore considered as standard practices and procedures, Appendix C is considered as recommended practices and procedures, Appendix E in respect of Regulation /C.1./ 2.2.10 is considered as recommended practices and procedures. In Volume III, Appendices A, B and C all have the status of recommended practices and procedures.";

(b) In paragraph 19 replace the text under the heading "A.1 - The Global Observing System" by the following:

"A.1.1 - Meteorological observing networks, stations and observations: Volume I, Chapter /A.1.1/"

(4) Under "Definitions":

(a) Delete the following terms and the corresponding definitions because they are no longer used in Volumes I, II and III of Regulations:

Actual time of observation

Agricultural meteorological station for specific purposes

Automatic climatological station

Automatic surface synoptic station

Auxiliary agricultural meteorological station

Baseline air-pollution station

Climatological station for specific purposes

Drifting automatic marine station

Indirect sounding

Lightship station

Meteorological reconnaissance flight

National standard barometer

Ordinary agricultural meteorological station

Ordinary climatological station

Pilot-balloon observation

Pilot-balloon station

Precipitation station

Principal agricultural meteorological station

Principal automatic station

Principal climatological station

Principal land station

Radiosonde observation

Radiosonde station

Radiowind observation

Radiowind station

Rawinsonde observation

Rawinsonde station

Regional air-pollution station

Regional standard barometer

Supplementary automatic station

(b) Replace the definition of "Ocean weather station" by the following:

"A station aboard a suitably equipped and staffed ship that endeavours to remain at a fixed sea position and that makes and reports surface and upper-air observations and may also make and report sub-surface observations.";

(c) Amend the definition of "Standard time of observation" to read as follows:

"A time specified in the Manual on the Global Observing System (Annex V to the Technical Regulations) for making meteorological observations";

(d) Insert the following terms and definitions:

Land station. An observing station situated on land.

Meteorological observing network. A group of meteorological observing stations spread over a given area for a specific purpose.

Sea station. An observing station situated at sea.

Surface observation. An observation, other than an upper-air observation, made on the Earth's surface.

Upper-air observation. An observation made in the free atmosphere either directly or indirectly.

(5) Make all the editorial changes (throughout Publication No. 49) necessitated by the amendments listed under (1) and (2) above, i.e. replace all references to regulations in the present Chapters A.1.1, A.1.2 and A.1.3 by references to the corresponding paragraphs in the Manual on the GOS, and change all references to Appendices C to G in accordance with the new notation.

ANNEX III

Annex to Recommendation 2 (CBS-Ext.(80))

PROPOSED AMENDMENTS TO THE MANUAL ON THE GLOBAL OBSERVING SYSTEM, VOLUME I (GLOBAL ASPECTS)

(1) Insert the following new definitions:

Atmospherics detection station: A station contributing observations to an atmospherics detection system.

Automated aircraft meteorological system: A series of devices integrated into the instrumentation of an aircraft, which records and/or transmits meteorological observations automatically.

Automatic station: A station at which instruments make and either transmit or record observations automatically, the conversion to code form, if required, being made either directly or at an editing station.

Baseline air-pollution station: A station at which observations are made on background air pollution to document long-term (global) changes in atmospheric composition of particular significance to weather and climate.

Climatological station: A station from which climatological data are obtained.

Coastal station: A station on a coast that may be able to make some observations of conditions at sea.

Environmental data buoy station: A fixed or drifting buoy which records or transmits environmental and/or marine data.

Island station: A station on a small island on which conditions are similar to those in the marine environment and from which some observations of conditions at sea can be made.

Land station: An observing station situated on land.

Meteorological element: One of the atmospheric variables or phenomena which characterize the physical state of the atmosphere at a specific place at a given time.

Meteorological observing network: A group of meteorological observing stations spread over a given area for a specific purpose.

Meteorological reconnaissance aircraft station: A meteorological station on an aircraft equipped and assigned for the specific purpose of making meteorological observations.

Meteorological rocket station: A station equipped to make atmospheric soundings by rockets.

Observing station: Any station making observations.

Planetary boundary-layer station: A station equipped to provide detailed meteorological data in the planetary boundary layer.

Platform station: A sea station on a platform either anchored in deep water or fixed to the sea bed in shallow water.

Principal land station: A suitably equipped surface synoptic station on land that normally reports for international exchange the observations listed in Part III, 2.4.2.1.1 of the Manual on the Global Observing System.

Reference level data: Data for a specified level, normally 1 000 mb, which enable absolute heights to be ascribed to satellite temperature-sounding data.

Research and special-purpose vessel station: A vessel making voyages for research or other purposes and which is recruited to make meteorological observations during the voyages.

Sea station: An observing station situated at sea.

Special report: A report made at a non-standard time when specified conditions or changes of conditions occur.

Special station: A station for a special purpose as specified in Part III, paragraph 1 of the Manual.

Surface observation: An observation, other than an upper-air observation, made on the Earth's surface.

Surface station: A station making surface observations.

Synoptic observation: A surface or upper-air observation made at a standard time.

Tide-gauge station: A station at which tidal measurements are made.

Upper-air observation: An observation made in the free atmosphere either directly or indirectly.

Upper-air report: A report of an upper-air observation.

Upper-air station: A surface station equipped to make radiosonde, radiowind or pilot-balloon observations.

Upper-wind observation: An observation at a given height or the results of a complete sounding of wind speed and direction in the atmosphere.

Weather: A qualitative observation of the state of the atmosphere and of phenomena associated with it, which are not necessarily measured quantitatively, e.g., the occurrence of any particular form of precipitation, the presence of obscuring matter giving rise to fog and mist, and the appearance of optical phenomena.

Weather radar station: A station making observations by weather radar.

(2) Amend the following definitions as follows:

Atmospherics detection system: An instrumental system consisting of a number of stations for the detection and location of atmospherics.

Background pollution station: A general term which includes both baseline and regional air-pollution stations.

Elevation: The vertical distance of a point or level on, or affixed to, the surface of the Earth measured from mean sea-level.

Meteorological observation (Observation): The evaluation or measurement of one or more meteorological elements.

Meteorological rocket: A rocket equipped with instrumentation to make atmospheric soundings up to high altitudes.

Planetary boundary layer: A layer in the atmosphere, usually taken to be the lowest 1 500 m, in which meteorological conditions are affected by the Earth's surface.

Radiosonde observation: An observation of meteorological elements in the upper air, usually atmospheric pressure, temperature and humidity, by means of a radiosonde.

Selected ship station: A mobile ship station that is equipped with sufficient certified meteorological instruments for making observations and that transmits the required observations in the appropriate code form for ships.

Standard time of observation: A time specified in the Manual on the Global Observing System for making meteorological observations.
NOTE: The term "Greenwich Mean Time", abbreviated as GMT, is used in this Manual as a synonym of the term "Universal Time (UT)".

Surface-based sub-system: An essential part of the Global Observing System as described in Part III, paragraph 1 of the Manual.

Weather radar: A radar used for the remote detection and location of clouds and precipitation and determination of their vertical structure. In some cases, measurement of precipitation intensities and wind shear can also be obtained.

(3) Delete the following definitions:

- Automatic climatological station
- Automatic land station
- Automatic land synoptic station
- Automatic Picture Transmission (APT) service
- Automatic sea station
- Automatic sea synoptic station
- High Resolution Picture Transmission (HRPT) service
- Island or coastal station
- Mobile ship station
- Surface synoptic station
- Upper-air synoptic station
- WEFAX

(4) Maintain or include in the Manual the following definitions, which either already appear in the Manual or used to appear in the WMO Technical Regulations (these definitions have already been adopted):

- Actual time of observation
- Aeronautical meteorological station
- Agricultural meteorological station
- Agricultural meteorological station for specific purposes
- Aircraft meteorological station
- Altitude
- Anchored platform station

- Auxiliary agricultural meteorological station
- Auxiliary ship station
- Climatological station for specific purposes
- Data-collection platform (DCP)
- Direct read-out service
- Drifting automatic sea (drifting buoy) station
- Fixed platform station
- Fixed sea station
- Geostationary satellite
- Global Data-processing System (GDPS)
- Global Observing System (GOS)
- Global Telecommunication System (GTS)
- Height
- Ice-floe station
- Lightship station
- Meteorological bulletin
- Meteorological message
- Meteorological observing station
- Meteorological reconnaissance flight
- Meteorological report
- Meteorological satellite
- Mobile sea station
- National Meteorological Centre (NMC)
- National standard barometer
- Near-polar orbiting satellite
- Ocean weather station
- Ordinary agricultural meteorological station
- Ordinary climatological station
- Ordinary radiation station
- Ozone sounding station
- Pilot-balloon observation
- Pilot-balloon station
- Precipitation station
- Principal agricultural meteorological station

- Principal automatic station
- Principal climatological station
- Principal land station
- Principal radiation station
- Radiation station
- Radiosonde station
- Radiowind observation
- Radiowind station
- Rawinsonde observation
- Rawinsonde station
- Reference climatological station
- Regional air-pollution station
- Regional basic synoptic network
- Regional Meteorological Centre (RMC)
- Regional standard barometer
- Regional Telecommunication Hub (RTH)
- Satellite operator
- Space-based sub-system
- Supplementary ship station
- Synoptic station
- World Meteorological Centre (WMC)
- World Weather Watch (WWW)

(5) Insert the following note at the beginning of the Definitions Section:

NOTE: Composite terms have not been defined in this section when their definitions can easily be deduced from those of the elements constituting them. For example, the definition of the term "synoptic land station" can be constructed logically from the definitions of the terms "synoptic station" and "land station".

(6) Amend Part I as follows:

- Paragraph 2.6, Note (2): Add after the term "Definitions of data levels", "(See Manual on the Global Data-processing System)".

- Paragraph 2.7: Amend the end of the paragraph to read "... in consultation and co-ordination with Members, regional associations and other technical commissions concerned."

- Paragraphs 3.2, 3.2.1 and 3.2.2: Replace the text of these paragraphs by the new following texts:

"3.2 The GOS surface-based sub-system shall be composed of the regional basic synoptic networks of surface and upper-air stations, climatological stations, agricultural meteorological stations, aircraft meteorological stations, and other networks of synoptic stations on land and at sea as detailed in Part III, paragraphs 1(a) to 1(h) of the Manual.

3.2.1 The main elements of the GOS surface-based sub-system shall consist of the regional basic synoptic networks, other networks of synoptic stations on land and sea and aircraft meteorological stations as detailed in Part III, paragraphs 1(a) to 1(c) of this Manual.

3.2.2 Other elements of the GOS surface-based sub-system shall consist of aeronautical meteorological stations, climatological stations, agricultural meteorological stations, research and special-purpose vessel stations and special stations (as listed in Part III, paragraphs 1(d) to 1(h))."

- Paragraph 4.1.4: Amend to read "... existing facilities, personnel and arrangements ...", and the NOTE as "NOTE (1)".

- Paragraph 4.2: Delete this text.

- Paragraph 4.2.1: Renumber this paragraph as NOTE (2) under paragraph 4.1.4 and modify it as to read: "The provisions of 2.5 above apply".

- Insert a new paragraph 4.1.5 as follows:

"4.1.5 The provisions of 2.5 above shall apply to the implementation of new elements."

- Add to this new paragraph a "NOTE (1)" with the text of the present paragraph 4.2.2 which is to be deleted.

- Renumber the NOTE under the former paragraph 4.2.2 as "NOTE (2)".

(7) Amend Part II as follows:

- Paragraph 2: Add a NOTE as follows:

"NOTE: Asynoptic data from satellites and other sources will be of increasing importance in the GOS in the future."

- Paragraph 3.2.2, NOTE (2): Replace "... WMO Technical Regulations" by "Manual on the GOS".

- Paragraph 3.2.3: Insert after "The global network" the phrase "for synoptic purposes" and in NOTE (2) after "the global network" "for numerical models", and finally in NOTE (3) after "A list of upper-air and surface" the word "synoptic".

- Attachment II-3: Amend the entries in the last column to read "8 per day, at the main and the intermediate standard times"; "4 per day, at the main standard times"; "4 per day, at the standard times (if not possible, at least at 0000 and 1200 GMT)".

(8) Amend Part III as follows:

- Paragraph 1: Replace text by the following:

"The surface-based sub-system is composed of main elements which shall consist of:

(a) The regional basic synoptic networks:

(i) Surface synoptic stations;
(ii) Upper-air synoptic stations;

(b) Other networks of synoptic stations:

(i) Land stations:
- Manned surface stations;
- Automatic surface stations;
- Upper-air stations:
  - Rawinsonde stations;
  - Radiosonde stations;
  - Radiowind stations;
  - Pilot-balloon stations;

(ii) Sea stations:
- Fixed sea stations:
  - Ocean weather stations;
  - Lightship stations;
  - Fixed platform stations;
  - Anchored platform stations;
  - Island and coastal stations;

- Mobile sea stations:
  - Selected ship stations;
  - Supplementary ship stations;
  - Auxiliary ship stations;
  - Ice-floe stations;

- Automatic sea stations:
  - Fixed sea stations;
  - Mobile sea stations;
  - Drifting buoy stations*;

(c) Aircraft meteorological stations;

The surface-based sub-system is also composed of other elements, which shall consist of:

(d) Aeronautical meteorological stations;

(e) Research and special-purpose vessel stations;

(f) Climatological stations:

(i) Reference climatological stations:
(ii) Principal climatological stations;
(iii) Ordinary climatological stations;
(iv) Precipitation stations;
(v) Climatological stations for specific purposes;
(vi) Automatic climatological stations;

(g) Agricultural meteorological stations:

(i) Principal agricultural meteorological stations;
(ii) Ordinary agricultural meteorological stations;
(iii) Auxiliary agricultural meteorological stations;
(iv) Agricultural meteorological stations for specific purposes;

(h) Special stations, which shall include:

(i) Weather radar stations;
(ii) Radiation stations;
(iii) Atmospherics detection stations;
(iv) Meteorological reconnaissance aircraft stations;
(v) Meteorological rocket stations;
(vi) Ozone sounding stations;
(vii) Background pollution stations;
(viii) Planetary boundary-layer stations;
(ix) Tide-gauge stations.

NOTES: (1) The definitions of stations listed above will be found in the Definitions section of the Manual.

(2) Any station may fall under more than one of the above categories."

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* Drifting buoy data may be asynoptic.

- Paragraph 2.1.1: Amend the middle of the paragraph to read: "... frequency of observations should be as laid down by decisions of Congress, ... ".

- Paragraph 2.1.2: Delete the second sentence, which constitutes the text of a new additional paragraph, paragraph 2.1.3.

- Paragraphs 2.2 to 2.3.7.10 Replace by the new following ones:

2.2 Main elements of the surface-based sub-system

2.2.1 Regional basic synoptic networks

2.2.1.1 The regional basic synoptic networks of both surface and upper-air stations shall form the main part of the surface-based sub-system.

2.2.1.2 The regional basic synoptic networks shall be established to meet the requirements laid down by the regional associations.

NOTES: (1) The regional associations will continue to examine their plans to meet any new international requirements.

(2) Details of known regional requirements are given in Volume II.

2.2.1.3 Members shall implement the regional basic synoptic networks.

2.2.2 Other networks of synoptic stations

2.2.2.1 Land stations shall include manned surface stations, automatic surface stations and upper-air stations.

2.2.2.1.1 Manned surface stations shall include principal and supplementary land stations.

2.2.2.1.2 When it is difficult for any reason to provide sufficient staff for 24-hour operations, automatic weather stations should supplement or replace manned surface observing stations, including stations in the basic synoptic network.

NOTE: These stations require skilled maintenance at intervals of a few months to ensure reliability and continued accuracy.

2.2.2.1.3 Upper-air stations shall include rawinsonde stations, radiosonde stations, radiowind stations and pilot-balloon stations.

2.2.2.1.4 Principal land stations, including those in the regional basic synoptic network, should be spaced at intervals not exceeding 150 km.

2.2.2.1.5 Upper-air land stations, including those in the regional basic synoptic network, should be spaced at intervals not exceeding 300 km.

2.2.2.1.6 If, in certain desert and other sparsely populated areas, it is impossible to establish networks of the densities recommended in 2.2.2.1.4 and 2.2.2.1.5 above, densities as near as possible to those recommended should be provided.

2.2.2.1.7 Although observations from more widely separated stations are also very valuable, surface stations should not be farther apart than 500 km and upper-air stations making observations of temperature, humidity and wind not farther apart than 1 000 km.

2.2.2.1.8 Special efforts should be made to establish an adequate network in such an area when it borders a populated area or is traversed by a regularly used air route.

2.2.2.2 Sea stations shall include fixed sea stations, mobile sea stations and automatic sea stations.

2.2.2.2.1 Fixed sea stations

2.2.2.2.1.1 Fixed sea stations shall include ocean weather stations, lightship stations, fixed platform stations (located in shallow water), anchored platform stations, and suitable island and coastal stations.

2.2.2.2.1.2 When more economic means are not available, ocean weather stations and some other fixed sea stations should provide essential and detailed meteorological and oceanographic data from critical locations or ocean areas.

NOTES (1) In this role, these stations are an integral part of regional and national networks.

(2) Fixed sea stations also provide reference level data and a basis for calibration of soundings by remote sensing from satellites and are thus important in the analysis of phenomena on a large or planetary scale.

2.2.2.2.1.3 Members should establish, either individually or jointly, ocean weather stations or other suitable observational facilities of surface and upper-air stations in ocean areas where there are large gaps in the global network.

2.2.2.2.2 Mobile sea stations

2.2.2.2.2.1 Mobile sea stations shall include selected ship stations, supplementary ship stations, auxiliary ship stations and ice-floe stations.

2.2.2.2.2.2 Since mobile ships are one of the main sources of surface observations over the oceans, Members shall recruit as many ships as possible that traverse data-sparse areas and regularly follow routes through areas of particular interest.

2.2.2.2.2.3 Each Member shall arrange for the recruitment of ships that are on the national register of that Member as mobile sea stations.

2.2.2.2.2.4 Members should also recruit ships carrying the flags of other countries to furnish meteorological reports.

2.2.2.2.2.5 Members recruiting a ship carrying the flag of another Member should, in each case, notify the Member concerned of the action taken, unless a port in the country of the Member that recruits the ship is considered to be its home port.

2.2.2.2.2.6 In its recruitment programme, each Member should aim at making the maximum possible contribution from mobile sea stations towards attaining an adequate density of surface and upper-air reports in all oceanic areas.

NOTES: (1) An adequate density of surface reports in oceanic areas is at least one per 300 km for each main standard time of observation.

(2) An adequate density of upper-air reports in oceanic areas is at least one per 1 000 km for each standard time of observation.

2.2.2.2.2.7 Members should arrange for the timely transmission of observations.

NOTE: Details of observing and reporting programme are described in Chapter 5 of the Guide to Marine Meteorological Services (WMO-No. 471). In case of difficulties resulting from fixed radio watch hours on board single-operator ships, the procedures given in the Manual on the Global Telecommunication System (WMO-No. 386), Attachment I.1, should be followed.

2.2.2.2.2.8 An increasing number of ships have a restricted radio watch, and to remedy this situation, Members should, in addition, endeavour to install automatic observing and transmission equipment whenever possible, as this will promote the prompt and accurate transmission of data.

2.2.2.2.2.9 As upper-air data from the ocean areas are particularly sparse, Members should give consideration to equipping suitable ships to make soundings and, if possible, to measure upper winds.

2.2.2.2.2.10 Priority should be given to upper-wind observations in the tropics.

2.2.2.2.2.11 Members should endeavour to equip mobile ships to make sub-surface observations and report them in the BATHY/TESAC code form in accordance with the IGOSS/WWW plan.

NOTE: Guidance on steps to be taken while recruiting a selected, supplementary or auxiliary observing ship, on the organization needed to collect ships' weather reports and on the use of marine meteorological logs on board ships, is contained in the Guide to Marine Meteorological Services (WMO-No. 471).

2.2.2.2.3 Automatic sea stations

2.2.2.2.3.1 Members should consider using fixed or mobile automatic sea stations or drifting buoy stations in the data-sparse areas of persistent cloudiness, where remote sounding by satellite is hampered.

2.2.2.2.3.2 Automatic sea stations shall include fixed and mobile automatic sea stations and drifting buoy stations.

NOTE: These stations are located on fixed or mobile ships, fixed or anchored platforms and on drifting platforms and ice floes.

2.2.2.2.3.3 It shall be possible to determine the position of fully automatic mobile sea stations.

2.2.3 Aircraft meteorological stations

2.2.3.1 Each Member shall arrange for observations to be made by aircraft of its registry operating on international air routes and for the recording and reporting of these observations.

NOTE: Further information on aircraft observations and reports may be found in the Technical Regulations (WMO-No. 49), Volume II - Meteorological Service for International Air Navigation.

2.2.3.2 Members accepting responsibility for collecting aircraft reports for synoptic purposes shall promptly make these available, in agreed code forms, to other Members.

2.2.3.3 Members should give special consideration to the use of automated systems for the making of aircraft meteorological observations.

2.3 Other elements of the surface-based sub-system

2.3.1 Aeronautical meteorological stations

2.3.1.1 Members should establish aeronautical meteorological stations to meet the requirements of aviation.

2.3.2 Research and special-purpose vessel stations

2.3.2.1 Members operating research and special-purpose vessels should do their utmost to ensure that all such vessels make surface and upper-air meteorological observations.

2.3.2.2 Sub-surface temperature observations, down to the thermocline, should also be made and transmitted (in real time), in accordance with the procedures agreed between WMO and the Intergovernmental Oceanographic Commission.

2.3.3 Climatological stations

2.3.3.1 Each Member shall establish in its territory a network of climatological stations.

2.3.3.2 The network of climatological stations should give a satisfactory representation of the climate characteristics of all types of terrain in the territory of the Member concerned (e.g. plains, mountainous regions, plateau, coasts, islands, etc.).

2.3.3.3 Each Member shall establish and maintain at least one reference climatological station.

2.3.4 Agricultural meteorological stations

2.3.4.1 Each Member should establish in its territory a network of agricultural meteorological stations.

2.3.4.2 The desirable density of the network of each category of agricultural meteorological stations should be determined by the agricultural features of the country.

2.3.5 Special stations

2.3.5.1 General

In addition to the stations discussed in 2.2.1 to 2.3.4 above, Members should establish special stations.

NOTE: In some cases, these special stations are co-located with surface or upper-air stations of the regional basic synoptic networks.

2.3.5.2 Members should co-operate in the establishment of special stations for particular purposes.

2.3.5.3 Weather radar stations

Members should establish an adequate network of weather radar stations, either nationally or in combination with other Members of the Region, in order to secure information about areas of precipitation and associated phenomena and about the vertical structure of cloud systems, for both operational meteorology and research.

2.3.5.4 Radiation stations

2.3.5.4.1 Members should establish at least one principal radiation station in each climatic zone of their territory.

2.3.5.4.2 Members should maintain a network of radiation stations of sufficient density for the study of radiation climatology.

2.3.5.5 Atmospherics detection stations

Members should establish atmospherics detection stations.

NOTE: Methods in use are described in the Guide to Meteorological Instrument and Observing Practices (WMO-No. 8).

2.3.5.6 Meteorological reconnaissance aircraft stations

Members should organize, either individually or jointly, routine and special aircraft weather-reconnaissance flights.

2.3.5.7 Meteorological rocket stations

Members should establish meteorological rocket stations.

NOTE: When establishing and operating these stations, appropriate aviation safety precautions are considered necessary and need to be co-ordinated with the relevant air traffic control authorities.

2.3.5.8 Ozone sounding stations

Members should establish an adequate network of ozone sounding stations.

2.3.5.9 Background pollution stations

2.3.5.9.1 Members should establish background air-pollution monitoring stations required to serve the WMO BAPMoN (Background Air Pollution Monitoring Network), the desirable density being one station per 500 00 km^2.

2.3.5.9.2 Each main climatic zone should be covered.

2.3.5.10 Planetary boundary-layer stations

2.3.5.10.1 Members should establish an adequate network of stations for making measurements in the planetary boundary layer.

2.3.5.10.2 Members should, whenever possible, provide a capability to obtain detailed knowledge of the profiles of temperature, humidity, pressure and wind in the lowest 1 500 m of the atmosphere.

NOTES: (1) This information is required in the study of diffusion of atmospheric pollution, the transmission of electromagnetic signals, the relation between free-air variables and boundary-layer variables, severe storms, cloud physics, convective dynamics, etc.

(2) The accuracy of measurements of several variables and the height intervals at which they are required depend upon the nature of the problems under study.

(3) Some of the vertical and horizontal sounding systems which could be applied to specific problems for limited periods in a variety of locations are described in the Guide on the Global Observing System (WMO-No. 488).

2.3.5.11 Tide-gauge stations

Members should establish an adequate network of tide-gauge stations along the coasts subject to storm surges.

- After Paragraph 2.3.8.1, insert the following new sub-paragraph:

"2.3.8.1.1 Geographical co-ordinates of stations on land shall be specified in degrees and minutes of arc, and elevation in whole metres."

- After Paragraph 2.3.8.4, insert the following new paragraph:

"2.3.8.5 Aeronautical meteorological stations

The data relating to the elevation of an aeronautical meteorological station on land shall be specified in whole metres."

- Renumber Paragraph 2.3.8.5 as paragraph 2.3.8.6.

- After Paragraph 2.3.8.5.2 (now 2.3.8.6.2), insert the new paragraphs:

"2.3.8.6.3 Background pollution stations

2.3.8.6.3.1 The location of each background pollution station (baseline and regional air-pollution stations) should meet the siting criteria as described in the WMO International Operations Handbook for Measurement of Background Atmospheric Pollution (WMO-No. 491), in order that the observations made be representative for the area it covers.

2.3.8.6.3.2 A principal climatological station should be located at/or near the air-pollution station."

- After Paragraph 2.3.9.1.3 insert the following new paragraphs and renumber paragraph 2.3.9.2 as 2.3.9.3:

"2.3.9.2 Aeronautical meteorological stations

2.3.9.2.1 An aeronautical meteorological station on land, the function of which includes the making and exchange of synoptic observations, shall be identified by a station index number assigned by the Member concerned in compliance with the scheme prescribed in Annex II to the Technical Regulations (Volume I of the Manual on Codes (WMO-No. 306)).

2.3.9.2.2 If a change of index number of an aeronautical meteorological station on land, the reports of which are included in international exchanges, is necessary, such change should be made effective on 1 January or 1 July."

- Paragraph 2.3.10.1.1 (d): Amend to read:

"Times at which synoptic observations are made and reported."

- Paragraph 2.3.10.4.1: Replace the first three lines of the text of this paragraph by the following: "Each Member should maintain an up-to-date directory of the radiation stations in its territory, including ordinary and principal stations, giving the following information for each station:"

- Paragraph 2.3.11.2: Give separate numbering to a new paragraph constituted by the second sentence.

- Paragraphs 2.4.2.1.7 and 2.4.2.1.8: Give separate numberings to the second "should" parts of these paragraphs and renumber the paragraphs concerned.

- After Paragraph 2.4.2.1.10 (new 2.4.2.1.12), insert the following new paragraph:

  "2.4.2.1.13 At a fixed platform automatic station erected in shallow water, a surface synoptic observation should consist of observations of the elements in 2.4.2.1.11 above and, if possible, those in 2.4.2.1.12."

- Paragraph 2.4.2.2: Amend the heading as to read:

  "Upper-air synoptic observations"

- Paragraph 2.4.2.3.1(a): Add after the word "Weather"; "(See Guide to Meteorological Instrument and Observing Practices)".

- Paragraph 2.4.2.3.2: Insert figure "50" between "20" and "100".

- Paragraph 2.4.2.4.1(a): Amend as to read:

  "... including extreme values of these elements:"

- Paragraph 2.4.2.5.2.5 and the note: Replace the text of this paragraph and the relevant note by the following: "Pyrheliometric measurements shall be expressed in accordance with the World Radiometric Reference (WRR)."

- After Paragraph 2.4.2.5.3.2, insert the following new paragraphs:

"2.4.2.5.4 Air-pollution observations

2.4.2.5.4.1 At baseline air-pollution stations the observing programme should give priority to the measurement of the following atmospheric constituents:
(a) Carbon dioxide (including, if possible, isotopic composition);
(b) Constituents of wet precipitation;
(c) Solar radiation (including turbidity);
(d) N_2O, CO, CH_3, total and surface O_3;
(e) Condensation nuclei.

2.4.2.5.4.2 At regional air-pollution stations the observing programme should give priority to the measurement of the following atmospheric constituents:
(a) Suspended particulate matter (including chemical composition);

(b) Constituents of wet precipitation;
(c) Turbidity;
(d) Surface O_3.

2.4.2.5.4.3 At regional air-pollution stations with an extended programme the observing programme should, in addition to the constituents listed in 2.4.2.5.4.2 above, give priority to the measurement of the following atmospheric constituents:
(a) Carbon dioxide;
(b) Gaseous sulphur and nitrogen compounds.

NOTE: Guidance on these measurements is given in the WMO International Operations Handbook for Measurement of Background Atmospheric Pollution (WMO-No. 491)."

- After Paragraph 2.4.3.2.4, add the following note:

"NOTE: The actual time of a pilot-balloon observation may deviate from the range indicated above if by doing so, wind observations to considerably greater heights can be expected."

- After Paragraph 2.4.3.2.5, add the following two new paragraphs:

"2.4.3.2.6 At ocean weather stations, upper-air synoptic observations should comprise rawinsonde observations at 0000 and 1200 GMT and radiowind observations at 0600 and 1800 GMT.

2.4.3.2.7 The coded report containing data obtained from upper-air synoptic observations up to and including the 100 mb level should be presented to the telecommunication system within 75 minutes of the standard time of the observation."

- After Paragraph 2.4.3.3.3, add the following text:

"2.4.3.4 Asynoptic observations

NOTE: Drifting buoys and aircraft can also report at asynoptic times."

- Paragraph 2.4.4: Under the heading add the following note:

"NOTE: This section refers to surface observations only."

- Paragraph 2.4.4.1.1, delete the last sentence.

- After Paragraph 2.4.4.1.3, insert the following new paragraphs:

"2.4.4.1.4 Computations of upper-air observations shall be based on the relevant definitions of physical functions and values of constants given in Appendix III/1.

2.4.4.1.5 Each upper-air station should have an appropriate manual of instructions."

- Paragraph 2.4.4.3: Amend as follows:

"2.4.4.3 Weather

Members shall use the term "weather" as defined in the Guide to Meteorological Instrument and Observing Practices (WMO-No. 8).

NOTE: The term "phenomenon" is used in the definition referred to above with the same meaning as in the Manual on the Observation of Clouds and other Meteors (WMO-No. 407)."

- Paragraph 2.4.4.4.3: Replace the text of this paragraph by the following: "Each Member shall apply the International Barometer Conventions given in Appendix III/2."

- Paragraph 2.4.4.4.4: Replace the text of this paragraph by the following: "Whenever it is necessary to compute the theoretical local value of the acceleration due to gravity, each Member shall follow the procedure given in Appendix III/3."

- Paragraph 2.4.4.6 : Replace the text of the NOTE by the following: "Definitions and specifications of water vapour in the atmosphere are given in Appendix III/4."

- Paragraphs 2.4.4.6.1 and 2.4.4.6.3: At the beginning of these paragraphs insert the words: "In surface observations, ..."

- Paragraph 2.4.4.7.1: Amend the beginning of the text to read: "In surface synoptic observations, measurements of wind should refer to the height ... ".

- Paragraph 2.4.4.7.2: Amend the text of the NOTE to read as follows: "The Beaufort scale is given in Appendix III/5."

- Paragraph 3: Delete paragraphs 3 and 3.1, as well as the Note appended to it.

Insert at the end of Part III Appendices III/1, III/2, III/3, II/4 and III/5.

ANNEX III

APPENDIX III.I

(See paragraph 2.4.4.1.4)

VALUES OF SOME PHYSICAL FUNCTIONS AND CONSTANTS USED IN METEOROLOGY

(1) ***Composition of dry air up to about 25 km***

Constituent gas	*Mole fraction* (per cent)*
Nitrogen	78.09
Oxygen	20.95
Argon	0.93
Carbon dioxide	0.03
Neon	1.8×10^{-3}
Helium	5.24×10^{-4}
Krypton	1.0×10^{-4}
Hydrogen	5.0×10^{-5}
Xenon	8.0×10^{-6}
Ozone	1.0×10^{-6}
Radon	6.0×10^{-18}

(2) ***Molecular weight of gases constituting dry air***

Constituent gas	*Molecular weight* ($^{12}C = 12.000\,0$)
Nitrogen (N_2)	28.013
Oxygen (O_2)	31.999
Argon (A)	39.948
Carbon dioxide (CO_2)	44.010
Neon (Ne)	20.183
Helium (He)	4.003
Krypton (Kr)	83.80
Hydrogen (H_2)	2.016
Xenon (Xe)	131.30
Ozone (O_3)	47.998
Radon (Rn)	222

(3) ***Apparent molecular weight of dry air (M)***

$$M = 28.964\,4$$

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* The mole fraction x_i of the i^{th} component of a mixture of gases is defined by

$$x_i = \frac{m_i / M_i}{\Sigma\,(m_i / M_i)}$$

where m_i is the mass of the i^{th} component in a given volume or mass of the mixture and M_i is its molecular weight, the summation indicated being made over all components.

(c) *The absolute thermodynamic Kelvin scale of temperature* (*T*K) is defined by assigning to the triple point of pure water (T_t) as the fundamental fixed point, the temperature of 273.16 K.

(5) ***Temperature on the thermodynamic Celsius scale*** (*t*°C)

There are two definitions which may be used to describe temperature on the Celsius scale:

(*a*) The definition of the thermodynamic Celsius scale in terms of the absolute thermodynamic temperature (*T*K) is given by the relationship

$$t°C = TK - 273.15$$

(*b*) The definition on the basis of the International Temperature Scale of 1948 [°C (Int. 1948)] which is determined by readings of standard instruments capable of interpolating smoothly and reproducibly between the normal ice point [0°C (Int. 1948)] and the normal point of water [100°C (Int. 1948)].

NOTES:

(1) For most purposes, the results given by the two definitions may be regarded as indistinguishable.
(2) Temperature on the International Scale should be designated "degrees Celsius (International Scale 1948)" and the designation "degrees centigrade" should be discontinued.

(6) ***The fundamental unit of energy and its relation to other units of energy***

(*a*) The fundamental unit of energy, in whatever form energy is concerned, is the absolute joule (= 10^7 ergs).

(*b*) The relation of the fundamental unit to other units of energy is as follows:

1 absolute joule = 0.238 844 International Steam Table (IT) calorie
1 IT calorie = 4.186 84 absolute joule
1 IT calorie = 1.000 32 cal_{15} (15°C water calorie)
1 IT calorie = $\frac{1}{860 \times 10^3}$ mean international kilowatt-hour
1 mean international kilowatt-hour = 1.000 19 absolute kilowatt-hour
1 thermochemical (TC) calorie = 4.184 0 absolute joule (definitive)
1 absolute joule = 0.239 006 TC calorie

NOTE: The thermochemical (TC) calorie has the advantage over the IT calorie of being precisely connected to the absolute joule by action of an authoritative standard standardizing body.

(7) ***Unit of geopotential*** ($H_{m'}$)

1 standard geopotential metre = 0.980 665 dynamic metre

$$H_{m'} = \frac{1}{9.806\,65} \int_0^z g(z)\,dz$$

where

$g(z)$ = acceleration of gravity, in $m\,s^{-2}$, as a function of geometric height;
z = geometric height, in metres;
$H_{m'}$ = geopotential, in standard geopotential metres.

(8) ***Gas constant*** (*R**) ***for 1 gram mole of ideal gas***

$$R^* = 8.314\,32 \pm 0.000\,34 \text{ joule (g mole)}^{-1}\ K^{-1}$$
$$= 1.987\,5 \pm 0.000\,08 \text{ IT calorie (g mole)}^{-1}\ K^{-1}$$

(9) ***Gas constant*** *(R)* ***for 1 gram of dry air***

$$R = \frac{R^*}{M} = 0.287\,05 \text{ joule g}^{-1}\text{ K}^{-1}$$
$$= 0.068\,56 \text{ IT cal g}^{-1}\text{ K}^{-1}$$

(10) ***Molecular weight*** *(M_w)* ***of water vapour***

$$M_w = 18.015\,3$$

(11) ***Gas constant*** *(R_w)* ***for 1 gram of water vapour***

$$R_w = \frac{R^*}{M_w} = 0.461\,51 \text{ joule g}^{-1}\text{ K}^{-1}$$
$$= 0.110\,23 \text{ IT cal g}^{-1}\text{ K}^{-1}$$

(12) ***Heats of transformation of phases of water***

	Recommended value		*Range of actual value*	
	joule g^{-1}	IT cal g^{-1}	joule g^{-1}	IT cal g^{-1}
Heat of fusion (L_f)	2835	677	334(0°C) to 203 (—50°C)	79.7(0°C) to 48.6 (—50°C)
Heat of sublimation (L_s)			2 834(0°C) to 2 839 (—30°C) to 2 824 (—100°C)	677(0°C) to 678 (—30°C) to 674 (—100°C)
Heat of vaporization (L_v)			2 406(40°C) to 2 501 (0°C) to 2 635 (—50°C)	575(40°C) to 597 (0°C) to 629 (—50°C)
			(extrapolation below 0°C)	

(13) ***Saturation vapour pressures***

(*a*) Over water (e_w), 0°C to 100°C

$$\log_{10} e_w = +10.795\,74\,(1 - T_1/T) - 5.028\,00\,\log_{10}(T/T_1)$$
$$+ 1.504\,75 \times 10^{-4}\left[1 - 10^{-8.296\,9\,(T/T_1 - 1)}\right]$$
$$+ 0.428\,73 \times 10^{-3}\left[10^{4.769\,55\,(1 - T_1/T)} - 1\right]$$
$$+ 0.786\,14$$

where

$T_1 = 273.16$K (the triple point of water),

e_w is expressed in millibars, and T in K.

NOTE: The above formula is based on data which have been experimentally confirmed only in the range 0° to 100°C, but the same formula can be used for saturation vapour pressure over super-cooled water in the range —50° to 0°C with, as far as is known, insignificant error.

(*b*) Over ice (e_i), 0°C to —100°C

$$\log_{10} e_i = -9.096\,85\left(\frac{T_1}{T} - 1\right) - 3.566\,54\,\log_{10}\left(\frac{T_1}{T}\right)$$
$$+ 0.876\,82\left(1 - \frac{T}{T_1}\right) + 0.786\,14$$

where

$T_1 = 273.16$K (the triple point of water),

e_i is expressed in millibars, and T in K.

INTERNATIONAL BAROMETER CONVENTIONS

(1) ***Standard temperature and density of mercury***

The value of 0°C shall be the standard temperature to which mercury barometer readings are reduced for the purpose of relating actual density of mercury at its observed temperature to the standard density of mercury at 0°C.

The standard density of mercury at 0°C (symbol $\rho_{Hg,0}$) shall be considered to be 13.5951 grams per cubic centimetre; and, for the purposes of calculating absolute pressures by means of the hydrostatic equation, the mercury in the column of a mercury barometer shall be regarded conventionally as an incompressible fluid.

(2) ***Standard (normal) gravity***

Barometric readings shall be reduced from local acceleration of gravity to standard (normal) gravity. The value of standard (normal) gravity (symbol g_n) shall be regarded as a conventional constant:

$$g_n = 980.665 \text{ cm s}^{-2}$$

NOTE: This is recognized by scientists as a gravity datum to which reported barometric data in mm or inches of mercury shall refer but it does *not* represent the value of gravity at latitude 45° at sea-level.

(3) ***Pressure units***

(*a*) The ***millibar***, defined as a unit of pressure equal to 1 000 dynes cm^{-2}, shall be the unit in which pressures are reported for meteorological purposes.

(*b*) In accordance with the provisions of paragraphs (1) and (2), a column of mercury at a standard temperature of 0°C when subjected to an acceleration of gravity equal to standard (normal) gravity, $g_n = 980.665$ cm s^{-2} may be regarded as representing pressure due to the weight of mercury on a unit cross-section area (one square centimetre). When the mercury column under these standard conditions of temperature and gravity has a ***true*** scale height of one millimetre, it shall be considered to represent a unit of pressure called "one millimetre of mercury under standard conditions", symbol "$(\text{mm Hg})_n$". When it is clear from the context that standard conditions are implied, the briefer term "millimetre of mercury" may be used in reference to this unit. In view of the provisions of paragraphs (1), (2) and (3 ***a***), a column of mercury having a true scale height of 760 millimetres when subjected to standard conditions of temperature and gravity yields a pressure of 1 013 250 dynes $\text{cm}^{-2} = 1\,013.250$ mb.

Consistent with the foregoing the following conversion factors obtain:

$$1 \text{ millibar} = 0.750\,062 \ (\text{mm Hg})_n$$
$$1 \ (\text{mm Hg})_n = 1.333\,224 \text{ mb}$$

(*c*) Analogous to the case outlined above under (***b***), "one inch of mercury under standard conditions", symbol "$(\text{in.Hg})_n$", shall refer to the pressure due to the weight of mercury per unit cross-section area when the column has a true scale height of one inch,

provided the mercury is at the standard temperature of 0°C and it is subjected to an acceleration of gravity equal to the standard (normal) value, $g_n = 980.665$ cm s^{-2}.

When it is clear from the context that standard conditions are implied, the briefer term "inch of mercury" may be used in reference to this unit.

In cases where the conventional engineering relationship between the inch and millimetre is assumed, namely 1 inch = 25.4 millimetres, the following conversion factors obtain:

1 mb = 0.029 530 0 $(\text{in.Hg})_n$
1 $(\text{in.Hg})_n$ = 33.863 9 mb
1 $(\text{mm Hg})_n$ = 0.039 370 08 $(\text{in.Hg})_n$

(*d*) When pressure data are issued, preference shall be given to expressing them in millibars; but if they are required in other units they should be given preferably in standard units as outlined under (*b*) and (*c*) above; that is, either in $(\text{mm Hg})_n$ or in $(\text{in.Hg})_n$, as the case may be.

(4) ***Mercury barometer scales and standard instrumental conditions***

Except for mercury barometers, still serviceable and graduated with scales on a different basis from that outlined below, scales on mercury barometers shall be graduated so that they yield true pressure readings directly in standard units as defined under paragraph (3) when the entire instrument is maintained at the standard temperature of 0°C and at the standard (normal) value of gravity, $g_n = 980.665$ cm s^{-2}.

It will be understood that the foregoing recommendation implies that the scales of Fortin barometers graduated in millimetres or inches shall yield true linear readings when the scale is maintained at a temperature of 0°C, except possibly for the case of barometers referred to in the first clause of the preceding paragraph.

Mercury barometers having scales engraved so as to yield standard units of pressure as prescribed in paragraph (3) when the instrument is maintained at the standard conditions of temperature and gravity specified under paragraphs (1) and (2) should have inscribed on the barometer scale(s) whichever of the following legends is appropriate:

"True mb at 0°C and 980.665 cm s^{-2}" (1)
"True $(\text{mm Hg})_n$ at 0°C and 980.665 cm s^{-2}" (2)
"True $(\text{in.Hg})_n$ at 0°C and 980.665 cm s^{-2}" (3)

Barometers may have more than one scale engraved on them; for example, mb and $(\text{mm Hg})_n$, or mb and $(\text{in.Hg})_n$, provided the conditions specified above are fulfilled.

(5) ***Determination of local acceleration of gravity***

The value of $g_{\varphi,H}$ required for reducing barometer readings to standard gravity shall be based on the most accurate determination of the acceleration of gravity g available. In the event that the local value of the acceleration of gravity has not been determined on the basis of some method considered to be more accurate in the absolute sense than the methods outlined in Appendix B, it shall be ascertained in accordance with the provisions of Appendix B.

(6) ***Standard instrumental conditions for mercury barometers bearing altitude scales***

Except for mercury barometers still serviceable and graduated with scales on a different basis from that outlined below, mercury barometers that bear a scale representing altitudes corresponding to pressures in accordance with some specified standard atmosphere shall have the scale graduated so that it will indicate the assumed pressure-altitude relationship when the entire instrument is maintained at the standard temperature of 0°C and at the standard (normal) value of gravity, $g_n = 980.665$ cm s^{-2}.

Barometers bearing scales satisfying these standard conditions should have inscribed on the scales an inscription of the following character:

"True - - - - pressure-altitude
at 0°C, 980.665 cm s^{-2}"

where there is inserted in the blank space the standard on which the pressure-altitude relationship is based, for example ICAO.

PROCEDURE FOR CALCULATING THEORETICAL VALUE OF LOCAL ACCELERATION OF GRAVITY

(1) The theoretical value ($g_{\varphi,0}$) of the acceleration of gravity at mean sea-level at geographic latitude φ is computed by means of the equation:

$$g_{\varphi,0} = 980.616\ (1 - 0.002\ 637\ 3\ \cos\ 2\varphi + 0.000\ 005\ 9\ \cos^2 2\varphi),\ \text{in cm s}^{-2} \qquad (1)$$

(2) The local value of the acceleration of gravity at a given point on the surface of the ground at a land station is computed by means of the equation:

$$g = g_{\varphi,0} - 0.000\ 308\ 6\ H + 0.000\ 111\ 8\ (H - H') \qquad (2)$$

where

g = local calculated value of the acceleration of gravity, in cm s^{-2}, at the given point;

$g_{\varphi,0}$ = theoretical value of the acceleration of gravity in cm s^{-2} at mean sea level at geographic latitude φ, computed in accord with equation (1) above;

H = actual elevation of the given point, in metres above mean sea-level; and

H' = mean elevation in metres above mean sea-level, of the actual surface of the terrain included within a circle whose radius is about 150 kilometres, centred at the given point.

(3) The local value of the acceleration of gravity at a given point within a distance (H) above mean sea-level of not more than about 10 kilometres, where the point lies over the sea-water surface, is computed by means of the equation:

$$g = g_{\varphi,0} - 0.000\ 308\ 6\ H - 0.000\ 068\ 8\ (D - D') \qquad (3)$$

where

g = local calculated value of the acceleration of gravity, in cm s^{-2}, at the given point;

$g_{\varphi,0}$ = theoretical value of the acceleration of gravity, in cm s^{-2}, at mean sea-level at geographic latitude φ, computed in accord with equation (1);

H = actual elevation of the given point, in metres above mean sea-level;

D = depth of water, in metres, below the given point;

D' = mean depth of water, in metres, included within a circle whose radius is about 150 kilometres centred at the given point.

(4) At stations or points on or near a sea coast, the local value of the acceleration of gravity is calculated, so far as practicable, through the use of equations (2) and (3) on a *pro rata* basis, weighting the last term of equation (2) according to the relative area of land included within the specified circle and weighting the last term of equation (3) according

to the relative area of the sea included within the circle, then combining algebraically the values thus secured to obtain a correction which is applied to the first two terms in the right-hand members of either of those equations.

(5) In order to compute the value of the acceleration of gravity at a given point in the free air at an altitude Z, in metres, above mean sea-level, equations (2) and (3), for land and sea surfaces respectively, may be adapted for the purpose by substituting for the term

$$-0.000\,308\,6\ H$$

in equations (2) and (3) the following free-air term:

$$\text{Free-air term} = \left\{ -[0.000\,308\,55 + 0.000\,000\,227 \cos 2\varphi]\ Z + [0.000\,072\,54 + 0.000\,000\,10 \cos 2\varphi] \left(\frac{Z}{1000}\right)^2 \right\} \quad (4)$$

(6) Any value of the acceleration of gravity derived in the manner described in paragraphs (1)–(5), inclusive, shall be referred to as being on the ***meteorological gravity system***, to distinguish the data from those on the so-called ***Potsdam system*** which is widely used by geodetic organizations and which is on a basis that yields values 0.013 cm s^{-2} greater than those on the meteorological gravity system.

NOTE: Further procedures for determining local acceleration of gravity are given in the Guide to Meteorological Instrument and Observing Practices (Publication No. 8).

APPENDIX III.4

DEFINITIONS AND SPECIFICATIONS OF WATER VAPOUR IN THE ATMOSPHERE

(1) The ***mixing ratio*** r of moist air is the ratio of the mass m_v of water vapour to the mass m_a of dry air with which the water vapour is associated:

$$r = \frac{m_v}{m_a}$$

(2) The ***specific humidity, mass concentration*** or ***moisture content*** q of moist air is the ratio of the mass m_v of water vapour to the mass $m_v + m_a$ of moist air in which the mass of water vapour m_v is contained:

$$q = \frac{m_v}{m_v + m_a}$$

(3) ***Vapour concentration (density of water vapour in a mixture)*** or ***absolute humidity:*** For a mixture of water vapour and dry air the vapour concentration ρ_v is defined as the ratio of the mass of vapour m_v to the volume V occupied by the mixture:

$$\rho_v = \frac{m_v}{V}$$

(4) ***Mole fraction of the water vapour of a sample of moist air:*** The mole fraction x_v of the water vapour of a sample of moist air, composed of a mass m_a of dry air and a mass m_v of water vapour, is defined by the ratio of the number of moles of water vapour ($n_v = m_v/M_v$) to the total number of moles of the sample $n_v + n_a$, where n_a indicates the number of moles of dry air ($n_a = m_a/M_a$) of the sample concerned. This gives us:

$$x_v = \frac{n_v}{n_a + n_v}$$

or

$$x_v = \frac{r}{0.621\,98 + r}$$

where

r is merely the mixing ratio ($r = m_v/m_a$) of the water vapour of the sample of moist air.

(5) The ***vapour pressure*** e' of water vapour in moist air at total pressure p and with mixing ratio r is defined by:

$$e' = \frac{r}{0.621\,98 + r} p = x_v p$$

(6) ***Saturation:*** Moist air at a given temperature and pressure is said to be saturated if its mixing ratio is such that the moist air can co-exist in neutral equilibrium with an associated condensed phase (liquid or solid) at the same temperature and pressure, the surface of separation being plane.

(7) *Saturation mixing ratio:* The symbol r_w denotes the saturation mixing ratio of moist air with respect to a plane surface of the associated liquid phase. The symbol r_i denotes the saturation mixing ratio of moist air with respect to a plane surface of the associated solid phase. The associated liquid and solid phases referred to consist of almost pure water and almost pure ice respectively, there being some dissolved air in each.

(8) *Saturation vapour pressure in the pure phase:* The saturation vapour pressure e_w of pure aqueous vapour with respect to water is the pressure of the vapour when in a state of neutral equilibrium with a plane surface of pure water at the same temperature and pressure; similarly for e_i in respect to ice. e_w and e_i are temperature-dependent functions only, i.e.:

$$e_w = e_w(T)$$
$$e_i = e_i(T)$$

(9) *Mole fraction of water vapour in moist air saturated with respect to water:* The mole fraction of water vapour in moist air saturated with respect to water, at pressure p and temperature T, is the mole fraction x_{vw} of the water vapour of a sample of moist air, at the same pressure p and the same temperature T, that is in stable equilibrium in the presence of a plane surface of water containing the amount of dissolved air corresponding to equilibrium. Similarly, x_{vi} will be used to indicate the saturation mole fraction with respect to a plane surface of ice containing the amount of dissolved air corresponding to equilibrium.

(10) *Saturation vapour pressure of moist air:* The saturation vapour pressure with respect to water e'_w of moist air at pressure p and temperature T is defined by:

$$e'_w = \frac{r_w}{0.621\,98 + r_w} p = x_{vw} p$$

Similarly, the saturation vapour pressure with respect to ice e'_i of moist air at pressure p and temperature T is defined by:

$$e'_i = \frac{r_i}{0.621\,98 + r_i} p = x_{vi} p$$

(11) *Relations between saturation vapour pressures of the pure phase and of moist air:* In the meteorological range of pressure and temperature the following relations hold with an error of 0.5 per cent or less:

$$e'_w \approx e_w$$
$$e'_i \approx e_i$$

(12) The *thermodynamic dew-point temperature* T_d of moist air at pressure p and with mixing ratio r is the temperature at which moist air, saturated with respect to water at the given pressure, has a saturation mixing ratio r_w equal to the given mixing ratio r.

(13) The *thermodynamic frost-point temperature* T_f of moist air at pressure p and mixing ratio r is the temperature at which moist air, saturated with respect to ice at the given pressure, has a saturation mixing ratio r_i equal to the given mixing ratio r.

(14) The ***dew- and frost-point temperatures*** so defined are related to the mixing ratio r and pressure p by the respective equations:

$$e'_w\ (T_d) = \frac{r}{0.621\ 98 + r} p = x_v p$$

$$e'_i\ (T_f) = \frac{r}{0.621\ 98 + r} p = x_v p$$

(15)* The ***relative humidity*** U_w ***with respect to water of moist air*** at pressure p and temperature T is the ratio in per cent of the vapour mole fraction x_v to the vapour mole fraction x_{vw} which the air would have if it were saturated with respect to water at the same pressure p and temperature T. Accordingly:

$$U_w = 100 \left(\frac{x_v}{x_{vw}}\right)_{p,T} = 100 \left(\frac{p x_v}{p x_{vw}}\right)_{p,T} = 100 \left(\frac{e'}{e'_w}\right)_{p,T}$$

where subscripts p, T indicate that each term is subject to identical conditions of pressure and temperature. The last expression is formally similar to the classical definition based on the assumption of Dalton's law of partial pressures.

U_w is also related to the mixing ratio r by:

$$U_w = 100 \frac{r}{r_w} \cdot \frac{0.621\ 98 + r_w}{0.621\ 98 + r}$$

where

r_w is the saturation mixing ratio at the pressure and temperature of the moist air.

(16)* The ***relative humidity*** U_i ***with respect to ice of moist air*** at pressure p and temperature T is the ratio in per cent of the vapour mole fraction x_v to the vapour mole fraction x_{vi} which the air would have if it were saturated with respect to ice at the same pressure p and temperature T.

Corresponding to the defining equation in (15):

$$U_i = 100 \left(\frac{x_v}{x_{vi}}\right)_{p,T} = 100 \left(\frac{p x_v}{p x_{vi}}\right)_{p,T} = 100 \left(\frac{e'}{e'_i}\right)_{p,T}$$

(17) ***Relative humidity at temperatures less than*** 0°C is to be evaluated with respect to water. The advantages of this procedure are as follows:

(*a*) Most hygrometers which are essentially responsive to the relative humidity indicate relative humidity with respect to water at all temperatures.

(*b*) The majority of clouds at temperatures below 0°C consist of water, or mainly of water.

(*c*) Relative humidities greater than 100 per cent would in general not be observed. This is of particular importance in synoptic weather messages, since the atmosphere is often supersaturated with respect to ice at temperatures below 0°C.

(*d*) The majority of existing records of relative humidity at temperatures below 0°C are expressed on a basis of saturation with respect to water.

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* Definitions (15) and (16) do not apply to moist air when the pressure p is less than the saturation vapour pressure of pure water and ice respectively at the temperature T.

(18) The *thermodynamic wet-bulb temperature of moist air* at pressure p, temperature T and mixing ratio r is the temperature T_w attained by the moist air when brought adiabatically to saturation at pressure p by the evaporation into the moist air of liquid water at pressure p and temperature T_w and containing the amount of dissolved air corresponding to equilibrium with saturated air of the same pressure and temperature.

T_w is defined by the equation:

$$h(p, T, r) + [r_w(p, T_w) - r]\, h_w(p, T_w) = h\left(p, T_w, r_w(p, T_w)\right)$$

where

$r_w(p, T_w)$	is the mixing ratio of saturated moist air at pressure p and temperature T_w;
$h_w(p, T_w)$	is the enthalpy • of 1 gram of pure water at pressure p and temperature T_w;
$h(p, T, r)$	is the enthalpy of $1 + r$ grams of moist air, composed of 1 gram of dry air and r grams of water vapour, at pressure p and temperature T;
$h\left(p, T_w, r_w(p, T_w)\right)$	is the enthalpy of $1 + r_w$ grams of saturated air, composed of 1 gram of dry air and r_w grams of water vapour, at pressure p and temperature T_w. (This is a function of p and T_w only, and may appropriately be denoted by $h_{sw}(p, T_w)$.)

If air and water vapour are regarded as ideal gases with constant specific heats, the above equation becomes:

$$T - T_w = \frac{[r_w(p, T_w) - r]\, L_v(T_w)}{c_p + r c_{pv}}$$

where

$L_v(T_w)$	is the heat of vaporization of water at temperature T_w;
c_p	is the specific heat of dry air at constant pressure;
c_{pv}	is the specific heat of water vapour at constant pressure.

NOTE: Thermodynamic wet-bulb temperature as here defined has for some time been called "temperature of adiabatic saturation" by the air-conditioning engineers.

(19) The *thermodynamic ice-bulb temperature of moist air* at pressure p, temperature T and mixing ratio r is the temperature T_i at which pure ice at pressure p must be evaporated into the moist air in order to saturate it adiabatically at pressure p and temperature T_i. The saturation is with respect to ice.

T_i is defined by the equation:

$$h(p, T, r) + [r_i(p, T_i) - r]\, h_i(p, T_i) = h\left(p, T_i, r_i(p, T_i)\right)$$

where

$r_i(p, T_i)$	is the mixing ratio of saturated moist air at pressure p and temperature T_i;
$h_i(p, T_i)$	is the enthalpy of 1 gram of pure ice at pressure p and temperature T_i;
$h(p, T, r)$	is the enthalpy of $1 + r$ grams of moist air, composed of 1 gram of dry air and r grams of water vapour, at pressure p and temperature T;

• The enthalpy of a system in equilibrium at pressure p and temperature T is defined as $E + pV$, where E is the internal energy of the system and V is its volume. The sum of the enthalpies of the phases of a closed system is conserved in adiabatic isobaric processes.

$h\,(p, T_i, r_i, (p, T_i))$ is the enthalpy of $1 + r_i$ grams of saturated air, composed of 1 gram of dry air and r_i grams of water vapour, at pressure p and temperature T_i. (This is a function of p and T_i only, and may appropriately be denoted by $h_{si}\,(p, T_i)$.)

If air and water vapour are regarded as ideal gases with constant specific heats, this equation becomes:

$$T - T_i = \frac{[r_i\,(p, T_i) - r]\,L_s\,(T_i)}{c_p + r c_{pv}}$$

where

$L_s\,(T_i)$ is the heat of sublimation of ice at temperature T_i.

The relationship between T_w and T_i as defined and the wet-bulb or ice-bulb temperature as indicated by a particular psychrometer is a matter to be determined by carefully controlled experiment, taking into account the various parameters concerned, for example, ventilation, size of thermometer bulb and radiation.

BEAUFORT SCALE OF WIND FORCE FOR REPORTING SURFACE WIND

BEAUFORT NUMBER	DESCRIPTIVE TERM	WIND SPEED EQUIVALENTS		SPECIFICATIONS FOR OBSERVATIONS		
		metres/sec	knots	On board ship (open sea)	Coast	Land
0	Calm	0 – 0.2	<1	Sea like a mirror	Calm	Calm; smoke rises vertically
1	Light air	0.3– 1.5	1– 3	Ripples with the appearance of scales are formed, but without foam crests	Fishing smack just has steerage way	Direction of wind shown by smoke drift but not by wind vanes
2	Light breeze	1.6– 3.3	4– 6	Small wavelets, still short but more pronounced; crests have a glassy appearance and do not break	Wind fills the sails of smacks which then travel at about 1–2 knots	Wind felt on face; leaves rustle; ordinary vanes moved by wind
3	Gentle breeze	3.4– 5.4	7–10	Large wavelets; crests begin to break; foam of glassy appearance; perhaps scattered white horses	Smacks begin to careen and travel about 3–4 knots	Leaves and small twigs in constant motion; wind extends light flag
4	Moderate breeze	5.5– 7.9	11–16	Small waves, becoming longer; fairly frequent white horses	Good working breeze, smacks carry all canvas with good list	Raises dust and loose paper; small branches are moved
5	Fresh breeze	8.0–10.7	17–21	Moderate waves, taking a more pronounced long form; many white horses are formed (chance of some spray)	Smacks shorten sail	Small trees in leaf begin to sway; crested wavelets form on inland waters
6	Strong breeze	10.8–13.8	22–27	Large waves begin to form; the white foam crests are more extensive everywhere (probably some spray)	Smacks have double reef in mainsail; care required when fishing	Large branches in motion; whistling heard in telegraph wires; umbrellas used with difficulty
7	Near gale	13.9–17.1	28–33	Sea heaps up and white foam from breaking waves begins to be blown in streaks along the direction of the wind	Smacks remain in harbour and those at sea lie-to	Whole trees in motion; inconvenience felt when walking against wind
8	Gale	17.2–20.7	34–40	Moderately high waves of greater length; edges of crests begin to break into the spindrift; the foam is blown in well-marked streaks along the direction of the wind	All smacks make for harbour, if near	Breaks twigs off trees; generally impedes progress
9	Strong gale	20.8–24.4	41–47	High waves; dense streaks of foam along the direction of the wind; crests of waves begin to topple, tumble and roll over; spray may affect visibility	—	Slight structural damage occurs (chimney pots and slates removed)
10	Storm	24.5–28.4	48–55	Very high waves with long overhanging crests; the resulting foam, in great patches, is blown in dense white streaks along the direction of the wind; on the whole, the surface of the sea takes a white appearance; the tumbling of the sea becomes heavy and shock-like; visibility affected	—	Seldom experienced inland; trees uprooted; considerable structural damage occurs
11	Violent storm	28.5–32.6	56–63	Exceptionally high waves (small and medium-sized ships might be for a time lost to view behind the waves); the sea is completely covered with long white patches of foam lying along the direction of the wind; everywhere the edges of the wave crests are blown into froth; visibility affected	—	Very rarely experienced; accompanied by widespread damage
12	Hurricane	32.7 and over	64 and over	The air is filled with foam and spray; sea completely white with driving spray; visibility very seriously affected	—	—

NOTE: The equivalents refer to a standard height of 10 metres above open flat ground.

(9) Amend Part IV as follows:

- Paragraph 1.1: Delete Note (1) and renumber Notes (2) and (3) as (1) and (2). Amend them to read:

"NOTE: (1) The different...the two groups of satellites...."

(2) Both groups are ...."

- Paragraph 2.1.1.2: Amend to read

" ... spaced approximately equidistant along ...."

- Paragraph 2.1.2.1 (c): Amend to read

"... Characteristics of their instrumentation, data-processing and transmissions,..."

(10) Amend Part V as follows:

- Paragraph 1.3.6: Replace the word "automated" by "automatic".

- Paragraphs 1.4.2 and 1.4.3: Introduce the following sub-divisions:

"1.4.2.1 Mercury barometers

1.4.2.1.1 The following steps ... (text as in present (a)).

1.4.2.2 Aneroid barometers

1.4.2.2.1 In the reduction of readings from aneroid barometers, the application ...(further text as in present (b)(i)).

1.4.2.2.2 (Text as in present (b)(ii)).

1.4.3.1 One of the following three main types of thermometer should be used:

(a) Liquid-in-glass thermometers;

(b) Resistance thermometers;

(c) Thermocouples.

1.4.3.2 Reduction of the data from liquid-in-glass thermometers shall be by the application of any index error provided by the calibration laboratory.

1.4.3.3 Resistance thermometers should be used in a resistance bridge circuit.

1.4.3.3.1 Reduction of the data from resistance thermometers shall be by the application ...(further text as in present (b)).

1.4.3.4 Reduction of the data from thermocouples shall be by the application ...(further text as in present (c))."

- Paragraph 1.4.6: Amend the end of the paragraph to read " ... and further reduction is not required."

- Paragraphs 1.4.7 and 1.4.7.1: Insert the word "relative" before "humidity".

- Paragraph 2.5.1: Amend to read "Imagery from satellites should provide a primary source ...."

- Paragraph 2.5.1.1(d): Amend to read " ... other meteorological data, yielding all the ...."

- Paragraph 2.5.2: Amend to read "The soundings' raw data consisting of measurements of radiation in a number of spectral channels, shall be used to derive vertical profiles of temperature and humidity on a grid scale of a few hundred kilometres a few times each day."

(11) Amend Part VI as follows:

- Paragraph 1.1.2: Amend to read "Quality control shall be also performed ...."

- Paragraph 1.2.1: Amend to read " ... shall meet specific minimum standards...."

- Paragraph 2.3.1: Replace the word "sites" by "stations".

- Paragraph 3.1: Amend the first line of the text to read "Quality control should be performed at the following stages:"

- Paragraph 3.1.2, Note (2): Delete the part of the Note starting by "Under particular ...."

- Paragraphs 3.1.3.1 and 3.1.3.2: Delete these paragraphs and renumber paragraph 3.1.3.3 as 3.1.3.1.

A N N E X IV

Annex to Recommendation 4 (CBS-Ext.(80))

AMENDMENTS TO THE MANUAL ON CODES, VOLUME I

Section A, Code form FM 71-VI CLIMAT

Amend Regulation 71.1.5 to read:

"71.1.5

Group ($S_1S_1S_1k_sk_s$)

When monthly total sunshine is available, the group $S_1S_1S_1k_sk_s$ shall be included."

Section C

Amend specification for H_e to read:

"H_e Height of echo top with reference to sea-level.
(Code table 1535) (FM 20-V)"

Section D

Amend code table 0964 to read:

"0964

E_3 - Slush conditions under the ice layer

Code figure

0 no slush ice

1 slush ice to approximately 1/3 of depth of the river, lake or reservoir

2 slush ice from 1/3 to 2/3 of depth of the river, lake or reservoir

3 slush ice to depth of the river, lake or reservoir greater than 2/3"

Amend title of code table 1535 to read:

"H_e Height of echo top with reference to sea-level"

Amend specification of code figure 0000 in code table 3596 to read:

"No precipitation or no measurable water equivalent of snow cover on the ground"

ANNEX V

Annex to Recommendation 5 (CBS-Ext.(80))

CORRECTIONS IN AERONAUTICAL CODES

Section A

Under Regulation 15.9 of FM 15-V of METAR insert:

"Note: Highest minimum sector altitude is defined in ICAO PANS-OPS, Part I - Definitions, as the lowest altitude which may be used under emergency conditions which will provide a minimum clearance of 300 m (1 000 ft) above all objects located in an area contained within a sector of a circle of 46 km (25 nautical miles) radius centred on a radio aid to navigation."

Amend Regulation 48.5 of FM 48-V ARMET to read:

"48.5

Section 4

When significant weather is included in the message, it shall be in plain language using, where appropriate, ICAO abbreviations."

Under Regulation 51.7 of FM 51-V TAF insert:

"Note: See note under Regulation 15.9"

Section D, code table 4678

Amend specification for code figure 86 to read:

"86 XXSNSH heavy snow showers."

ANNEX VI

Annex to Recommendation 7 (CBS-Ext(80))

AMENDMENTS TO THE MANUAL ON THE GDPS, VOLUME I

Part A

ATTACHMENT I.1

LOCATION OF WMCs and RMCs

1. The WMCs are located at:

   Melbourne (southern hemisphere only)

   Moscow

   Washington

2. The RMCs are located at:

Algiers	Lagos	Offenbach
Antananarivo	Melbourne	Rome
Beijing	Miami	Tashkent
Bracknell	Montreal	Tokyo
Brasilia	Moscow	Tunis/Casablanca
Buenos Aires	Nairobi	Wellington
Cairo	New Delhi	
Dakar	Norrköping	
Darwin	Novosibirsk	
Khabarovsk		

*

* *

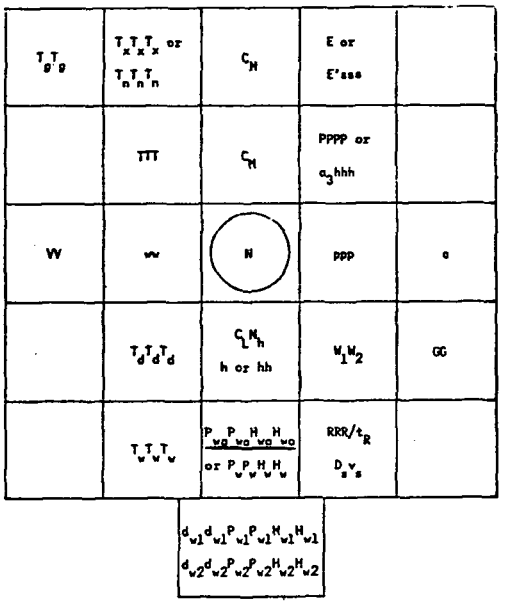
Part B

ATTACHMENT II.4

SYMBOLS USED FOR PICTORIAL REPRESENTATION OF DATA AND FOR ANALYSIS AND FORECAST ON WEATHER CHARTS

1. THE PLOTTING MODEL

The elements of a surface observation are plotted around the station circle in accordance with the model below.



The "boxes" are included in the diagram simply to fix the positions of the elements and are not included in the actual plot. The wind plot is not shown in the model. SHIP identification letters or buoy identifiers should be plotted below in the above model. In the case of automatic weather stations, an equilateral triangle is plotted round the station circle so that the apex of the triangle (△) points towards the position of the medium cloud symbol.

2. GRAPHIC REPRESENTATION OF DATA ON WEATHER CHARTS

2.1 The following rules concern the symbols to be used for the plotting of various elements figuring in a surface observation:

N Total cloud cover

Code			Symbol
0	=	0	
1	=	1 okta or 1/10 or less, but not zero	
2	=	2 oktas or 2/10-3/10	
3	=	3 oktas or 4/10	
4	=	4 oktas or 5/10	
5	=	5 oktas or 6/10	
6	=	6 oktas or 7/10-8/10	
7	=	7 oktas or 9/10 or more, but not 8 oktas or 10/10	
8	=	8 oktas or 10/10	
9	=	Sky obscured, or cloud amount cannot be estimated	
/	=	No measurement made	

In the polychromatic method, black is used.

ddff True direction, in tens of degrees, from which wind is blowing (dd) and wind speed in units indicated by i_w (ff).

Wind is represented by barbs and solid pennants in black, the full barbs representing 5 m s^{-1} or 10 knots, the half barbs representing 2.5 m s^{-1} or 5 knots and the solid pennant representing 25 m s^{-1} or 50 knots.

The wind shaft in black is directed along the axis of the wind towards the centre of the station circle and stops at its circumference.

All pennants and barbs lie to the left of the wind shaft in the northern hemisphere and to the right of the wind shaft in the southern hemisphere.

Barbs are at an angle of approximately 120° from the wind shaft. Pennants are triangles with their bases on the wind shaft.

A calm should be indicated by a circle drawn around the station circle:

Missing wind speed should be indicated by placing an "x" at the end of the wind shaft in lieu of the wind barbs. Wind direction is indicated in the usual manner, e.g. x——o. When the wind direction is missing, no wind should be plotted.

VV Horizontal visibility at surface

The code figures are plotted.

ww Present weather

The symbols for the appropriate code figures are given in the following table:

ww	0	1	2	3	4	5	6	7	8	9
00										
10										
20										
30										
40										
50										
60										
70										
80										
90										

In the polychromatic method, black is used.
In the symbols and Δ or * are alternatives, according to the observation.

In the symbols and the rain symbol and the snow symbol are alternatives, either • or * being used, except in cases of doubt.

NOTE: (1) The meanings of the code figures for present weather are given in Code 4677 in the Manual on Codes (Publication No. 306) (Annex II to the Technical Regulations).

(2) When present and past weather are not included because:

(a) They are not significant (i_x = 2 or 5), the spaces for ww and W_1W_2 are left blank;

(b) No observation was made (i_x = 3 or 6) or the data are missing (i_x = 1 or 4, but no 7-group in the message), ww and W_1W_2 are both plotted as //.

W_1W_2 Past weather

The symbols to be plotted for both W_1 and W_2 are taken from the following list:

Code		Symbol
3	Sandstorm or dust storm	
3	Blowing snow	
4	Fog or ice fog or thick haze	
5	Drizzle	

Code		Symbol
6	Rain	•
7	Snow, or rain and snow mixed	*
8	Shower(s)	▽
9	Thunderstorm(s)	℞

The two symbols are plotted as W_1W_2

In the polychromatic method, red is used.

NOTE: See Note (2) under ww.

PPPP or $a_3$hhh — Pressure at mean sea-level in tenths of a hectopascal omitting thousands digit of hectopascal of the pressure value or geopotential of the standard "constant pressure level" given by a_3 in standard geopotential metres omitting the thousands digit

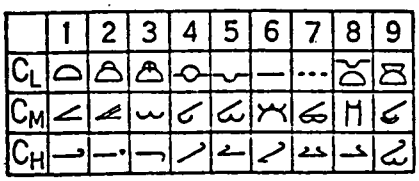
Normally the pressure is that which has been reduced to mean sea-level. It may be plotted as reported in four figures or alternatively in three figures by plotting the last three figures only of the group. If $a_3$hhh has been reported instead of pressure reduced to mean sea-level and it is to be plotted on the same chart as mean sea-level pressure observations then it is plotted in four figures and the first figure (a_3) can be used to indicate the datum plane, other than mean sea-level, to which the plotted value refers.

TTT — Air temperature in tenths of a degree Celsius, its sign given by s_n

The actual value of this temperature may be plotted in degrees and tenths of a degree Celsius, the tenths figure being separated by a decimal point, or it may be plotted in whole degrees Celsius having first been rounded to the nearest degree. Negative values are preceded by a minus sign.

$C_LC_MC_H$ — Cloud of the genera Stratocumulus, Stratus, Cumulus and Cumulonimbus (C_L); Altocumulus, Altostratus and Nimbostratus (C_M), and Cirrus, Cirrocumulus and Cirrostratus (C_H)

The symbols for the appropriate code figure are given in the following table:



In the polychromatic method, black is used. However, ths use of red for plotting C_H symbols is optional.

NOTES: (1) The meanings of the code figures for type of cloud are given in Codes 0509, 0513 and 0515 in the Manual on Codes (Publication No. 306, Annex II to the Technical Regulations).

(2) If, with C_L = 8, it is known that the base of the Sc is below the base of the Cu, the symbol  is used.

N_h Amount of all C_L cloud(s) present or, if no C_L cloud is present, the amount of all the C_M cloud(s) present

The code figure for N_h is entered to the right of the position allotted to C_L.

h or hh Height, above ground, of the base of the lowest cloud seen. The code figure for h is entered below the position allotted to C_L. If hh is reported, the two code figures for hh may be entered in lieu of h.

$8N_sCh_sh_s$ Genus of cloud (C)

Code C		Monochromatic
0	Cirrus Cl	
1	Cirrocumulus Cc	
2	Cirrostratus Cs	
3	Altocumulus Ac	
4	Altostratus As	
5	Nimbostratus Ns	
6	Stratocumulus Sc	
7	Stratus St	
8	Cumulus Cu	
9	Cumulonimbus Cb	

The symbols corresponding to code figures 6 to 9 will be plotted in the position allotted to C_L, those corresponding to code figures 3 to 5 in the position allotted to C_M and those corresponding to code figures 0 to 2 in the position allotted to C_H. The symbols should be arranged in ascending order of height of cloud base, i.e. the lowest cloud will be at the bottom.

The code figures for N_s and h_sh_s relating to the lowest cloud layer should normally be plotted in the positions reserved for N_h and h. If the purpose of the chart requires it, the code figures for N_s and h_sh_s for each cloud layer may be plotted against the corresponding cloud symbol in the same manner as are N_h and h for C_L.

$T_dT_dT_d$ Dew-point temperature in tenths of a degree Celsius, its sign being given by s_n

The actual value of this temperature may be plotted in degrees and tenths of a degree Celsius, the tenths figure being separated by a decimal point, or it may be plotted in whole degrees Celsius, having first been rounded to the nearest degree. Negative values are preceded by a minus sign.

a Characteristic of pressure tendency during the three hours preceding the time of observation

Code		Monochromatic
0	- Increasing, then decreasing; atmospheric pressure the same or higher than three hours ago	
1	- Increasing, then steady; or increasing, then increasing more slowly; atmospheric pressure now higher than three hours ago	
2	- Increasing (steadily or unsteadily); atmospheric pressure now higher than three hours ago	
3	- Decreasing or steady, then increasing; or increasing, then increasing more rapidly; atmospheric pressure now higher than three hours ago	
4	- Steady; atmospheric pressure the same as three hours ago	
5	- Decreasing, then increasing; atmospheric pressure the same or lower than three hours ago	
6	- Decreasing, then steady; or decreasing, then decreasing more slowly; atmospheric pressure now lower than three hours ago	
7	- Decreasing (steadily or unsteadily); atmospheric pressure now lower than three hours ago	
8	- Steady or increasing, then decreasing; or decreasing, then decreasing more rapidly; atmospheric pressure now lower than three hours ago.	

ppp — Amount of pressure tendency at station level during the three hours preceding the time of observation, expressed in tenths of a hectopascal

The pressure change is plotted in two figures by plotting only the last figures of ppp unless the first figure of ppp is other than zero, in which case the pressure change is plotted as reported in three figures. The plotting figures may be preceded by a plus sign, when a = 0, 1, 2 or 3 and by a minus sign, when a = 5, 6, 7 or 8. In this case the symbol for a = 2, 4 (if used) or 7 may be omitted.

$D_s v_s$ — Direction (true) of resultant displacement of the ship (D_s) and ship's average speed made good (v_s) during the three hours preceding the time of observation

The direction D_s is plotted by means of an arrow pointing in the direction towards which the ship is moving and the code figure for the speed v_s is entered to the right of the arrow.

$T_w T_w T_w$ — Sea-surface temperature in tenths of a degree Celsius, its sign given by s_n

The actual value of this temperature is plotted in degrees and tenths of a degree Celsius, the tenths figure being separated by a decimal point, or it may be plotted in whole degrees Celsius, having first been rounded to the nearest degree. Negative values are preceded by a minus sign.

$d_{w1}d_{w1}d_{w2}d_{w2}$ — True direction, in tens of degrees, from which swell waves are coming

This is represented by an arrow with a wavy shaft; the arrow-heads point in the direction towards which the waves are moving. If $d_{w1}d_{w1}$ is reported as 00, a wavy line without an arrow-head is drawn in a north-south direction.

If $d_{w1}d_{w1}$ is reported as 99, crossed arrows with wavy shafts are drawn one from south-west to north-east and the other from south-east to north-west, thus  .

If $d_{w1}d_{w1}$ is missing, it is plotted as for $d_{w1}d_{w1}$ 99 but the arrow-heads are omitted.

When there is a second swell system reported by $d_{w2}d_{w2}$, this is plotted below the first.

$P_{w1}P_{w1}P_{w2}P_{w2}$ — Period of swell waves in seconds

The code figures for $P_{w1}P_{w1}$ and $P_{w2}P_{w2}$ are plotted immediately to the right of the symbol for $d_{w1}d_{w1}$ and $d_{w2}d_{w2}$.

When there are no swell waves $P_{w1}P_{w1}$ and $P_{w2}P_{w2}$ are not plotted.

$H_{wa}H_{wa}$ H_wH_w $H_{w1}H_{w1}$ $H_{w2}H_{w2}$ Height of waves, obtained by instrumental methods ($H_{wa}H_{wa}$), wind waves (H_wH_w) or swell waves ($H_{w1}H_{w1}$ and $H_{w2}H_{w2}$), respectively in units of 0.5 metre

These code figures are plotted immediately to the right of the symbols for $P_{wa}P_{wa}$, P_wP_w, $P_{w1}P_{w1}$ or $P_{w2}P_{w2}$ respectively.

When there are no swell waves $H_{w1}H_{w1}$ and $H_{w2}H_{w2}$ are not plotted.

NOTE: If instrumental wave data, as reported in group $1P_{wa}P_{wa}H_{wa}H_{wa}$, are plotted, they should be underlined.

$P_{wa}P_{wa}$ P_wP_w Period of waves, obtained by instrumental methods ($P_{wa}P_{wa}$) or period of wind waves (P_wP_w), in seconds

Either the code figure for $P_{wa}P_{wa}$ or for P_wP_w is plotted under the symbol for low clouds.

NOTE: If instrumental wave data, as reported in group $1P_{wa}P_{wa}H_{wa}H_{wa}$, are plotted, they should be underlined.

RRR Amount of precipitation which has fallen during the period preceding the time of observation, as indicated by t_R.

If following a national decision this element is to be plotted, the following cases may occur:

(a) Precipitation amount is reported (i_R = 1 or 2), the figures of RRR are entered at the appropriate place in the plotting model (See paragraph 1 of this Attachment);

(b) Precipitation amount is zero (i_R = 3), RRR is not entered on the map;

(c) No observation was made (i_R = 4), RRR is entered as ///.

t_R Duration of period of reference for amount of precipitation, expressed in units of six hours, and ending at the time of the report

The code figure for t_R is entered, except in cases where precipitation is not reported (i_R = 3 or 4).

$T_xT_xT_x$ or $T_nT_nT_n$ Maximum ($T_xT_xT_x$) or minimum ($T_nT_nT_n$) temperature in degrees Celsius and tenths, its sign given by s_n

The actual maximum or minimum temperature is entered in degrees and tenths of a degree Celsius, the tenths figure being separated by a decimal point and negative values being preceded by a minus sign.

$T_g T_g$ Ground (grass) minimum temperature of the preceding night in whole degrees Celsius, its sign given by s_n

The actual value is entered in degrees Celsius, negative values being preceded by a minus sign.

E or E' State of the ground without (E) or with (E') snow or measurable ice cover

One of these is plotted using the appropriate symbol from the following tables:

Code figure for E

0	Surface of ground dry (without cracks and 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	Flooded	
4	Surface of ground frozen	
5	Glaze on ground	
6	Loose dry dust or sand not covering ground completely	
7	Thin cover of loose dry dust or sand covering ground completely	
8	Moderate or thick cover of loose dry dust or sand covering ground completely	
9	Extremely dry with cracks	

Code figure for E'

0	Ground predominantly covered by ice	
1	Compact or wet snow (with or without ice) covering less than one-half of the ground	
2	Compact or wet snow (with or without ice) covering at least one-half of the ground but ground not completely covered	
3	Even layer of compact or wet snow covering ground completely	

4 Uneven layer of compact or wet snow covering ground completely 

5 Loose dry snow covering less than one-half of the ground 

6 Loose dry snow covering at least one-half of the ground (but not completely) 

7 Even layer of loose dry snow covering ground completely 

8 Uneven layer of loose dry snow covering ground completely 

9 Snow covering ground completely; deep drifts 

sss Total depth of snow in centimetres

This is plotted in code figures or actual depths in accordance with national or regional decisions

GG Actual time of observation to the nearest hour GMT

GG is plotted only if it is different from the reference hour of the chart.

A N N E X VII

Annex to Recommendation 9 (CBS-Ext.(80))

DETAILED LAYOUT OF GUIDE ON THE AUTOMATION OF DATA-PROCESSING CENTRES

Chapter 1 - INTRODUCTION

1. Purpose

The Guide is designed for those WMO Members:

(a) Operating manual RMCs or NMCs which are considering the introduction of automation; or

(b) Considering the replacement or upgrading of present automated facilities at their centre;

(c) Requiring a reference on all aspects of automation of data-processing activities.

2. What the Guide contains (brief discussion of what is to be covered in following chapters)

(a) Establishing the specific needs for automation of data-processing activities;

(b) Planning of the automation project;

(c) System design information - hardware and software required to accomplish requirements in (a) above;

(d) Development of software;

(e) Contract actions required;

(f) Installation of computer(s);

(g) Acceptance tests;

(h) Selection and training of staff;

(i) Operation and maintenance of both hardware and software;

(j) Upgrading or replacement of automation equipment;

(k) Examples of automated data-processing systems at:

(1) RMC or large NMC;

(2) Small NMC.

Chapter 2 - SPECIFIC REQUIREMENTS FOR AUTOMATION OF DATA-PROCESSING ACTIVITIES

1. Importance of establishing requirements or needs for automation at a centre before proceeding with a project; i.e. make a preliminary feasibility study of project (including those functions which may not need to be automated).

2. Why automate? Criteria for automation of data-processing activities at:

(a) RMC or large NMC;

(b) Small NMC.

3. What to automate, and how to automate?

(a) What, among the various activities of an RMC or NMC need to be automated?

- Interface with telecommunications facilities (e.g. RTHs)*;
- Real-time data processing (including further processing of automated observations);
- Graphics and other output operations;
- Non-real-time data processing (e.g. support to research, climatology and applications programmes).

(b) How to automate these activities?

- By carrying out various jobs on one or more computers in an integrated system, this system could be reduced to only one computer with adequate capacity;
- By grouping jobs in blocks, each one being carried out by a smaller dedicated computer (e.g. mini-computers); the system is therefore generally made up of several mini-computers linked together;
- By making use of existing computers, which are far apart, or even co-located, through the use of various types of terminals.

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* Reference should be made to the Guide on the Automation of Meteorological Telecommunication Centres, WMO-No.468.

4. Discussion of contingency plans that are necessary for back-up of the automated system.

Chapter 3 - PLANNING THE PROJECT

(a) Make detailed feasibility study to include the aims, objectives, and technical as well as cost-performance estimates and time-scales of the automation project, including the impact of automation on the activities of the centre concerned;

(b) Obtain acceptance of project at policy level;

(c) Make preliminary estimates of how project will be managed and controlled.

Chapter 4 - SYSTEM DESIGN INFORMATION

Detailed discussion of types (not specific models) of hardware and software needed to do various data-processing jobs including the time-critical nature of GDPS operations, such as:

(a) Acquisition of basic data (interface with telecommunications);

(b) Pre-processing to include message decoding, pre-analysis processing, quality control;

(c) Objective analysis and prediction;

(d) Post-processing to include output of various types of charts, and conversion of GRID/GRAF coded products into pictorial information (Note: Care should be taken to avoid duplication of material in the Guide on the GDPS);

(e) Data storage and retrieval;

(f) Interface with other RMCs/NMCs and/or customers.

Chapter 5 - DEVELOPMENT OF SOFTWARE

(a) Various methods of developing software (e.g. by contract or internal effort);

(b) Standardization of computer programs;

(c) Arrangements for exchanging meteorological software.

Chapter 6 - CONTRACT ACTIONS

(a) Detailed instructions on development and writing of an invitation to tender (an important step in acquiring a new system);

(b) Guidelines for contract selection and awarding.

Chapter 7 - INSTALLATION OF COMPUTER(S)

- Development of plans and specification for the building or room in which the computer is to be located, including all necessary power supply, fire protection and environmental conditions, etc.

Chapter 8 - ACCEPTANCE TESTS

- Detailed guidelines for tests during production phase (or before delivery) and on site, after installation, of both hardware and software systems.

Chapter 9 - SELECTION AND TRAINING OF STAFF

- Arrangements necessary for selection and pre-installation training of staff and for continued on-the-job training during and after installation of automated equipment (in operation and maintenance of hardware and software).

Chapter 10 - OPERATION AND MAINTENANCE OF BOTH HARDWARE AND SOFTWARE

- Discussion of the recommended procedures for efficient operation of computer system(s) and the staff-support for development and maintenance of hardware and software needed for meteorological operations at a centre.

Chapter 11 - UPGRADING AND REPLACEMENT OF HARDWARE AND SOFTWARE

- Review of procedures discussed in Chapters 2 through 9 as they apply to upgrading or replacing automated systems (hardware and software) already in place in a centre.

Chapter 12 - EXAMPLES OF AUTOMATED DATA-PROCESSING SYSTEMS

- General examples of the configuration (e.g. types and typical specifications of hardware and software systems, without giving names of manufacturers) for a typical RMC or large NMC and for a small NMC.

A N N E X VIII

Annex to Recommendation 10 (CBS-Ext.(80))

PROPOSED AMENDMENTS TO THE MANUAL ON THE GLOBAL TELECOMMUNICATION SYSTEM, VOLUME I (GLOBAL ASPECTS), PART I - ORGANIZATION OF THE GLOBAL TELECOMMUNICATION SYSTEM

(1) Paragraph 1.3: Engineering principles of the Global Telecommunication System

Principle 2 should read as follows:

"The system shall make the fullest possible use of all available telecommunication means (including cable, radio and satellite circuits) which are reliable and have suitable technical and operational characteristics. For medium- and high-speed data transmissions and for facsimile transmission in digital and analogue forms, standard circuits of the telephone type and radio circuits having similar technical characteristics are used whenever possible for operational and financial reasons."

The first line of principle 4 should read:

"In the planning of the circuits and transmission schedules, the daily volume of traffic ..."

(2) Paragraph 1.4.2: General responsibilities of Members

Insert the following Note after paragraph 1.4.2.1:

"Note: The contents and schedules of meteorological transmission programmes are published in WMO Publication No. 9, Volume C."

(3) Paragraphs 2.1(f) and 2.2.(f)

These two sub-paragraphs (f) should read as follows:

"(f) Carrying out the monitoring of the operation of the GTS of the WWW."

(4) Paragraph 2.4

Insert the following sub-paragraph (e):

"(e) Carrying out the monitoring of the operation of the GTS of the WWW."

(5) Paragraph 2.9: Responsibility for meteorological reports from automatic surface synoptic stations

The following new paragraph 2.9.4 should be inserted:

"2.9.4 Other observational data from drifting buoys available at satellite data-processing centres should be made available to the appropriate WMCs/RTHs for regional and global distribution over the GTS, using the appropriate code form for international exchange."

(6) Paragraph 3.1: The Main Trunk Circuit and its branches

Paragraph 3.1.2 should read as follows:

"3.1.2 The Main Trunk Circuit and its branches should operate in a segmented "store and forward" mode. Circuits established directly between WMCs and/or RTHs on the MTC and its branches may be designated at the request of Members concerned as additional segments or branches.

Note: For all segments of the MTC and its branches the provisions of Part III apply."

Paragraph 3.1.3(a) should read as follows:

"Ensuring the rapid and reliable exchange of observational data required for making analyses and prognoses to meet the GDPS requirements."

(7) Insert a new paragraph 3.5, after paragraph 3.4, which reads as follows:

"3.5 Role of meteorological satellites in the functioning of the GTS

3.5.1 Data-collection platforms (DCPs) operating with geostationary or meteorological near-polar orbiting satellites constitute an integral part of the GTS for the collection of observations from fixed and mobile platforms. In addition, the analogue direct broadcasts of geostationary meteorological satellites, known as WEFAX, are an important part of the GTS for the distribution of processed information in pictorial form directly to users.

3.5.2 The contents, frequencies, area coverage and schedules of transmission by meteorological satellites shall be provided by satellite operators.

Note 1: The contents and schedules of transmission by meteorological satellites are published in WMO Publication No. 9, Volume C.

Note 2: Information on meteorological satellite programmes operated by Members and Organizations is published in WMO Publication No. 411."

(8) Replace paragraph 5.4, ATTACHMENT I-1, Part I, by the following new paragraph:

"5.4 BATHY and TESAC reports should be transmitted as soon as possible after the time of observation. However, the reports may be transmitted up to 48 hours after the time of observation in case operational difficulties do not permit their earlier transmission. The international date-time group in the abbreviated heading of the bulletins should be the time of origin of these bulletins* in GMT (see Part II, paragraph 2.3.2.2).

*Note: The time of origin of bulletins refers to the time of compilation of bulletins by the GTS centres.

(9) Attachment I-2: Routeing of the Main Trunk Circuit and its branches

Insert a new segment between the RTHs Beijing and Offenbach.

(10) Attachment I-3, Section I: The target and present responsibilities of centres performing telecommunications functions and located on the Main Trunk Circuit and its branches, for the collection, exchange and distribution of observational data:

(a) Figure 1 - Target routeing of observational data on the Main Trunk Circuit and its branches

The following changes should be made:

Washington-Buenos Aires: Selected programme, as requested;
Washington-Brasilia: Add: 12. Delete: 51.66;

(b) The title of Figure 2 should read:

"Figure 2 - Routeing of observational data on the Main Trunk Circuit and its branches, as on 15 September 1980."

(11) Attachment I-3, Section II: Principles for the establishment of the exchange programme for observational data on the Main Trunk Circuit and its branches

The following changes should be made to Attachment I-3, Section II:

(a) Sub-title 1 should read: "Type of information";

(b) Paragraph 1 (i) should read: "Selected satellite data, such as cloud images, SATEM, SAREP, SARAD SATOB";

(c) Add a new paragraph 1(j) after paragraph 1(i) which reads as follows: "(j) DRIBU";

(d) Renumber the present paragraphs 1(j), 1(k) and 1(l) as 1(k), 1(l) and 1(m);

(e) Note under sub-paragraph 1 should read:

"Items (a) to (m) do not indicate priorities.";

(f) Paragraph 2(d) should read as follows:

"Selected satellite data, such as cloud images, SATEM, SAREP, SARAD and SATOB, as available";

(g) Add a new paragraph after paragraph 2(d) which reads as follows:

"(e) DRIBU as available orbit by orbit";

(h) Renumber the present paragraphs 2(e) and 2(f) as 2(f) and 2(g);

(i) Paragraph 3(d)(iii) should read as follows:

"Synoptic surface observation reports from land stations exchanged on the MTC and its branches shall include at least Sections 0 and 1 of the SYNOP code";

(j) Add a new paragraph after 3(g):

"(h) All DRIBU data available";

(k) Renumber the present paragraph 3(h) as 3(i).

(12) Attachment I-5: Plan for monitoring the operation of the WWW

Replace the present text of Attachment I-5 by the following new text:

ATTACHMENT I-5

PLAN FOR MONITORING THE OPERATION OF THE WWW

Objectives

1. The objectives of the monitoring effort are to improve the performance of the WWW, in particular the efficiency and effectiveness of the operation of the WWW Global Observing System (GOS), the Global Data-processing System (GDPS) and the Global Telecommunication System (GTS) on a national, regional and global level. As the operation of these three elements of the WWW (GOS, GDPS and GTS) is so inter-related, each element cannot be monitored independently; therefore, for efficient monitoring of the operation of the WWW as an integrated system, close co-ordination among all centres concerned, as well as with the WMO Secretariat, is essential in order to identify the deficiencies and initiate the corrective action as quickly as possible.

2. The implementation of the monitoring plan involves all three sub-systems of the WWW. Thus, in the context of monitoring, the GOS is responsible for ensuring that the observations are made according to the prescribed standards, are encoded correctly and are presented for transmission at the times laid down; in addition, the GOS responds in timely fashion to requests for checks, corrections, etc. The GTS is responsible for ensuring the regular flow of meteorological information, both raw and processed. This involves keeping a close watch on the receipt and transmission of information, generating requests for missing bulletins and other products when necessary, checking telecommunication formats, arranging for the re-routeing of traffic in case of outages and other difficulties, and so on. The GDPS provides processed information for timely distribution and also has an important role in the quality control of data.

3. An important objective of any monitoring activity must include provision for the identification of deficiencies and also for corrective action to improve the efficiency and effectiveness of the WWW. Success is measured in terms of how many deficiencies are corrected.

4. In accordance with the decision of Seventh Congress, the following items should be included in the monitoring programme:

(a) Regularity of observations;

(b) Quality of observational data and correct coding;

(c) Completeness and timeliness of collection of observational data at the NMC concerned;

(d) Adherence to WMO standard codes and telecommunication procedures;

(e) Collection of observational data at RTHs and WMCs;

(f) Exchange of data and processed information on the regional telecommunication networks and the Main Trunk Circuit and its branches;

(g) Evaluation of the observations and processed information received at NMCs, RMCs and WMCs in respect of their data needs.

Basic components

5. Real-time monitoring

Real-time monitoring is the term used to describe monitoring which is carried out quickly enough to allow remedial action to be taken in time to be of value in day-to-day meteorological work. Ideally, it should be carried out within the times specified in the appropriate manuals and guides as the maximum acceptable time delays for the receipt of meteorological information, but in practice it is still valuable if it can be carried out before similar subsequent information is received.

In view of the short time available, corrective action on real-time monitoring should be restricted to departures from the normal, e.g. bulletins or observations which are not received in time, obvious or suspected errors, and so on. Thus, real-time monitoring requires the provision of information concerning:

- Bulletins not received by the specified time;

- Observations not received by the specified time, or which are incorrect or suspect, or cannot be interpreted with confidence;

- Inadequacies in receipt of processed information.

6. Non-real-time monitoring

Non-real-time monitoring is the term used to describe monitoring which is carried out over a specific time period. The purpose of non-real-time monitoring is to keep under review the general performance of the WWW and to identify shortcomings which may persist after the real-time monitoring has been carried out. Non-real-time monitoring requires the preparation of summaries and various statistics which become available after a certain time, which may vary from a few hours to several months.

7. Follow-up action for co-ordination and assistance

In the real-time mode, the initial corrective action will be immediate and will be taken at the centres concerned or at the point of observation. In the non-real-time mode, follow-up action will be taken by the Members concerned to remedy any deficiencies with respect to the WWW plan. In some cases, this might involve obtaining advice on the procedures for obtaining external assistance and information on the maintenance and operation of their WWW facilities. In addition, the Secretary-General will take action, as indicated in paragraph 16.

Definitions and standards

8. In the monitoring context the terms used and the minimum standards to be attained should be as defined in the Manual on the Global Observing System, the Manual on the Global Telecommunication System, the Manual on Codes, the Manual on the Global Data-processing System and relevant parts of the Technical Regulations.

Priorities

9. The monitoring scheme should concentrate, in the order of priority given below, on the establishment of checks on the following information:

(a) TEMP and TEMP SHIP (up to at least 300 mb);

(b) PILOT and PILOT SHIP (up to at least 300 mb - especially in the tropics);

(c) SYNOP (global exchange);

(d) SHIP and AIREP/CODAR (global exchange);

(e) CLIMAT and CLIMAT TEMP;

(f) All other observational data and processed information, regularly exchanged.

Monitoring of satellite data presents a special case. There are only a few operators and their standards for monitoring, including quality control of satellite data, are already high. Monitoring of satellite data bulletins and GRID-code bulletins shall be a special event for a limited time as designated by the WMO Secretariat.

10. In implementing this monitoring plan, it is important to establish the capability for quick responses at the observing points and at all centres to requests for checks and repetitions in real time. It will also be found useful to give particular attention to ensuring the following elements of the monitoring plan:

(a) The correct telecommunication formats of messages in the GTS;

(b) The correct coding of messages and reports;

(c) The timely availability of data;

(d) The quality of the meteorological content of messages.

Responsibilities

11. The basic responsibilities for monitoring the operation of the WWW rest with Members.

12. The responsibilities for carrying out the real-time and non-real-time monitoring activities are given in Tables A and B. An essential part of the monitoring plan is that information should be exchanged between adjacent centres on the GTS in order that telecommunication problems in particular may readily be identified. A special aspect of the exchange of information is that procedures should be developed to ensure that no doubts exist that a bulletin contains all the observations available for inclusion in it. In the case of standard bulletins containing routine observations, the contents of the bulletins should always conform to the list included in the appropriate WMO publication, as amended. When the observations from some stations included in the publication are not available for any reason, "NIL" should appear in place of the coded report. As a further check on completeness, NMCs should send messages to the associated RTH, preferably in advance, when it is known that observations from listed stations are not (or will not be) available. It is important that all WWW centres (NMCs, RMCs, RTHs and WMCs) make a contribution to the overall monitoring effort. Obviously, centres having a multiple role will make more than one contribution. In the contributions, the following points should be taken into account:

(a) For the monitoring at bulletin level, retard (RTD) and corrected (COR) bulletins should be included;

(b) For the monitoring at report level, corrected reports should not be counted as additional reports, but retard reports should be counted;

(c) Duplicated reports and duplicated bulletins should be counted only once;

(d) The contributions should clearly indicate the data base used for monitoring (telecommunications or data-processing);

(e) The contributions should also report any outages of centres and/or circuits occurring during the monitoring period;

(f) In the contributions every possible effort should be made to adhere to the times included in the headings of the tables.

13. The frequency with which monitoring reports should be prepared and/or exchanged is illustrated in the following table:

Every day	- Every centre carries out continuous real-time monitoring;
At intervals of not more than one month	- NMCs should prepare a summary of relevant information on monitoring for use on a national and international level as appropriate;

At least once every three months	- RTHs/RMCs send a summary of monitoring information to their associated NMCs;
At least once every three months	- RTHs/RMCs send a summary of monitoring information to adjacent RTHs which supply them with data;
Once every six months	- WMCs send a summary of monitoring information to adjacent RTHs/RMCs.

Reports called for at intervals of three months or more should always be forwarded to the Secretary-General in an agreed format for further action.

As regards contents, reports should include as many items for Table B as are practical and useful.

14. Members should implement the plan for monitoring the operation of the WWW at the earliest possible date, in particular the real-time monitoring.

15. In order to keep under review the efficient operation of the WWW, internationally co-ordinated monitoring on a non-real-time basis should be carried out periodically on the full range of global observational data once a year in October with the participation ofa limited number of major WWW centres. During other periods, particular problem areas should be monitored, in respect of either selected information only or limited parts of the world. The Secretary-General will arrange, in consultation with the appropriate centres, details of the special monitoring exercises and the periods during which they should be carried out, and will provide adequate notice well in advance.

16. The Secretariat will carry out the necessary analyses of the non-real-time monitoring reports from WWW centres and will make the results of the analyses available to the centres concerned. The Secretary-General will co-ordinate and advise on assistance necessary to rectify the deficiencies revealed from the results of the monitoring. The Secretary-General will also arrange (as required) for the specific monitoring exercises mentioned in paragraph 15 above to be carried out.

Procedures

17. As far as real-time monitoring is concerned, each centre should develop the necessary detailed procedures for this purpose. These procedures will vary from centre to centre, but should be designed to facilitate the real-time checking of the receipt of bulletins and observations as appropriate. At fully automated centres these procedures may include the use of telecommunication system records, visual display units, special programmes in telecommunication and data-processing computers, and so on. At manual centres check lists or sheets may be developed for the same purposes using ticks, crosses or the entry of times to indicate when selected bulletins and/or reports have been received. To avoid excessive use of paper forms, it may be convenient to place transparent sheets of plastic over the check sheets and make entries using soft wax pencils. The entries can be removed very easily when a suitable period has elapsed and the sheets made ready for the checks to be repeated

for a later period. Some further guidance on the operation of real-time monitoring, together with examples of the kind of forms which might be developed, are given in Table C.

18. As far as non-real-time monitoring is concerned, when special exercises are requested by the Secretariat, an indication of the form in which contributions should be made will be provided at the time the request is made. It is important that, as far as possible, centres should follow closely the procedures indicated in order that results from various centres are directly comparable with each other. It is particularly important that this should be the case when the annual global monitoring exercise is carried out. The procedures, together with the standard forms to be used for the provision of results, are given in Table D.

19. It is emphasized that nothing in the formal monitoring procedures prescribed in the attachment is intended to replace the normal day-to-day exchange of information and advice between adjacent centres. As far as possible, all problems should be resolved in this way and, after a time, only serious difficulties will be reflected in the formal monitoring reports.

TABLE A

Real-time monitoring

Items	National units	NMC	RTH/RMC	RTH/WMC
1. Bulletins not received in time	←	↔	↔	→
2. Observations not received in time	←			
3. Processed information not received in time			→	→
4. Errors in observations	←	(←)		
5. Special bilateral checks	↔	↔	↔	→

(Items are indicative rather than mandatory.)

NOTES

1. Bulletins not received in time are bulletins which appear on the transmission schedule and have not been received by a time agreed bilaterally between two adjacent centres.

2. Observations not received in time are observations which appear in the published contents of the bulletins listed for transmission but which have not been received by the time agreed.

3. Processed information not received in time refers to data not received by the time agreed but known to be in the transmission schedule.

NOTES (contd.)

4. Errors in observations are errors detected or suspected in the coding and/or meteorological content of messages.

5. Special bilateral checks are checks on any of the previous elements 1-4 or other elements which may have been arranged temporarily or on a more continuous basis by the centres concerned.

Legend

1. National units is understood in this context to be national observing, collecting and dissemination systems.

2. The arrows indicate the direction in which messages concerning monitoring will normally be sent. Thus, for example, messages concerning suspected errors in observations will normally be sent only by NMCs to the observing network - unless a special bilateral agreement has been made between an NMC and an appropriate RMC to carry out real-time quality control on its behalf. To cover this possibility, an entry in parentheses has been made under RMC.

TABLE B

Non-real-time monitoring

Items	NMC	RTH/RMC	WMC
1. Bulletins not received	x	x	x
2. Bulletins received late	x	x	x
3. Observations not received	x	x	x
4. Observations received late	x	x	x
5. Processed information not received	x	x	
6. Processed information received late	x	x	
7. Non-adherence to telecommunication format	x	x	x
8. Completeness of observational data	x	x	x
9. Quality of observational data	x	x	x
10. Deficiencies in processed information	x	x	x
11. Statistical verification of numerical weather prediction	x	x	x
12. Special bilateral or multilateral checks	x	x	x
13. Notes on recurrent problems	x	x	x
14. Monitoring reports	x	x	x

(Items are indicative rather than mandatory.)

NOTES

1. Bulletins not received are bulletins scheduled for transmission but not received.

2. Bulletins received late are bulletins received later than the time periods specified by WMO or agreed bilaterally.

NOTES (contd.)

3. Observations not received are observations scheduled for transmission but not received.

4. Observations received late are defined in a similar way as "bulletins received late" in Note 2 above.

5. Processed information not received is products in alphanumeric or pictorial form scheduled for transmission but not received.

6. Processed information received late is defined in a similar way as "bulletins received late" in Note 2 above.

7. Non-adherence to telecommunication format refers to errors made consistently or frequently by transmitting stations which interfere with the regular transmission of messages.

10. Deficiencies in processed information are shortcomings (e.g. data missing, messages garbled, facsimile products unreadable) which seriously interfere with the operational value of the products.

11. Statistical verification of numerical weather prediction would be supplied only by centres having a special interest in, and capability for, this type of information.

12. Special bilateral or multilateral checks means supplementary checks arranged between two or more centres by mutual agreement, on either a temporary or a continuous basis, to deal with special problems.

13. Notes on recurrent problems indicate areas of difficulty not covered by Notes 1-13 inclusive.

14. Monitoring reports are reports in the format to be developed by the Secretary-General, in consultation with the president of CBS and the chairmen of the appropriate working groups.

Legend

The crosses in the various columns indicate the centres at which these functions would normally be carried out.

TABLE C

Guidance for real-time monitoring

Check on the reception of observational reports from land stations

1. In order to implement real-time monitoring, suitable forms should be used for checking the reception of observational reports from land stations. Separate tables may be prepared for SYNOPs for global exchange, for TEMP/PILOTs for global exchange, for SYNOPs for regional exchange, and so on in order to check the availability of various types of observational data. If an observation from a particular station has not been received within the appropriate time, a request should be made to the station. Detailed procedures must be developed to meet the needs of centres of various kinds.

Check on the reception of aircraft and ships' weather reports from coastal radio stations or aeronautical radio stations

2. Each centre should ensure that all bulletins have been received, and procedures to ensure this is the case (for example by introducing the use of channel sequence numbers and similar ideas) should be developed to meet local needs.

Check on coding of observational reports

3. Observational reports should be checked before transmission of bulletins, in order to eliminate coding errors. This check should be made by the observer when the observation is first made and by suitably qualified staff when the bulletins are prepared. Such checking procedures, however, must not result in appreciable delays in the transmission of bulletins.

Check on the standard format of meteorological messages

4. Meteorological messages shall be checked to ensure that the standard format has been used and corrections shall be made as required. In particular, the following points shall be checked:

(a) The starting line, the abbreviated heading and the end-of-message signal of messages shall be completely free from any errors;

(b) Reports included in a bulletin shall be separated by the report separation signal.

It is emphasized that messages which can be handled without difficulty at manual centres may still give very serious problems at automated centres unless the procedures are scrupulously observed. Even a single incorrect character can lead to these difficulties in some cases.

Check on the reception of scheduled bulletins within specified times

5. Each RTH should check the reception of bulletins from the NMCs in the zone of responsibility. For this purpose, forms such as Examples 1 and 2 may be useful. If channel sequence numbers (nnn) have not been received in sequential order, queries should be made to the centre concerned immediately. Where no channel sequence number procedures are in operation, other measures must be taken to ensure that no transmissions have been missed, and no individual observations missed because of garbling, radio fading, or other causes.

Example 1 - REAL-TIME MONITORING

(Check for individual meteorological bulletins, not received, incorrect format or mutilated)

CENTRE	DATE	CIRCUIT			Page
Abbreviated heading	Description of fault	Time of reception	Time of request	Time of reception of repeat	Remarks (e.g. circuit outage times)

Example 2 - MONITORING OF THE RECEPTION OF SHIP/AIREP BULLETINS AND NUMBER OF REPORTS

SHIP			AIREP		
Abbreviated heading	Time of receipt	Number of reports	Abbreviated heading	Time of receipt	Number of reports

TABLE D

PROCEDURES FOR INTERNATIONALLY CO-ORDINATED NON-REAL-TIME MONITORING

1. FUNCTIONS OF WMCs, RMCs, RTHs AND NMCs

1.1 Functions of WMCs, RMCs and RTHs located on the Main Trunk Circuit

WMCs, RMCs and RTHs on the MTC should monitor the availability of observational data and processed information for global exchange. In making the statistics use should be made, as far as possible, of computers. Statistics on the availability of observational data from individual observing stations should be made for the period of 15 days for automated centres and 5 days for manually-operated centres.

1.2 Functions of RTHs and RMCs not located on the MTC

RTHs and RMCs not located on the MTC should monitor the availability of observational data from individual observing stations for global exchange in their zone of responsibility for collecting observational data as prescribed in Volume II of the Manual on the GTS. Statistics should be made for the period of at least five days.

1.3 Functions of NMCs

NMCs should actively participate in this monitoring to check the reception of observational data from individual observing stations for global exchange in the area from which the NMCs are responsible for the collection of observational data. Statistics should be made for the period of at least five days.

2. FREQUENCY OF THE MONITORING ACTIVITIES

The internationally co-ordinated monitoring of data for global exchange will be carried out once a year in October with a view to checking periodically the efficiency of the operation of the WWW. The WMCs, RTHs, RMCs and NMCs will be requested to participate in this global monitoring. The period of the monitoring will be 6-10 October for 5 days and 1-15 October for 15 days.

3. TYPES OF DATA TO BE MONITORED

The following types of data should be monitored:

TEMP/TEMP SHIP, PILOT/PILOT SHIP, SYNOP, SHIP, AIREP/CODAR, CLIMAT/CLIMAT TEMP and BATHY/TESAC for global exchange.

Note: As regards CLIMAT/CLIMAT TEMP, the monitoring period should be extended to 15 days, even if (for other observations) a return for a period of only 5 days is made.

4. THE STANDARD FORMAT FOR STATISTICS

With a view to enabling easy comparison of results of the internationally co-ordinated monitoring carried out by the different centres, the standard formats A to G attached should be used. All centres carrying out monitoring should state clearly the period covered. The statistics should be sent to adjacent centres concerned and to the WMO Secretariat at the earliest possible date after the end of the monitoring period.

5. ROLE OF THE WMO SECRETARIAT

The Secretariat will ensure that the Members are made aware of their respective responsibilities and will collect statistical results of internationally co-ordinated monitoring from the Members concerned. The Secretariat will make a summary of the statistics and will evaluate the deficiencies and effectiveness of the operation of the WWW as a whole and some parts of it.. In this connexion, the Secretariat will check the observing programme of individual observing stations. The results of the monitoring will be made available to the Executive Committee and CBS by correspondence or at sessions as appropriate. The Secretariat will take up the possibility of remedial action with Members concerned in order to eliminate shortcomings in the operation of the GOS and the GTS as quickly as possible.

6. SPECIAL TYPES OF NON-REAL-TIME MONITORING OF THE WWW

If necessary, monitoring of the WWW may be undertaken in different regions and also for various types of observational data. The purpose of such monitoring is to identify, in greater detail, the deficiencies in the collection and exchange of data in different parts of the GTS and the reason for these deficiencies. Special types of monitoring should be initiated by the Secretary-General or by some of the Members concerned. The dates and duration of such monitoring will have to be agreed upon with these Members.

FORMAT A

STATISTICS ON GLOBAL EXCHANGE DATA RECEIVED IN CENTRES CONCERNING OBSERVATIONAL DATA - SYNOP

Name of centre _____ Monitoring period _____

(1)	(2)	(3)	(4)	(5)
Station index number	Number of SYNOP reports received within the specified period after observation time			
	HH+60 min	HH+120 min	HH+180 min	HH+360 min
	00 06 12 18	00 06 12 18	00 06 12 18	00 06 12 18

Explanatory remarks:

(1) This table is used for statistics concerning data from surface land stations (SYNOP).

(2) Under column (1) station index number (IIiii) should be indicated.

(3) Under columns (2), (3), (4) and (5) the number of reports received within 60 minutes, 120 minutes, 180 minutes and 360 minutes after observation time should be indicated, respectively.

(4) The numbers should be related to the whole monitoring period and each observation time - 0000, 0600 1200 and 1800 GMT.

(5) All stations from which reports are to be exchanged globally are given in the Manual on the Global Telecommunication System, Part I, Attachment I-4.

FORMAT B

STATISTICS ON GLOBAL EXCHANGE DATA RECEIVED IN CENTRES CONCERNING OBSERVATIONAL DATA - TEMP/TEMP SHIP/PILOT/PILOT SHIP

Name of centre _____ Monitoring period _____

(1)	(2)				(3)				(4)				(5)			
Station index number	Number of TEMP/TEMP SHIP reports received within the specified period after observation time								Number of PILOT/PILOT SHIP reports received within the specified period after observation time							
	HH+180 min				HH+720 min				HH+180 min				HH+720 min			
	00	06	12	18	00	06	12	18	00	06	12	18	00	06	12	18

Explanatory remarks

(1) This table is used for statistics concerning TEMP/TEMP SHIP and PILOT/PILOT SHIP data.

(2) Under column (1) station index number (IIiii) should be indicated.

(3) Under columns (2) and (3) and columns (4) and (5) the number of reports received within 180 minutes and 720 minutes after observation time should be indicated, respectively.

(4) The numbers should be related to the whole monitoring period and each observation time - 0000, 0600, 1200 and 1800 GMT.

(5) As regards TEMP SHIP and PILOT SHIP, callsigns or appropriate indicators of ships' stations should be indicated in column (1). These callsigns will be available in the Manual on the Global Telecommunication System, Part I, Attachment I-4, as well as WMO Publication No. 47, International List of Selected Supplementary and Auxiliary Ships.

FORMAT C

STATISTICS ON GLOBAL EXCHANGE DATA RECEIVED IN CENTRES CONCERNING OBSERVATIONAL DATA - SHIP

Name of centre _____ Monitoring period _____

(1) Originating centre (CCCC)	(2) Total number of SHIP bulletins and reports received							
	Observation time 0000 GMT		Observation time 0600 GMT		Observation time 1200 GMT		Observation time 1800 GMT	
	No. of bulletins	No. of reports	No. of bulletins	No. of reports	No. of bulletins	No. of reports	No. of bulletins	No. of reports

Explanatory remarks:

(1) This table is used for statistics concerning synoptic surface data from sea stations (SHIP).

(2) Under column (1) the CCCC of the originating centre should be indicated.

(3) Under column (2) the total number of SHIP bulletins and reports received from each CCCC should be indicated for each observation time - 0000, 0600, 1200 and 1800 GMT.

(4) Statistics should be included of all ships' weather report bulletins (SHIP) available up to 12 hours after the time of observation and up to 24 hours in the southern hemisphere and other areas where few ships' weather reports are available.

FORMAT D

STATISTICS ON GLOBAL EXCHANGE DATA RECEIVED IN CENTRES CONCERNING OBSERVATIONAL DATA - AIREP/CODAR

Name of centre _____ Monitoring period _____

(1) Originating centre (CCCC)	(2) Total number of AIREP/CODAR bulletins and reports received							
	Observation time 2100-0300 GMT		Observation time 0300-0900 GMT		Observation time 0900-1500 GMT		Observation time 1500-2100 GMT	
	No. of bulletins	No. of reports	No. of bulletins	No. of reports	No. of bulletins	No. of reports	No. of bulletins	No. of reports

Explanatory remarks:

(1) This table is used for statistics concerning all available AIREP/CODAR data.

(2) Under column (1) the CCCC of the originating centre should be indicated.

(3) Under column (2) AIREP/CODAR reports/bulletins received 3 hours before and 3 hours after each of the main standard observation times for each CCCC should be included in the column for the relevant observation times.

FORMAT E

STATISTICS ON GLOBAL EXCHANGE DATA RECEIVED IN CENTRES CONCERNING OBSERVATIONAL DATA - BATHY/TESAC

Abbreviated heading	Time of receipt	Number of reports	Abbreviated heading	Time of receipt	Number of reports

Explanatory remarks:

(1) The international data/time group (YYGGgg) should be included in the "Abbreviated heading" column.

(2) The date of receipt, if necessary, should also be included in the column "Time of receipt".

FORMAT F

STATISTICS ON GLOBAL EXCHANGE DATA RECEIVED IN CENTRES - CLIMAT AND CLIMAT TEMP

CLIMAT			CLIMAT TEMP		
Abbreviated heading	Time of receipt	Number of reports	Abbreviated heading	Time of receipt	Number of reports

Explanatory remarks:

(1) The international date/time group (YYGGgg) should be indicated in the "Abbreviated heading" column.

(2) The date should also be included, if necessary, in the column "Time of receipt".

FORMAT G

STATISTICS ON GLOBAL EXCHANGE FOR PROCESSED INFORMATION

(SATELLITE BULLETINS, DRIFTING BUOY DATA BULLETINS AND GRID-CODE BULLETINS, ETC.)

Abbreviated heading	Time of receipt (in convenient intervals)	Remarks

Explanatory remarks:

(1) The abbreviated heading and international date/time group (YYGGgg) should be indicated in the "Abbreviated heading" column.

(2) The date should also be included in the column "Time of receipt".

A N N E X IX

Annex to Recommendation 11 (CBS-Ext.(80))

PROPOSED AMENDMENTS TO THE MANUAL ON THE GLOBAL TELECOMMUNICATION SYSTEM, VOLUME I (GLOBAL ASPECTS), PART II - METEOROLOGICAL TELECOMMUNICATION PROCEDURES FOR THE GLOBAL TELECOMMUNICATION SYSTEM

1. Amendment to paragraph 2.3.2.2

Replace the sentence concerning the number of bulletins containing ships' weather reports and aircraft reports by the following:

"In the case of bulletins containing ships' weather reports and aircraft reports the number (ii) should be used for facilitating the selective distribution of ships' weather reports and aircraft reports (surface and upper-air). Whenever practicable a fixed number of "ii" should be allocated to the bulletins for those reports which are collected from a certain area within each Region (e.g. southern Indian Ocean in Region I, southern Atlantic in Region III, etc.) and separate bulletins should be prepared for northern and southern hemispheres, respectively."

2. Amendment to paragraphs 2.7.1 and 2.7.2

Replace paragraphs 2.7.1 and 2.7.2 by the following:

"2.7.1 The length of messages should never exceed 3 800 characters but, where practicable and convenient, should preferably be as close as possible to 3 800 characters.

2.7.2 Meteorological data should not be unnecessarily held up for transmission merely for the purpose of retaining until a message of appropriate length can be compiled."

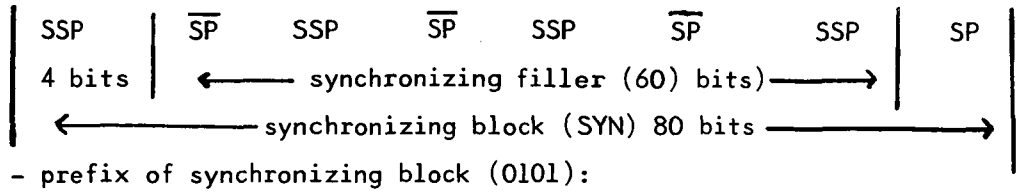
3. Replace the text of paragraph 2.12 (Error-control procedures for data transmission on the Global Telecommunication System) by the following new text:

"The error-control procedures for use on the GTS shall be the software/hardware systems, the Balanced Line Access Procedures (LAPB) as specified in CCITT Recommendation X.25 and for HF radio transmissions the ARQ procedures conforming to CCIR Recommendation 342-2.

Note: The error-control procedures for the software/hardware systems are given in Attachment II-8, and for HF radio transmissions in Part II, 2.3.1.2."

4. Amendment to paragraph 5.3 of Attachment II-8

5.3 Structure of synchronizing block:



SSP - prefix of synchronizing block (0101):

SP - synchronizing pattern (0101000010100101)

$\overline{SP}$ - inversion of SP

On starting synchronization, after the synchronizing block (SYN), block A is transmitted and then, depending on the condition of the backward channel, the blocks SYN, A or B, C, etc. are again transmitted.

ANNEX X

Annex to Recommendation 13 (CBS-Ext.(80))

PROPOSED AMENDMENTS TO THE MANUAL ON THE GLOBAL TELECOMMUNICATION SYSTEM, VOLUME I (GLOBAL ASPECTS), PART III - TECHNICAL CHARACTERISTICS AND SPECIFICATIONS FOR THE GLOBAL TELECOMMUNICATION SYSTEM

Amend the last sentence of paragraph 2.2.1.4 as follows:

"As regards the modulation code, in addition to Alternatives A and B specified in Recommendation V.26, the use of the following alternative (A2) is also permitted on agreement between the centres concerned:

Dibit	Phase change
00	+270°
01	0°
11	+90°
10	+180°

Add the following new paragraphs:

"2.3.3 The characteristics in respect of coded digital facsimile transmission shall be in accordance with WMO standards given in paragraph 8 below."

"8 TECHNICAL CHARACTERISTICS OF EQUIPMENT FOR CODED DIGITAL FACSIMILE TRANSMISSIONS

8.1 The code for digital facsimile transmission shall be determined by CCITT Recommendation T.4*- Standardization of Group 3 facsimile apparatus for document transmission, paragraph 4.1 and tables 1/T.4 and 2/T.4.

RESOLUTIONS AND RECOMMENDATIONS OF THE COMMISSION FOR BASIC SYSTEMS ADOPTED PRIOR TO ITS EXTRAORDINARY SESSION (1980) AND MAINTAINED IN FORCE

Res. 1 (CBS-VII) - ADVISORY WORKING GROUP OF THE COMMISSION FOR BASIC SYSTEMS

THE COMMISSION FOR BASIC SYSTEMS,

NOTING:

(1) Paragraph 7.13.5 of the general summary of the abridged final report of Fifth Congress,

(2) Resolution 1 (CBS-VI) - Advisory Working Group of the Commission for Basic Systems,

CONSIDERING that a working group would be of value in advising the president of the Commission and in assisting him in his duties of co-ordination and planning,

DECIDES:

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

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

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

(c) To assist the president in the co-ordination of the activities of the four major working groups in CBS (GOS, GDPS, GTS and Codes);

(d) To keep under review the work of the Commission;

(2) That the composition of the Advisory Working Group should be as follows:

President of CBS (chairman)

Vice-president of CBS

Outgoing president of the Commission

Chairmen of the CBS Working Groups on the GOS, GDPS, GTS and Codes

Mr. Chan Hsun-liang (People's Republic of China)

Mr. M. E. Mlaki (United Republic of Tanzania)

Res. 2 (CBS-VII) - WORKING GROUP ON THE GLOBAL OBSERVING SYSTEM

THE COMMISSION FOR BASIC SYSTEMS,

NOTING Resolution 2 (CBS-VI) - Working Group on the Global Observing System,

CONSIDERING that there is a need for the Working Group on the Global Observing System to be re-established to keep under constant review observational requirements of the WWW, the FGGE and its regional experiments, IGOSS, as well as other international programmes,

DECIDES:

(1) To re-establish the Working Group on the Global Observing System with the following terms of reference:

(a) To follow closely the progress of the implementation of the GOS and, as necessary, to formulate recommendations with a view to improving the performance of the GOS, including ways and means of its monitoring;

(b) To keep the Guide on the GOS, the Manual on the GOS, and the Technical Regulations relevant to the GOS under constant review;

(c) To make studies and recommendations on the following items:

(i) Specifications of observational data requirements for the various networks and scales of meteorological phenomena;

(ii) Design of the future Global Observing System in close relation to the development of four-dimensional data-assimilation techniques;

(iii) More effective integration of aircraft reports in a mixed observing system, in particular using new techniques and methods of meteorological observation aboard aircraft;

(iv) Mixture of various observing techniques in the light of new requirements and evaluation of data accuracies and compatibilities;

(v) New observing technology and methods for inclusion in the GOS;

(vi) Problems relating to the initial processing of Level-I data;

(vii) Relevant aspects of quality-control procedures applied at observing stations;

(viii) Monitoring the operation of the GOS;

(d) To consider and, as necessary, make recommendations on observational data requirements for the GOS as put forward by international programmes;

(e) To take action on matters referred to the working group by the president of the Commission;

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

(a) An expert designated by each regional association;

(b) An expert designated by the president of the Commission for Instruments and Methods of Observation;

(c) An expert designated by the president of the Commission for Marine Meteorology;

(d) Experts who may be designated by presidents of other technical commissions;

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

(3) To select, in accordance with Regulation 31 of the General Regulations, Dr. T. Mohr (Federal Republic of Germany) as chairman of the working group.

Res. 3 (CBS-VII) - WORKING GROUP ON THE GLOBAL DATA-PROCESSING SYSTEM

THE COMMISSION FOR BASIC SYSTEMS,

NOTING Resolution 3 (CBS-VI) - Working Group on the Global Data-processing System,

CONSIDERING that there is a need for the continuation of the work of the working group established by Resolution 3 (CBS-VI),

DECIDES:

(1) To re-establish the Working Group on the Global Data-processing System with the following terms of reference:

(a) In order to achieve the most rational and economical GDPS possible, to formulate recommendations on, and to keep under continuous study, the following items, taking into account the views expressed by other technical commissions:

(i) Principles and guidance on methods for the co-ordination and monitoring of technical operational matters of the GDPS;

(ii) Co-ordination of observational data needs of the GDPS and provision of advice on the formulation of requirements;

(iii) Organization of the GDPS to determine whether changes are desirable and possible;

(iv) All statements of requirements for the products of GDPS from all users of the system;

(v) Co-ordination of the products of the WMCs and the RMCs and the time schedules for their output, frequency of issue and distribution;

(vi) Transmission priorities of WMC and RMC products on the Main Trunk Circuit and its branches, including priorities for resumption of service after outages;

(vii) Consideration of matters relating to real-time and non-real-time quality control, storage and retrieval of data and products within the GDPS, in particular in connexion with storage and retrieval of climatological data;

(viii) Regular exchange among WMCs, RMCs and NMCs of information on the techniques and procedures used within the GDPS and the results achieved from these techniques;

(ix) Study of the best mix of observing systems (in co-operation with the Working Group on the GOS);

(b) To provide co-ordination and guidance on the use of modern data-processing techniques, and to bring the resulting requirements to the attention of other CBS working groups, as necessary;

(c) To keep abreast of scientific and technical developments relating to methods and techniques of meteorological analysis and forecasting for general purposes including the World Weather Watch, to formulate recommendations on implementation of new techniques and/or to bring these developments to the attention of the president of CBS with a view to referring them to other relevant constituent bodies as required;

(d) To identify problems associated with meteorological analysis and forecasting requiring study and research and to bring them to the attention of the president of CBS with a view to referring them to the relevant technical commissions as required;

(e) To keep abreast of and identify problems which relate to the processing of basic data and the functions of GDPS centres for climatological, hydrological and other purposes and to bring specific proposals on these matters to the attention of the president of CBS;

(f) To prepare additional parts of the Guide on the GDPS and to keep the Guide up to date;

(g) To complete the development of the Manual on the GDPS;

(h) To keep up to date relevant training syllabi as required, and to suggest training materials and the holding of seminars and symposia;

(i) To establish, as necessary, study groups composed of experts, or to appoint rapporteurs, for consideration of specific problems of a technical or operational nature;

(j) To act upon matters referred to the working group by the president of CBS;

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

(a) An expert designated by each regional association;

(b) An expert to be nominated by each of the Members responsible for the operation of the World Meteorological Centres;

(c) Experts nominated by Members responsible for the operation of Regional Meteorological Centres and other Members wishing to participate actively in the work of the group;

(d) Experts who may be nominated by presidents of other technical commissions;

(3) To select, in accordance with Regulation 31 of the General Regulations, Mr. F. Duvernet (France) as chairman of the working group.

Res. 4 (CBS-VII) - WORKING GROUP ON CODES

THE COMMISSION FOR BASIC SYSTEMS,

NOTING Resolution 5 (CBS-VI) - Working Group on Codes,

CONSIDERING:

(1) That the rapid evolution of meteorological requirements and techniques gives rise to the necessity for frequent revision of the existing codes or to that of creating new ones,

(2) That the complexity of the problems relating to codes is constantly increasing, and that consequently it is desirable to entrust their solution to a permanent group of experts on this subject,

DECIDES:

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

(a) To consolidate and co-ordinate statements received from Members, regional associations, other technical commissions, appropriate international organizations and other bodies on the need for new international code forms and tables of specifications;

(b) To develop codes to meet new requirements which have been so established;

(c) To keep under review the existing international codes and to recommend changes to these codes as required;

(d) To establish, as necessary, study groups composed of experts, or to appoint rapporteurs, for consideration of specific problems of a technical nature;

(e) To take action on problems assigned to the working group by the president of CBS;

(f) To co-ordinate its work on the development of new codes and improvement of existing codes with the CBS Working Groups on the GOS, GDPS and GTS;

(g) To improve the presentation and precision of the contents of Volume I of the Manual on Codes by using, in particular, the principles to this effect developed by the seventh session of CBS and by developing definitions, as required;

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

(a) An expert designated by each regional association;

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

(c) Experts who may be designated by the presidents of the technical commissions;

(3) To select, in accordance with Regulation 31 of the General Regulations, Mr. G. Doumont (Belgium) as chairman of the working group.

Res. 5 (CBS-VII) - WORKING GROUP ON THE GLOBAL TELECOMMUNICATION SYSTEM

THE COMMISSION FOR BASIC SYSTEMS,

NOTING:

(1) Resolution 4 (CBS-VI) - Working Group on the Global Telecommunication System,

(2) That the developments in the field of telecommunications are progressing at an accelerated rate, and

CONSIDERING:

(1) That the concept of the World Weather Watch, in the implementation period 1980-1983, will require a series of technical studies,

(2) That changes in meteorological requirements stemming from the World Weather Watch, other WMO programmes and joint programmes between WMO and other organizations entail a constant review of the world-wide telecommunication system,

DECIDES:

(1) To re-establish the Working Group on the Global Telecommunication System, with the following terms of reference:

(a) To study and to formulate recommendations in respect of organizational, technical and procedural aspects of the meteorological telecommunication systems, in particular the Global Telecommunication System of the World Weather Watch, including the collection of weather reports from ships, as well as the collection and distribution of meteorological information through meteorological satellites;

(b) To keep under constant review developments in telecommunication techniques and equipment and their adaptation to the requirements of an efficient, world-wide system of meteorological telecommunications, in particular the advantages derived from communication space techniques, including meteorological satellites, and to formulate appropriate recommendations;

(c) To formulate for meteorological transmissions (observational data and processed information), proposals on international standardization of operating practices, procedures, equipment and related questions, including format and digital facsimile transmissions, as well as schedules;

(d) To follow closely the progress on the implementation, as well as the operation of the meteorological telecommunication systems and, as necessary, to formulate recommendations with a view to remedying shortcomings and effecting improvements;

(e) To keep in touch with the activities of the Working Groups on Meteorological Telecommunications of regional associations;

(f) To co-ordinate, as necessary, its activities with the work of other working groups of CBS, in respect of meteorological telecommunications;

(g) To keep abreast of the activities of the International Telecommunication Union, the International Organization for Standardization, the International Civil Aviation Organization, the Inter-Governmental Maritime Consultative Organization and other international organizations concerned on matters pertaining to meteorological telecommunications;

(h) To establish, as necessary, study groups or panels composed of experts, or appoint rapporteurs, for consideration of special problems of a technical or operational nature;

(i) To undertake any appropriate task in accordance with the directives given by the Commission for Basic Systems, or by its president;

(j) To advise the president of the Commission for Basic Systems on meteorological telecommunication matters, as necessary;

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

(a) The chairmen of the Working Groups on Meteorological Telecommunications of all regional associations;

(b) Experts to be nominated by each of the Members responsible for the operation of World Meteorological Centres and the Regional Telecommunication Hubs on the Main Trunk Circuit and its branches;

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

(d) Experts who may be nominated by presidents of other technical commissions;

(3) To select, in accordance with Regulation 31 of the General Regulations, Mr. I. A. Ravdin (U.S.S.R.) as chairman of the working group.

Rec. 10 (CBS-VII) - AMENDMENTS TO THE MANUAL ON CODES, VOLUME I

THE COMMISSION FOR BASIC SYSTEMS,

NOTING the report of the fifth session of the CBS Working Group on Codes,

CONSIDERING that there is a need for technical improvements to Volume I of the Manual on Codes,

RECOMMENDS that the amendments as given in the annex to this recommendation be included in Volume I of the Manual on Codes as follows:

(a) Part A to be introduced as soon as possible but not later than 1 January 1980, after consultation with CAeM;

(b) Part B to be taken into account when preparing the revised edition of the Manual (see Recommendation 11 (CBS-VII)).

ANNEX

AMENDMENTS TO THE MANUAL ON CODES, VOLUME I*

Part A

List of urgent amendments

Page I-D-14 Code table 0300	Difficulties have been reported in the transmission on voice channels of similar sounding words which have opposite meanings, such as "frequent" and "infrequent". To overcome this difficulty, it has been suggested that the term "infrequent" could be replaced by "occasional", a word of similar meaning, for which, moreover, there is a standard aeronautical abbreviation (OCNL). CAeM should, if necessary, be consulted on this matter.

*Note: All the amendments contained in this annex refer to the relevant text of the Manual on Codes, Volume I, as it should have appeared after modification by CBS-Ext.(76), i.e. before the inclusion of Supplement No. 4, issued in September 1977.

Note under new Regulation 51.3.1

The extraordinary (1976) session of CBS requested the Working Group on Codes to review the note under new Regulation 51.3.1 with a view to making it more precise. The group agreed that the interpretation of the sense of a regulation should not, as a rule, be left to the user without any further guidance. In view of Notes (2) and (4) under the FM 51-V TAF code form with the corresponding reference to the Technical Regulations (C.3.1), including in Attachment B the specifications about the "operationally desirable accuracy of forecasts", the Commission is of the opinion, however, that the note under discussion does not serve any useful purpose. It therefore recommends its deletion.

Part B

List of amendments to be included as necessary in the future revised edition of the Manual on Codes

Page I-A-1 (first section)

FM system of numbering code forms

When reviewing the Manual on Codes, Volume I, it was found that the system of adding a Roman numeral to the number of each code to identify the session of the CBS which approved the code form or made amendments to a previous version leads to a multitude of editorial amendments. In view of the increasing frequency of CBS-sessions in recent years and the very limited information provided to the user by these numerals, it is suggested that this practice be discontinued and a reference be given to the appropriate CBS session within the reference list of code forms (only pages I-A-4 to I-A-9).

Page I-A-10 Notes, (4)

should read:

... may be reported more than once, as necessary.

"Repeating" means doing one identical thing again. In this case the code values actually transmitted may not be reported twice.

Comments:

The word "repeated" is used in the same sense in many other places in Vol. I, e.g. page I-A-27, Reg. 15.8.1 and page I-A-53, Reg. 32.2.2.5. The meaning of the word "group" obviously means "groups of the same symbolic forms". Substituting "reported" for "repeated" does not seem to solve the problem which for linguistic reasons would require complicated and almost in each instance different explanations such as "Two or more groups of the form .... shall, if necessary, be included in a report, one after another".

Action proposed:

If there are no cases of misinterpretation known to WMO, a change does not appear to be required.

Pages I-A-12 to I-A-15 — Titles in 11.4.1, 11.4.2, 11.4.3, 11.5.1 should be completed by symbolic letter (see e.g. 11.3.2 or 11.5.2)

Reg. 11.5.1.1 — Should it not read:

... hundred digits of ...?

Comments:

The statement in the Manual is not in accordance with the usual terminology of the Regulations. There appear to be two possibilities for an improvement:

1. Omission of Reg. 11.5.1.1 and renumbering of the remaining Regs., and on page I-C-27 under PPP insertion of "Pressure in tenths of a millibar, omitting hundreds and thousands digits of millibars, or geopotential..."

(This procedure would be in accordance with FM 14-V, Note (9) and the legend under PPPP on page I-C-28).

2. Changing Reg. 11.5.1.1 to:
"The pressure shall be reported in tenths of a millibar with the hundreds and thousands digits omitted."

Action proposed:

As it is not certain whether the reporting of tenths of millibars should appear as a Regulation (e.g. problem of measurement on ships), the possibility No. 1 is suggested for adoption.

Page I-A-15 — 11.5.1.5: There is some uncertainty as to what is actually intended by saying "after the last group". Does it mean: after "additional groups", or even after "... information in plain language"?

Page I-A-16
Reg.11.5.2.2

Considering that temperatures of -50° and below as well as 0°C and above are given by the same figures TT, this regulation should read as follows:

"11.5.2.2

Negative temperatures shall be encoded as follows:

(a) 50 is added to the absolute value of the temperature;

(b) The value so obtained is used to encode TT; the digit of one hundred (for temperatures -50°C and below) is omitted.

NOTES:

(1) Examples of encoding TT:

A temperature of - 0°C is given as 50

A temperature of -10°C is given as 60

A temperature of -50°C is given as 00

A temperature of -60°C is given as 10

(2) The distinction between a temperature above freezing and one below freezing (in the case of the same figures TT) is made from the general weather situation and from comparison with previous reports of the same station."

Page I-A-17
group ($8N_sCH_sh_s$)

While, for example, under "Group PPPTT" each element PPP and TT is discussed separately, this is not done with other code elements, e.g. under $N_hC_LhC_MC_H$.

There should at least be a reference to the International Cloud Atlas. The same should be considered with other groups.

Comments:

The first remarks above concerning the $N_hC_LhC_MC_H$ group also refer to page I-A-16, para. 11.6. Contrary to other groups of the SYNOP code, the group $N_hC_LhC_MC_H$ is wholly devoted to one element, i.e. clouds. There does not seem to be a necessity, therefore, to introduce sub-headings. As for the second point, a reference to the International Cloud Atlas appears in Part C of the Manual under C_L etc.

On the other hand, the importance of this group may warrant a more detailed description. The following text, copied from Sections A and B of the Manual, is therefore suggested:

"11.6

Group $N_h C_L h C_M C_H$

11.6.1

Amount of cloud N_h

11.6.1.1

The amount of all the C_L cloud(s) present or, if no C_L cloud is present, the amount of all the C_M cloud(s) present shall be reported.

11.6.1.2

Regulation 11.3.1.1 to 11.3.1.6 shall apply when coding N_h.

11.6.2

Genera of low cloud C_L

11.6.3

Height above ground of the base of lowest cloud seen h.

11.6.3.1

When the station is in fog, a sandstorm or a dust-storm, or in blowing snow, but the sky is discernable through it, h shall refer to the base of the lowest cloud observed, if any. When, under the above conditions, the sky is not discernable, h shall be reported as / (also N_h=9, C_L=/, C_H=/).

NOTE: See Regulations 11.2.1 to 11.12.10.

11.6.4

Genera of medium and high cloud C_M, C_H

11.6.4.1

Regulations 11.3.1.5 and 11.3.1.6 shall apply when coding C_M and C_H."

Action proposed:

The text under para. 11.6 should be replaced by the above text.

Page I-A-34

SHIP (FM 21) (FM 22): In the Technical Regulations there is no definition of a "sea station". Are the different terms "sea station" "from a ship" "station on a ship" (ROCOB SHIP) really needed?

Page I-A-69
group 33399

Should be amended to read $\frac{33399}{33300}$

The use of 33399 or 33300 is of the same weight; on page I-A-70, 44.2.4, we learn that both groups have "equal right". This should be expressed in the way proposed above.

Comments:

The proper amendment would appear to be the adoption of the corresponding procedure of Code FM 45-V, i.e. to substitute $333x_1x_1$ for 33399 with consequent amendments to Reg. 44.2.4, the specification of x_1x_1 on page 1-C-40, and Code table 4887 (addition of 99), as follows:

"44.2.4

Positions shall be given in degrees and minutes or by using the group $L_aL_aL_oL_ok$ which gives the position to the nearest half-degree. The form in which point position groups are given shall be indicated by x_1x_1."

Page I-C-40

Under x_1x_1 insert FM 44-V.

Code table 4887

Add code figure:

"99 Positions in form $Q_cL_aL_aL_aL_a\ L_oL_oL_oL_oL_o$

NOTE: In FM 44-V ICEAN code figures 22, 66 and 88 are not used."

Action proposed:

Insert the above changes on pages I-A-69, I-A-70 Regulation 44.2.4, I-C-40 and I-D-113 (Code table 4887).

Page I-A-94

Proposal to amend TAF code

Add a new Regulation (after present 5.1.3 concerning change groups), as follows:

"The length of the aerodrome forecast and the number of changes indicated in the forecast shall be kept to a minimum."

Reason: Alignment with Technical Regulations [C.3.1./]6.2.4

Page I-B-1 first line

Here and elsewhere all FM names should be standardized: e.g. "Report of ..." "Forecast of ..." and "Analysis of ..."

The use in a quasi-synonymous manner of the words "code", "code form", "report", "message", is rather confusing. Here and elsewhere these terms are not used with the necessary distinction throughout.

Page I-B-1 line 12

Here and elsewhere different terms are in use: "for aviation", "for aeronautical purposes", the attributive "aviation report". Standardization is suggested.

Page I-B-2 line 7 from the bottom

SFAZU

Here and elsewhere, the code titles are too long. What does not really belong to the "title" would be better placed under a note, so as to read:

SFAZU - Detailed report ... by bearings (FM 83-I)

(1) This report covers any period of time up to and including 24 hours.

Page I-B-4

There are still some remaining passages where the "follow" and the "indicates" have not been inserted.

"follow(s)" should be used if there really follows a group or a number of groups, etc. (e.g. groups 33300 up to 33399).

"indicates" should be used only if information is given without any specific group(s) following.

Page I-C-1

A_C, A_t (and elsewhere)

"position" or "geographical position"?

Whether the suggestion applies elsewhere and possibly everywhere would require a careful study of the Manual. In this case it should be treated as a principle.

a_3

Both tables should be combined into one. The least thing that could be done is to add figures 5, 7, 8 to figures 0, 1, 2. But further simplification is quite feasible.

Page I-C-3

C

If possible, the allocation to the same symbolic letter of two entirely different specifications should be avoided. See also (e.g.): C/C, C_1/D_1, C_2/C_2, S_1/S_2 (twice).

Page I-C-5 to I-C-8

Directions (1, 2 and 3 digits)

The ways of referring to "true" are multiple. This should be standardized one way or another.

Page I-C-11

$f_m f_m$

If a third digit is provided to be used, a NOTE should refer to $f_m f_m f_m$. The same applies to pp/ppp, rr/rrr.

Page I-C-12

GG and other specifications of time

Specification of the time appears in various ways: "in whole hours", "to the nearest whole hour", "in GMT", "synoptic hour in GMT", "hour in GMT, of ...", "nearest whole hour (GMT) ...", ... etc.

There is no reason for so many different versions.

One method should be decided upon and deviations should not be allowed unless necessary.

Page I-C-12

GG

The various ways of specifying time when an observation is made should be strictly classified. Some observations (SYNOP, TEMP, etc.) are made at scheduled times; others (SPECI, ...) are made at unscheduled times.

The following system is suggested:

"time of observation" - term to be used when there is no need for, or possibility of, being more precise.

"standard time of observation" - the regular scheduled time when an observation, ascent, etc. has to be made. Qualifying attributives such as "main", "intermediate" may be used as appropriate, which complies fully with the Technical Regulations. Quite a large number of symbolic letters are affected by this problem.

Page I-C-14

GGggHR

As the specification is presently worded, it is not clearly indicated that no space is to be left between GGgg and HR. The following text is suggested: "... (with the letters HR being attached/to be attached) ...".

H_e

Here and elsewhere: obviously the definitions given in the Technical Regulations for "height" and "altitude" have not been applied systematically throughout the Manual.

Page I-C-17

$h_1h_1h_1$, $h_2h_2h_2$, ... (FM 39-VI, FM 40-VI)

The wording in Note (1) is a little confusing and its meaning is not clarified by the lack of system in the corresponding paragraph 39.4 (page I-A-67), which is therefore considered simultaneously. It is suggested that the Note (1) be replaced by the following:

"(1) The geopotentials of isobaric surfaces from 70 millibars to 0.0001 millibar inclusive shall be reported in hundreds of standard geopotential metres. The geopotentials of the remaining isobaric surfaces listed in Regulation 39.4.1 (i.e. 0.00007 mb, 0.00005 mb, 0.00003 mb, 0.00002 mb and 0.00001 mb) shall be reported in thousands of standard geopotential metres."

The following tables would permit a more systematic presentation of the contents of Regulation 39.4.

39.4

Section 3 - Isobaric surfaces

39.4.1

Section 3 shall be included only when data are available for any of the isobaric surfaces:

70	50	30	20	10	7	5	3	2	1
7.10^{-1}		5.10^{-1}		4.10^{-1}		3.10^{-1}		2.10^{-1}	1.10^{-1}
7.10^{-2}		5.10^{-2}				3.10^{-2}		2.10^{-2}	1.10^{-2}
7.10^{-3}		5.10^{-3}				3.10^{-3}		2.10^{-3}	1.10^{-3}
7.10^{-4}		5.10^{-4}				3.10^{-4}		2.10^{-4}	1.10^{-4}
7.10^{-5}		5.10^{-5}				3.10^{-5}		2.10^{-5}	1.10^{-5}

39.4.2

In section 3, indicator figures 11, 22, 33, 44, 55 and 66 specify the following values for PP and hhh:

Ind. fig.	P_1P_1, P_2P_2,..., P_nP_n	$h_1h_1h_1$, $h_2h_2h_2$,..., $h_nh_nh_n$
11	1.0	millibar, geopotential, hectometre
22	0.1	" " "
33	0.01	" " "
44	0.001	" " "
55	0.0001	" " "
66	0.00001	" " kilometre

Action proposed:

Insert the above changes on pages I-C-17 and I-A-67 respectively.

Page I-C-18

I_d

The specification is much too long, containing too many explanatory remarks. The following is suggested:

"I_d - Indicator of the last standard isobaric surface for which the wind is reported (Code table 1734) (FM 35-V, FM 36-V).

(1) In TEMP and TEMP SHIP reports, Part A, the indicator specifies the hundreds of millibar figure, in Part C the tens of millibar figure of the pressure."

Previous No. (3) to be renumbered (2).

Previous Nos. (1), (2), (4), (5), (6) to be renumbered accordingly.

Page I-C-18

Referring to "iii", the word "international" should be added to the specification of "II".

Page I-C-19

(i_w, i_u)

For the sake of simplification the code tables could be combined into one only, the simplest way being as follows:

i_u wind and instrumentation indicator

0, 1, 2, 3 (as at present under i_u)

6, 7, 8, 9 (as at present under i_w).

Page I-C-23

N_s

While under N_s the terminology "... of genus ..." is used, under h_sh_s and P_LP_L et alia it reads "... genus indicated by ...". Standardization is desirable.

Page I-C-23

NN

There being hardly any difference between "identity number" and "identification number" (see also under n_tn_t, and elsewhere), it is suggested to use one term only.

Page I-C-25

n_on_o, ... n_nn_n (and elsewhere)

Compare, under P_wP_w: "by coding 99 for P_wP_w", and under n_on_o: "shall be coded n_on_o = 00". The wording should be standardized.

Page I-C-26

PP

"... pressure on ... a surface ...". Under P_1P_1 it reads "... of the ... surface ...". Under $P'_mP'_m$ it reads "... at ... level ...". A minor correction could be made.

P_1P_1

To avoid ambiguity the first line of (1) should read: "... up to and at the ...".

Page I-C-27

$P_sP_sP_s$, second $P_sP_sP_s$

Different ways of writing "in millibars" "in whole millibars" (for comparison, see also $P_sP_sP_s$, $P_oP_oP_o$, $P_HP_HP_HP_H$).

Page I-C-29

ppp

The specification of ppp being a mere extension of pp, it should also refer to the preceding three hours, to read: "Total amount of pressure tendency at station level during the three hours preceding the time of observation, expressed in tenths of a millibar.

(1) ppp is used when pp is 9.9 mb or more."

Page I-C-30

R_s, R_s^+ and Code tables 3551, 3551^+

There is no reason for maintaining two code tables for the description of one process or phenomenon. Both tables could well be combined into one.

Page I-C-34

TT

Under the temperature symbolic letters various specifications are used, such as "... in whole degrees ..." "... to the nearest whole degree ..." "... Tens and unit digits of ..." (which are also whole degrees). Moreover, TT in FM 11-V and FM 21-V are both described as "air temperature in whole degrees Celsius", while one value represents air temperature rounded off, the other one not.

Page I-C-35

TTT

Under TT, first "-", there is an indication to the coding of the sign in a separate paragraph (1). Under TTT, $T_dT_dT_d$, $T_tT_tT_t$, $T_wT_wT_w$, $\overline{TTT}$, $\overline{T_wT_wT_w}$, the indication to the handling of the sign has been included into the title of the symbolic letter. There should be some standardization; a separate paragraph would appear to be the best solution.

Page I-C-36

t_T

This symbolic letter is to be used for coding the tenths figure; the text under TT (for SHIP, etc.) should include an indication on the use of t_T for the tenths. This the more so since the t_T is part of a different group.

Page I-C-40

$x_2x_2x_2$

The title should be simplified to read: "Type of analysis" or "Indicator of the type of analysis".

Y

Day of the week (GMT) (Code table 4900)

(FM 83-I)

(1) ... present text unchanged ...

(2) The day indicated by Y shall be the day the observation was made by GMT; i.e. no reference shall be made to the actual time of transmission

(3) ... present text unchanged ...

Pages I-C-40
I-C-41

YY

The following change to the specification is proposed:

Day of the month (GMT)

(1) Indicating the date of the actual time of observation (FM 11-V ... FM 85-V)

(2) Indicating the date of the beginning of the period for which the whole forecast or set of forecasts is valid (FM 61-V)

(3) Indicating the date when the observation was made of the data from which the chart is made (FM 44-V ... FM 48-V)

(4) Indicating, by the addition of 50 to the actual day of the month, the use of knots (e.g. 15 + 50: YY = 65)

(5) The sequential number of the day of the month shall be indicated by YY = 01, ... 09, 10, ...)

Page I-C-41

The text under the symbolic letters zz should be changed to read:

zz Depth in hundreds of metres (FM 63-V)

(1) The code is direct reading in units of 100 metres, e.g. zz = 01 : 100 m, zz = 02 : 200 m, etc.

Page I-D-58

Table 2339 represents a conglomerate of different items which can hardly be described by a single heading. An improvement of the present heading, however, appears to be possible. Two versions are subsequently suggested for this purpose:

1. "Area concerned and/or feature being described."

2. "Indicator of supplementary information related to the description or analysis of ice conditions."

A NOTE appears to be appropriate indicating that the order of the code figures does not matter. However, there should be no "shall" Regulation in a NOTE. The following wording is suggested:

"NOTE: The sequence of the individual sets of code figures L_iL_i and L_jL_j may be arranged at choice. If only one set of code figures is used L_jL_j should be coded as 00."

Action proposed:

Selection of an appropriate heading for Table 2339, and insertion of the NOTE suggested above.

Remarks:

The provision of one set of code figures for two different symbolic letters to be reported in the same group should not be encouraged. Only half of the available figures can thus be utilized. Further examples for this procedure are:

S_1, S_2 (FM 45-IV); E_1E_1, E_2E_2 (FM 67-VI);

b_1b_1, b_2b_2 (FM 47-V); a_1a_1, a_2a_2 (FM 47-V).

Page I-D-116

The title of Code table 5184 differs from the corresponding text in the specifications section under symbolic letters Z_oZ_o, Z_1Z_1 ... (page I-C-41). The headlines of the code table should be re-arranged as follows:

5184

Z_oZ_o	Depths of IAPSO standard levels starting with the surface
Z_1Z_1	
....	
Z_nZ_n	
i_zi_z	Indicator for range and units of depths

with i_zi_z = 77: with i_zi_z = 55:

(remaining table unchanged)

Rec. 11 (CBS-VII) - EDITORIAL REVISION OF THE STRUCTURE OF THE MANUAL ON CODES, VOLUME I

THE COMMISSION FOR BASIC SYSTEMS,

NOTING the report of the fifth session of the CBS Working Group on Codes,

CONSIDERING that there is a need for further improvement of the existing text of the Manual on Codes, Volume I, based on general editorial revision,

RECOMMENDS that the text of the Manual on Codes, Volume I, edition 1974, be revised, taking into account the list of principles given in the annex to this recommendation;

REQUESTS the Secretary-General, in consultation with the president of CBS, to arrange for the preparation of the revision of the text;

INVITES the president of CBS to arrange for the formal adoption of the revised text.

ANNEX

EDITORIAL REVISION OF THE STRUCTURE OF THE MANUAL ON CODES, VOLUME I

Principles regarding the structure of the Manual on Codes, Volume I

1. GENERAL PRINCIPLES

1.1 Volume I of the Manual on Codes is an annex to the Technical Regulations and carries the same status. A strict standard should be maintained in the code forms, regulations, specifications and code tables.

1.2 Terms and concepts used should be restricted to those for which definitions have been provided in the regulations to the code forms, in the specifications and in the code tables. The introduction of any new codes is accompanied by relevant definitions if such definitions have not been published or referred to WMO regulatory material.

1.3 Only those units of measurement which have been approved by the WMO Congress are used in the codes.

1.4 Letters used should be restricted to the Latin alphabet. Arabic numerals are used in the codes.

1.5 Number of codes, sections and groups should be limited and when developing new codes the existing system of groups and symbolic letters should be used as far as possible.

2. PRINCIPLES RELATING TO THE ORGANIZATION OF THE CODE

2.1 Components of the code

Each code should consist of three major components:

1. A title;
2. A basic part;
3. A complementary part.

2.2 Organization of the title

The title should contain five specific pieces of information:

(a) Code category;

(b) Code number;

(c) CBS (CSM) session number - the number of the last session of CBS (CSM) at which the code in question was adopted or amended;

(d) Code short name;

(e) Code full name.

2.2.1 Code category

2.2.1.1 Depending on their basic purpose, codes should be classified into categories such as the following:

(a) Synoptic - for the transmission of synoptic surface observation data from land and ship stations (FM 11, 14, 21, 22, 23, 24, 26, 81, 82, 83, 20);

(b) Aerological - for the transmission of atmospheric sounding data (FM 32, 33, 35, 36, 39, 40, 41);

(c) Hydrological - for the transmission of hydrological observation data or forecasts (FM 67, 68);

(d) Marine - for the transmission of marine observation data or forecasts (FM 44, 61, 63, 64);

(e) Climatological - for the transmission of means and totals of monthly (10-day) data (FM 71, 72, 73, 75, 76);

(f) Analyses and forecasts (FM 45, 46, 47);

(g) Satellite - for the transmission of data obtained by means of orbiting satellites (orbital and geostationary) (FM 85, 86, 87, 88);

(h) Aviation - for the transmission of observation data and forecasts for aviation purposes (FM 15, 16, 48, 51, 53, 54, 55).

2.2.1.2 Each category should be indicated by two distinctive letters such as the following:

(a) Synoptic - SN;

(b) Aerological - UP;

(c) Hydrological - HY;

(d) Marine - MR;

(e) Climatological - CL;

(f) Analyses and forecasts - AF;

(g) Satellite - ST;

(h) Aviation - AV.

2.2.2 Code number

2.2.2.1 Each code category should be assigned a specific set of numbers such as:

(a) Synoptic from ... to ...;

(b) Aerological from ... to ...;

(c) Hydrological from ... to ...;

(d) Marine from ... to ...;

(e) Climatological from ... to ...;

(f) Analyses and forecasts from ... to ...;

(g) Satellite from ... to ...;

(h) Aviation from ... to ....

2.2.2.2 Each code is assigned a number from among the numbers attributed to the category of codes in question.

2.2.2.3 The code number is given in Arabic numerals and is indicated next to distinctive letters of the category, for example SN 11.

2.2.3 CBS (CSM) session number

2.2.3.1 The number of the last session of CBS (CSM) at which the code in question was adopted or amended is indicated by Roman numerals. A code approved or amended by correspondence after a session of CBS (CSM) receives the number of that session.

2.2.4 Code short name

2.2.4.1 The short name of the code can consist of one or a maximum of two words; a word of no more than five letters is preferred.

2.2.4.2 The short name of the code should, as far as possible, succinctly reflect the basic purpose of the code. For example, RADOB - radar observations; in other words, this code is to be used for the transmission of radar observation data.

2.2.4.3 The short name of the code is given after the number of the last session of CBS (CSM) at which the code in question was adopted or amended; for example, SN 11-V SYNOP.

2.2.5 Code full name

2.2.5.1 The full name of the code should reflect in a comprehensive manner the basic purpose of the code. The first word of the full name should be either report or analysis or forecast. For example, code FM 44-V "Ice analysis" should have been called "analyses and/or forecasts of ice conditions, navigation conditions and recommended routes".

2.2.5.2 The full name of the code is given immediately after the abbreviated name; for example, "SN 11-V SYNOP – report of synoptic surface observation data from land stations".

2.3 The basic part of the code

The basic part of the code consists of:

(a) The code form;

(b) Notes to the code form;

(c) Regulations on the inclusion in the report of parts, sections, code groups and words.

2.3.1 The code form

2.3.1.1 Each code form should, as far as possible:

(a) Ensure easy manual and/or automatic and computer encoding;

(b) Ensure easy manual and/or automatic and computer decoding;

(c) Obviate the possibility of ambiguity during decoding;

(d) Avoid the risk of confusion during transmission;

(e) Ensure maximum brevity, i.e. groups with repeated data, distinctive numbers, distinctive groups, word control groups, groups explaining the non-inclusion of information and groups indicating the end of the coded information should be included only in cases of extreme need;

(f) Avoid the use of "artificialities" such as adding 50 to the wind direction.

2.3.1.2 The code form can consist of one or more parts. Each part may be transmitted separately.

2.3.1.3 Each part may consist of two or more sections. Sections must not be transmitted separately.

2.3.1.4 The first section should contain identification data (type of coded information) and the next section (sections) should contain the type of coded information.

2.3.1.5 The identification data of the code includes the group $M_i M_i M_j M_j$ or the abbreviated name of the code.

2.3.1.5.1 Position and time groups may, depending on the nature of the report, be included in the first (identification) or in the subsequent section (sections).

2.3.1.6 Each section begins with distinctive numbers (from one to four digits) or with a distinctive group of numbers consisting of two to five digits, or with a distinctive word.

2.3.1.7 If any particular section does not necessarily have to be included in the report it should be placed in brackets.

2.3.1.8 All code groups - even those which are included in the report only in certain circumstances - should be placed in the appropriate position in the code form.

2.3.1.9 If a group, or a number of groups, is used more than once under certain circumstances, it (they) should be followed in the code form by a group (groups) of dots.

2.3.1.10 If a group (or number of groups) is not, in certain circumstances, included in the report, it (they) should be placed in brackets in the code form.

2.3.1.11 Code data groups should consist of not more than five figures.* Figures and letters should not be mixed in one group.**

2.3.1.12 Those parts and sections of code forms to be used for the transmission of information that has to be processed automatically by computer should not contain any written text. Should it be necessary to transmit a text, in plain language, a separate section should be provided for it.**

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* This principle is not applicable to aviation codes and codes for the machine-to-machine transmission of data.

** This principle is not applicable to aviation codes.

2.3.2 Notes to the code form

2.3.2.1 The notes to the code form should indicate the following: the parts and sections comprising the code form, what kind of data are to be transmitted in these parts and sections, as well as explanations and special features of the code forms. The word "shall" is not used in the notes.

2.3.3 Regulations

2.3.3.1 The regulations on the inclusion of code groups in the report should indicate the circumstances in which particular parts and/or sections and/or code groups should (or should not) be included in the report. Only the word "shall" is used in the regulations.

2.4 The complementary part of the code

The complementary part of the code comprises:

(a) Specifications of symbolic letters;

(b) Notes to the specifications;

(c) Regulations for the coding of elements;

(d) Code tables with the associated notes;

(e) Appendices, if any.

2.4.1 Specification of symbolic code letters

2.4.1.1 The specification of a symbolic code letter (letters) should indicate:

(a) The meaning of the code letter (letters). The same symbolic letter cannot be used for specifying different types of information in one code form and it should have a unique definition for all code forms;

(b) The units in which the element in question is being coded or, if a code table has been compiled for the coding of the element or phenomenon in question, it should be placed in a separate part of the Manual;

(c) Regulations concerning standard practice in the coding of the element in question; they shall be distinguished by the use of the term "shall";

(d) Notes which should provide explanations concerning the coding of the element in question; the word "shall" is not used in the notes;

(e) The code category and number in which the element or phenomenon in question is to be found.

2.4.1.2 Code tables are drawn up for those phenomena or values of elements which cannot be read off directly from the code figures.

2.4.1.3 The code tables should indicate:

(a) Code figures;

(b) Specifications of code figures, i.e. which phenomena or values of elements correspond to the code figures.

2.4.1.4 All code figures are included in the table; those figures not presently used will be labelled with the words "not used" or "reserved".

2.4.1.5 Code tables cannot contain regulations for the coding of phenomena or elements.

2.4.1.6 Code tables can contain explanatory notes.

3. PRINCIPLES RELATING TO THE PRESENTATION OF VOLUME I OF THE MANUAL ON CODES

3.1 Volume I of the Manual on Codes should be compiled separately for each category of codes. Each category of codes can subsequently be incorporated in a single manual.

3.2 The chapter in the manual relating to each category should include:

(a) A list of the codes it contains;

(b) A complete description of the codes, namely the title* and the basic and complementary parts of the code;

(c) Appendices, if any are needed for a particular category.

3.3 The following headings should be used for all categories of codes:

(a) Introduction;

(b) Basic principles;

(c) The units used for specific elements.

These headings should appear at the beginning of the collection.

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* The CBS/CSM session Roman number should only be published in one section of the Manual on Codes, e.g. in Section A reference list of code forms (see also Part B to Annex XIII)

3.4 Volume I includes such sections and code groups for:

(a) Global exchange;

(b) Regional exchange; and

(c) National exchange;

which have a common form and common procedures for all Regions and countries.

3.5 The Manual should contain a list of terms with either a standard WMO reference for its definition or a definition provided.

Rec. 12 (CBS-VII) - STANDARDIZATION OF VOLUME II OF THE MANUAL ON CODES

THE COMMISSION FOR BASIC SYSTEMS,

NOTING:

(1) Paragraph 5.11 of the general summary of the abridged final report of the extraordinary (1976) session of CBS,

(2) The final report of the fifth session of the CBS Working Group on Codes,

CONSIDERING that there is a need for standardization of Volume II of the Manual on Codes in order to bring it into conformity with the structure of Volume I of the Manual,

INVITES the regional associations to review the relevant regional and national parts of Volume II of the Manual on Codes with a view to bringing them into conformity with the structure of Volume I of the Manual;

RECOMMENDS that the draft revised text of Chapter VI of the Manual given in the annex to this recommendation be used as a layout for the revision of Volume II of the Manual on Codes by the regional associations.

ANNEX

Annex to Recommendation 12 (CBS-VII)

STANDARDIZATION OF VOLUME II OF THE MANUAL ON CODES

Draft Chapter VI - Region VI - Europe

Editorial remarks:

1. The following passages should be transferred to a general introduction to Volume II of the Manual on Codes:

1.1 REGIONAL CODE FORMS

Regulation /A.2.3/1.2.2 of the WMO Technical Regulations specifies that symbolic words, groups and letters (or groups of letters) required for regional or national purposes only shall be selected so as not to duplicate those used in international code forms.

1.2 SPECIFICATION OF SYMBOLIC LETTERS

Whenever symbolic letters appearing in regional codes are already used in the international codes, they retain their international character. Their specifications remain unaltered and are to be found in Volume I, Part A-3.

2. This text is no longer needed in this form; part of it already appears in the general Introduction to Volume II of the Manual on Codes; and part of it will become irrelevant after the general revision of national practices.

PART B

NATIONAL CODING PRACTICES

PRACTICES WITH REGARD TO INTERNATIONAL CODE FORMS

This section contains information (printed in Roman type) of the various uses of groups in international code forms, which are reserved for national use. Information is given only for groups which are used. Countries are listed alphabetically under each FM code form.

Other national practices, which deviate from international or regional decisions on the use of the codes, are printed in italics.

Contents and layout

Introduction

(a) Origin of material;

(b) List of global code forms concerned by regional or national decisions;

(c) List of regional code forms.

A-1 Global code forms, notes and instructions

Regional notes, instructions)
National notes) as appropriate

A-2 Regional code forms, notes and instructions

Regional notes, instructions)
National notes) as appropriate

B Specifications of symbolic letters for regional use

C Regional code tables

D National code forms with notes

National notes, instructions
Specifications of national symbolic letters
National code tables

REGION VI

Introduction

(a) Origin of material

The following instructions, code forms, specifications and code tables were adopted for use in WMO Regional Association VI by postal ballot in 1954, 1959, 1963, 1967 and 1971, and at the sessions of WMO Regional Association VI and IMO Regional Commission VI listed below:

Third session of Regional Commission VI - Paris, April 1948
Fourth session of Regional Commission VI - London, June-July 1949
First session of Regional Association VI - Zurich, May-June 1952
Second session of Regional Association VI - Dubrovnik, March 1956
Third session of Regional Association VI - Madrid, September-October 1960
Fourth session of Regional Association VI - Paris, April 1965

For convenience, the page numbering should be as follows: II-6-A-1, II-6-A-2, II-6-B-1, II-6-B-2, etc., the "6" indicating the Region.

Fifth session of Regional Association VI - Varna, May 1969

Sixth session of Regional Association VI - Bucharest, September 1974

Extraordinary session of Regional Association VI - Budapest, October 1976

(b) List of global code forms concerned by regional or national decisions

RA VI has developed instructions for the use in Region VI of the following global code forms:

FM 11-V - SYNOP
FM 14-V - SYNOP (AUTOMATIC weather station)
FM 20-V - RADOB
FM 21-V - SHIP
FM 24-V - SHIP (AUTOMATIC weather station)
FM 32-V - PILOT
FM 33-V - PILOT SHIP
FM 35-V - TEMP
FM 36-V - TEMP SHIP
FM 48-V - ARMET
FM 53-V - ARFOR
FM 81-I - SFAZI

(c) List of regional code forms

RF 6-01 EXFOR Forecasts of extreme temperatures
(Resolution 11 (II-RA VI, Dubrovnik, 1956))

A-1 GLOBAL CODE FORMS, NOTES AND INSTRUCTIONS

FM 11-V SYNOP

Regional instructions

6/11.1 Group PPPTT (see Regulation 11.5.1.3)

6/11.1.1 Stations which cannot report MSL pressure with reasonable accuracy shall report the agreed standard constant levels corresponding to the station elevation as follows:

	Station elevation	
pressure	greater than	smaller than or equal to
850 mb		2300 m
700 mb	2300 m	3700 m
500 mb	3700 m	

6/11.1.2 When 6/11.1.1 applies, PPP shall indicate the geopotential of the suitable pressure level expressed in geopotential metres, the thousands figure being omitted.

6/11.1.3 The group $6a_3hhh$ shall not be used in the Region.

6/11.2 Group $T_dT_dj_aj_pj_p$ (see Regulation 11.7)

$j_a = 9$ shall not be used, and Regulation 11.7.2 (i) shall always apply in the Region.

6/11.3 Group 7RRjj (see Regulation 11.9)

6/11.3.1 RR shall relate to:

(i) the preceding 6 hours at 0000 and 1200 GMT;

(ii) the preceding 12 hours at 0600 and 1800 GMT.

6/11.3.2 At 0000 and 1200 GMT, use shall not be made of jj, which shall be encoded as "//".

6/11.3.3 At 0600 and 1800 GMT, use shall be made of jj to report the extreme T_eT_e of temperature during the preceding 12 hours as follows:

(i) 0600 GMT: T_eT_e = minimum night-time temperature;

(ii) 1800 GMT: T_eT_e = maximum day-time temperature.

6/11.4 Group $9S_pS_ps_ps_p$ (Code table 668) (see Regulation 11.11)

6/11.4.1 When there is the requirement to give information about certain special phenomena occurring at the time of observation, or on phenomena which have occurred during the period covered by W (3 or 6 hours) the group $9SpSps_ps_p$ shall be used.

6/11.4.2 One or more time groups (decade 00 and 10) may be used referring to the preceding 9-group as appropriate.

6/11.4.3 The inclusion of this group shall be left to national decision.

6/11.5 Groups 1...., 2...., 3...., 4...., 5....
(see Regulation 11.13.3)

6/11.5.1 Groups 1...., 2....
These groups shall be reserved for regional use.

6/11.5.2 Group $2T_gT_gEs$

6/11.5.2.1 A supplementary group $2T_gT_gEs$ shall be added by a selection of stations to the SYNOP reports of 0600 GMT or, where this is not possible, to the reports of 0900 GMT (as a temporary measure).

6/11.5.2.2 This group shall be placed immediately after the group(s) T_dT_dapp (99ppp) ($6P_oP_oP_oP_o$) in the SYNOP report.

6/11.5.2.3 The observations of the elements reported in the group $2T_gT_gEs$ shall preferably be made at 0600 GMT. Any deviations shall be reported to the Secretariat as national practices.

6/11.5.3 Group(s) $3P_wP_wH_wH_w$ ($d_wd_wP_wH_wH_w$)

6/11.5.3.1 Lightships and coastal stations able to observe direction, period and height of waves shall include this (these) group(s) in their reports in accordance with relevant international specifications.

6/11.5.4 Groups 4...., 5....

6/11.5.4.1 These groups shall be left at the disposal of national Services.

6/11.6 International exchange

6/11.6.1 The first groups shall always be included reported up to and including $T_dT_dj_oj_pj_p$.

6/11.6.2 When data are available, the inclusion of the following groups shall be left to national decision: 99ppp, $6P_oP_oP_oP_o$, $2T_gT_gEs$ 7RRjj, $3H_wH_wP_wP_w$ ($d_wd_wP_wH_wH_w$).

6/11.6.3 Groups 8.... and 9...., when included, shall be reported in accordance with the provisions given in the Manual on the GTS.

National notes

Comment by the Rapporteur on Volume II:

In view of Resolution 7 (Ext.76-RA VI), by which Regional Association VI (Europe) decided that the national coding practices indicated in Volume II of the Manual on Codes will be revised on the basis of the new guidelines adopted by the Extraordinary session of RA VI in October 1976 (Budapest), the national practices part has been deliberately excluded from this document.

The rapporteur for the revision of Volume II of the Manual on Codes will, however, as soon as possible after the deadline (1 July 1977) for submission of the revised national practices complete the national practices part for RA VI on the understanding that the layout suggested by the chairman of the Working Group on Codes in his letter 5.786/W/SY/CO of 26 February 1975 will be used as a model.

FM 14-V SYNOP (Automatic weather stations)

Regional instructions

6/14.1 Group 5PPPP (see Regulation/Note (9) I-A-22).

6/14.1.1 In messages from high-level automatic land stations provided with an instrument to measure pressure, but for which it is not possible to calculate the pressure reduced to mean sea level to a sufficient degree of accuracy, the geopotential shall be given, if possible, instead of the pressure reduced to mean sea level, using the group $5a_3hhh$ instead of the group 5PPPP.

6/14.1.2 Regulation 6/11.1.1 shall apply.

FM 20-V RADOB

Regional instructions

6/20.1 Part B, Section 2

6/20.1.1 Section 2 shall be used in the Region in the following form:

51515 n_1REEE $(/h_eh_eH_eH_e)$
....
n_nREEE $(/h_eh_eH_eH_e)$

6/20.1.2 This section shall be used to indicate the range of the radar equipment and the angle of elevation of the antenna at the time of observation of each of the echo systems described in Part B using each series of groups $e_tW_eI_ea_eH_e$ to /999/.

6/20.1.3 Information/observations referring to the first, second, etc. n-th system of echos thus described shall be reported by group(s) n_1...., n_2...., n_n.... .

6/20.1.4 To indicate the height of the base and of the top of the systems of echos thus described the optional group(s) $/h_eh_eH_eH_e$ shall be used.

FM 21-V SHIP

Regional instructions

6.21 Group 7RRjj (see Regulation 21.8)

6/21.1 The group shall be reported at 0000, 0600, 1200, and 1800 GMT by ocean weather stations, and lightships using the SHIP code form.

6/21.2 RR shall be used as stated in Regulation 21.8.3.

6/21.3 The meaning of jj shall be determined by national Services.

6/21.4 All groups of reports received from ships shall be re-transmitted.

6/21.5 Reports received from ships fitted only with radio-telephony shall be edited and coded before inclusion in the Global Telecommunication System.

FM 24-V SHIP (Automatic weather station)

Regional instructions

6/24.1 Group $7RRRt_R$ (see Regulation 24.10).

6/24.1.1 The group ($7RRRt_R$) may be included in the reports from fixed-position automatic sea stations.

6/24.1.2 The use of the group shall be left to national decision.

FM 32-V PILOT and FM 33-V PILOT SHIP

6/32.1 Part A, Section 2

When the upper-wind observation is carried out by means of a procedure which does not permit pressure measurement, the following levels shall be used as approximations to the standard isobaric surfaces:

Standard isobaric surface (mb)	Altitude (metres)		
850	1 500	or	1 500
700	3 000		3 000
500	5 500		5 400

Standard isobaric surface (mb)	Altitude (metres)		
400	7 000	or	7 200
300	9 000		9 000
250	10 500		10 500
200	12 000		12 000
150	13 500		13 500
100	16 000		16 000

6/32.2 Part A, Section 3

Use or omission of the group ($4v_bv_bv_av_a$) shall be left to national decision. Members are nevertheless encouraged to include this group as often as possible in PILOT messages.

6/32.3 Part B, Section 4

(1) When the upper-wind observation is carried out by means of a procedure which does not permit pressure measurement, and altitudes are indicated in geopotential units (use of the symbolic form $8/9t_nu_1u_2u_3$ ddfff), wind data shall be included in this section for the following levels:

either: 1 000, 2 000, 4 000 metres (when indicator figure 8 is used in the group $8/9t_nu_1u_2u_3$);

or: 900, 2 100, 4 200 metres (when indicator figure 9 is used in the group $8/9t_nu_1u_2u_3$).

In addition, no more than two supplementary levels may still be included, the selection of these levels shall be left to national decision. The different levels of the Section 4 shall succeed each other in ascending order of altitude.

(2) When the upper-wind observation is carried out by means of a procedure which permits the simultaneous measurement of wind and pressure, and altitudes are indicated in pressure units (in whole millibars) (use of the symbolic form 21212 $n_pn_pn_pP_PP_P$ $d_nd_nf_nf_nf_n$), wind data shall be included in this section for the significant levels as well as for the following fixed regional levels: 900, 800 and 600 mb (considered as approximations to the levels 1 000, 2 000 and 4 000 metres, respectively).

Significant levels and fixed regional levels shall be inserted so that they succeed each other in Section 4 in ascending order of altitude.

6/32.4 Part C, Section 2

6/32.4.1 When the upper-wind observation is carried out by means of a procedure which does not permit pressure measurement, the following altitudes shall be used as approximations to the standard isobaric surfaces:

Standard isobaric surface (mb)	Altitude (metres)		
70	18 500	or	18 300
50	20 500		20 700
30	23 500		23 700
20	26 500		26 400
10	31 000		30 900

6/32.5 Part C, Section 3

6/32.5.1 Instruction 6/32.2 shall apply.

6/32.6 Part D, Section 4

6/32.6.1 This section shall contain wind data for significant levels up to the top of the ascent.

6/32.7 International exchange

6/32.7.1 All Parts A, B, C and D shall be included in the international exchange.

FM 35-V TEMP and FM 36-V TEMP SHIP

Regional instructions

6/35.1 Part A, Section 4

6.35.1.1 Use or omission of the group ($4v_bv_bv_av_a$) shall be left to the discretion of each Member of Regional Association VI.

Members are nevertheless encouraged to include this group as often as possible in TEMP messages.

6/35.2 Part B, Section 9

6/35.2.1 Section 9 shall be used in the Region in the following form:

51515	$11P_1P_1P_1$	$d_1d_1f_1f_1f_1$
	22800	ddfff
	33600	ddfff

6/35.2.2 This section shall be used to transmit the following wind data:

(1) Wind for 900 or 1 000 metres above the surface, described by groups $11P_1P_1P_1$ $d_1d_1f_1f_1f_1$ in which $P_1P_1P_1$ is the pressure (mb) at 900 or 1 000 metres above the surface. These wind data are used to calculate wind vector differences;

(2) Wind for 800 mb, described by groups 22800 ddfff;

(3) Wind for 600 mb, described by groups 33600 ddfff.

6/35.3 Part C, Section 4

6/35.3.1 Instruction 6/35.1.1 shall apply.

6/35.4 International exchange

6/35.4.1 All Parts A, B, C and D shall be included in the international exchange.

FM 48-V ARMET

Regional instructions

6/48.1 Group $QL_aL_aL_oL_o$ (see Regulation 48.1.2).

6/48.1.1 Positions shall be given using group $QL_aL_aL_oL_o$.

6/48.2 Group ddfffTT (see Regulation 48.1.2).

6/48.2.1 Negative temperatures shall be indicated by inserting the letter M before the absolute value of the temperature, e.g.: ddfffMTT.

FM 53-V ARFOR

Regional instructions

6/53.1 Group AAAAA (see Regulation 53.1.3).

6/53.1.1 Plain language shall be used in place of the zone indicator AAAAA.

A-2 REGIONAL CODE FORMS, NOTES AND INSTRUCTIONS

RF 6-01 EXFOR - Forecast extreme temperatures

Code form: EXFOR IIiii $T_{x1}T_{x1}T_{n1}T_{n1}T_{x2}$ $(T_{x2}T_{n2}T_{n2}C_1C_1)$

NOTES:

1. EXFOR is the name of the code for reporting forecast extreme temperatures.

2. In the case of a group of such forecasts the code name EXFOR is used only in the heading of the collective.

3. The group in brackets is used only on special request between members concerned.

Instructions

6/01.1.

GENERAL

6/01.1.1 The code name EXFOR shall appear as a prefix to individual reports.

6/01.1.2 In a meteorological bulletin of EXFOR reports the code name shall be included only in the first line of the text.

6/01.2 Group $T_{x1}T_{x1}T_{n1}T_{n1}T_{x2}$

6/01.2.1 If the group ($T_{x2}T_{n2}T_{n2}C_1C_1$) is not transmitted the last symbolic letter of the first group shall be coded as T_{x2}=/.

6/01.3 Group ($T_{x2}T_{n2}T_{n2}C_1C_1$)

6/01.3.1 This optional group shall be included only when the information is needed.

6/01.3.2 The two confidence figures C_1 and C_1 refer to $T_{n2}T_{n2}$ respectively (One of the following solutions: Code table 0562 or probability in per cent).

6/01.4 International exchange

6/01.4.1 The arrangement of the exchange of EXFOR reports shall be left to Members concerned.

B Specifications of symbolic letters for regional use

Comment

With the exception of a few editorial amendments, such as the deletion of "E" plus relevant specifications, the specifications of symbolic letters as contained in the present Volume II of the Manual on Codes may remain unchanged.

C Regional code tables

See comment under B (above).

D National code forms with notes

See the comment by the Rapporteur on Volume II appearing under "National notes".

Rec. 14 (CBS-VII) - COMMON CODE FOR REPORTING SURFACE OBSERVATIONS FROM DIFFERENT TYPES OF SURFACE STATION

THE COMMISSION FOR BASIC SYSTEMS,

NOTING:

(1) Recommendation 44 (73-CBS) - Date of introduction of new code forms for synoptic surface observations, approved by Resolution 3 (EC-XXV),

(2) Section 8.2 of the general summary of the sixth session of CBS (Belgrade, March/April 1974),

CONSIDERING:

(1) That the present code forms available for reporting of synoptic surface observations no longer meet the data requirements of the various WMO programmes,

(2) That the present SYNOP and SHIP codes cannot accommodate the resolution of data, and other modifications resulting from changes in requirements, in an efficient way unless the structure of the existing codes is entirely changed,

(3) That new automatic and manual data-processing centres require, for greater efficiency and economy, the utilization of a non-ambiguous common code form which could be used by different types of surface station (manned and automatic stations on land and at sea),

(4) That a code form similar to the proposed common code form has already been successfully tested in the past,

RECOMMENDS:

(1) That codes FM 12-VII SYNOP and FM 13-VII SHIP for reporting surface observations from different types of surface station, given in the annex to this recommendation, be introduced for international use as from 1 January 1981;

(2) That these codes be included in Volume I of the Manual on Codes;

(3) That codes FM 11-V SYNOP, FM 14-V SYNOP, FM 21-V SHIP, FM 22-V SHIP, FM 23-V SHRED and FM 24-V SHIP be deleted from Volume I of the Manual on Codes as from 1 January 1981;

INVITES the presidents of regional associations to take urgent steps to adopt the regional coding procedures taking into account the regional sections in FM 12-VII SYNOP and FM 13-VII SHIP;

AUTHORIZES the president of CBS to approve editorial amendments in the regulations for these codes, as necessary.

ANNEX

COMMON CODE (FM 12-VII AND FM 13-VII) FOR REPORTING SURFACE OBSERVATIONS FROM DIFFERENT TYPES OF SURFACE STATION

FM 12-VII SYNOP - Report of surface observation from a land station

FM 13-VII SHIP - Report of surface observation from a sea station

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C O D E F O R M :

SECTION 0 - $M_iM_iM_jM_j$ $YYGGi_v$ $\begin{matrix}(IIiii & *\\ (99L_aL_aL_a & Q_cL_oL_oL_oL_o & **\end{matrix}$

SECTION 1 - i_Ri_xhVV Nddff $1s_nTTT$ $2s_nT_dT_dT_d$ $3P_oP_oP_oP_o$

$4PPPP$ $5appp$ $6RRRt_R$ $7wwW_1W_2$ $8N_hC_LC_MC_H$ 9hh//

SECTION 2 - $222D_sv_s$ $(0s_nT_wT_wT_w)$ $(1P_{wa}P_{wa}H_{wa}H_{wa})$ $(2P_wP_wH_wH_w)$

$((3d_{w1}d_{w1}d_{w2}d_{w2})$ $(4P_{w1}P_{w1}H_{w1}H_{w1})$ $(5P_{w2}P_{w2}H_{w2}H_{w2}))$

$(6I_sE_sE_sR_s)$ $(ICE + \begin{Bmatrix}\text{plain language}\\ c_iS_ib_iD_iz_i\end{Bmatrix})$

SECTION 3 - 333 $(0.....)$ $(1s_nT_xT_xT_x)$ $(2s_nT_nT_nT_n)$

$(3Ejjj)$ $(4E'sss)$ $(5j_ij_sj_sj_s)$

$(6RRRt_r)$ $(7....)$ $(8N_sCh_sh_s)$

$(9S_PS_Ps_pp_p)$ (groups to be developed regionally)

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* Used in FM 12-VII.

** Used in FM 13-VII.

SECTION 4 - 444 $N'C'H'H'C_t$

SECTION 5 - 555 groups to be developed nationally

SECTION 6 - 666 DDDD

SECTION 7 - 777 $A_1b_wn_bn_bn_b$

N O T E S :

(1) The code form FM 12-VII SYNOP is used for reporting synoptic surface observations from a land station, manned or automatic. The code form FM 13-VII SHIP is used for the same kind of observation from a sea station, manned or automatic.

(2) A SYNOP report from a land station is identified by the symbolic letters $M_iM_iM_jM_j$ = AAXX.

(3) A SHIP report from a sea station is identified by the symbolic letters $M_iM_iM_jM_j$ = BBXX.

(4) Groups in brackets are drop-out items and may or may not be included in the report, depending on specified conditions.

(5) Except for the groups i_Ri_xhVV and Nddff, which are always included in all reports, and also for the group 222D$_s$v$_s$, which is always included in all SHIP reports, the groups with numerical indicators may be included or omitted under the conditions stated in the regulations set out below. The omission of two of them is indicated by an appropriate code figure of the symbolic letters i_x and i_R.

(6) The code form is divided into a number of sections as follows:

Section number	Indicator figures or symbolic figure groups	Contents
0	-	Identification and position data
1	-	Data for international exchanges which are common to the SYNOP and to the SHIP code form
2	222	Maritime data pertaining to a sea or to a coastal station
3	333	Data for regional exchange

4	444	Data for clouds with base below station level, included by national decision
5	555	Data for national exchange
6	666	In case of a sea station, ship's call sign
7	777	In case of a sea station, buoy identifier number

R E G U L A T I O N S :

12.1

General

12.1.1

The code name SYNOP or SHIP shall not be included in the report.

12.1.2

The groups $M_iM_iM_jM_j$ $YYGGi_v$ shall be included only as the first line of the text in the following cases:

(a) Bulletin of SYNOP reports from land stations;

(b) Bulletin of SHIP reports from sea stations;

and provided all the reports of a given bulletin consist of observation data which were taken at the same time and which use the same unit for reporting wind speed.

12.1.3

Use of sections

12.1.3.1

Observation reports from a land station shall always include at least sections 0 and 1, and the position of the station shall be indicated by means of the group IIiii.

12.1.3.2

Observation reports from a sea station shall always include at least sections 0, 1 and 2, and 6 or 7 as the case may be; the position of the station shall be indicated by means of the groups $99L_aL_aL_a$ $Q_cL_oL_oL_oL_o$.

12.1.3.3

Whenever the observation reports from a coastal land station contain maritime data, they shall always include at least sections 0, 1 and 2 and the position of the station shall be indicated by means of the group IIiii.

12.2

Section 1

12.2.1

Groups $i_R i_x$hVV Nddff

12.2.1.1

These groups shall always be included in the report.

12.2.1.2

Visibility VV

12.2.1.2.1

When the horizontal visibility is not the same in different directions, the shortest distance shall be given for VV.

12.2.2

Groups $1s_nTTT$, $2s_nT_dT_dT_d$, 4PPPP, 5appp

12.2.2.1

These groups shall always be included whenever the corresponding data are available.

12.2.2.2

Group $2s_nT_dT_dT_d$

12.2.2.2.1

The group 29UUU shall replace the group $2s_nT_dT_dT_d$ in reports from automatic weather stations when dew-point temperature is not available from these stations and humidity of the air is measured.

12.2.2.3

Group 4PPPP

12.2.2.3.1

By regional decision, a high-level station which cannot give pressure at mean sea-level to a satisfactory degree of accuracy shall report the geopotential height of an agreed standard pressure level. In that case the group 4PPPP shall be replaced by the group $4a_3hhh$.

12.2.3

Group $3P_oP_oP_oP_o$

12.2.3.1

This group shall be included in reports from a land station in lieu of the group 4PPPP whenever the following conditions apply together:

(a) The station elevation exceeds 500 metres from the level to which pressure is reduced;

(b) The reduction method in use does not permit the computation of station pressure from the actual SYNOP report and from information contained in WMO publications.

12.2.4
Group $6RRRt_r$

12.2.4.1

When precipitation data are to be exchanged on a global basis, this group shall be included in Section 1 and omitted in Section 3.

12.2.4.2

When precipitation data are to be exchanged on a regional basis, this group shall be omitted in Section 1 and included in Section 3.

12.2.4.3

This group shall be omitted from the report:

(a) When no precipitation occurred during the reference period;

(b) When precipitation amount was not measured and data are not available.

The coded value of indicator i_R shall indicate which one of these conditions applies.

12.2.5

Group $7wwW_1W_2$

12.2.5.1

This group shall be included only if present or past weather phenomena of significance, or both, were observed.

12.2.5.2

Code figures 00, 01, 02, 03 of the ww code table and code figures 0, 1 and 2 of the W_1, W_2 code table shall be considered to represent phenomena without significance.

12.2.5.3

This group shall be omitted if both present and past weather were not observed.

12.2.5.4

Present weather: ww

12.2.5.4.1

The highest applicable figure shall be selected, but code figure 17 shall have preference over figures 20 - 49.

12.2.5.4.2

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 interpretation of the specifications shall 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.

12.2.5.4.3

When the phenomenon is not predominantly water droplets, the appropriate code figure shall be selected without regard to VV.

12.2.5.4.4

The code figure 05 shall be used when the obstruction to vision consists predominantly of lithometeors.

12.2.5.4.5

National instructions shall be used to indicate the specifications for ww = 07 and 09.

12.2.5.4.6

The visibility restriction on ww = 10 shall be 1 000 metres or more. The specification refers only to water droplets and ice crystals.

12.2.5.4.7

For ww = 11 or 12 to be reported, the apparent visibility shall be less than 1 000 metres.

12.2.5.4.8

For ww = 18, the following criteria for reporting squalls shall be used:

(a) When wind speed is measured:

A sudden increase of wind speed of at least eight metres per second (16 knots), the speed rising to 11 metres per second (22 knots) or more and lasting for at least one minute;

(b) When the Beaufort scale is used for estimating wind speed:

A sudden increase of wind speed by at least three stages of the Beaufort scale, the speed rising to force 6 or more and lasting for at least one minute.

12.2.5.4.9

Figures 20 - 29 shall never be used when precipitation is observed at the time of observation.

12.2.5.4.10

For ww = 28, visibility shall have been less than 1 000 metres.

N O T E :

The specification refers only to visibility restrictions which occurred as a result of water droplets or ice crystals.

12.2.5.4.11

For synoptic coding purposes, a thunderstorm shall be regarded as being at the station from the time thunder is first heard, whether or not lightning is seen or precipitation is occurring at the station. A thunderstorm shall be reported in present weather if thunder is heard within the normal observational period preceding the time of the report. A thunderstorm shall be regarded as having ceased at the time of the last audible thunder and the cessation is confirmed if thunder is not heard for 10 - 15 minutes after this time.

12.2.5.4.12

The necessary uniformity in reporting ww = 36, 37, 38 and 39 which may be desirable within certain regions shall be obtained by means of national instructions.

12.2.5.4.13

A visibility restriction "less than 1 000 metres" shall be applied to ww = 41 - 49. In the case of ww = 40, the apparent visibility in the fog or ice fog patch or bank shall be less than 1 000 metres. 40 - 47 shall be used when the obstruction to vision consists predominantly of water droplets or ice crystals, and 48 or 49 when the obstruction consists predominantly of water droplets.

12.2.5.4.14

When referring to precipitation, the phrase "at the station" in the ww table shall mean "at the point where the observation is normally taken".

12.2.5.4.15

The precipitation shall be encoded as intermittent if it has been discontinuous during the preceding hour, without presenting the character of a shower.

12.2.5.4.16

The intensity of precipitation shall be determined by the intensity at the time of observation.

12.2.5.4.17

Code figures 80 - 90 shall be used only when the precipitation is of the shower type and takes place at the time of observation.

N O T E :

Clouds producing showers are isolated clouds and, in consequence, showers are always of short duration. Between showers, openings are observed, except if stratiform clouds fill the intervals between clouds from which showers are falling.

12.2.5.4.18

In reporting code figure 98, the observer shall be allowed considerable latitude in determining whether precipitation is or is not occurring, if it is not actually visible.

12.2.5.5

Past weather W_1W_2

12.2.5.5.1

The period covered by W_1 and W_2 shall be:

Six hours for observations at 0000, 0600, 1200 and 1800 GMT;

Three hours for observations at 0300, 0900, 1500 and 2100 GMT;

Two hours for intermediate observations if taken every two hours.

12.2.5.5.2

The code figures for W_1 and W_2 shall be selected in such a way that W_1W_2 and ww together give as complete a description as possible of the weather in the time interval concerned. For example, if the type of weather undergoes a complete change during the time interval concerned, the code figures selected for W_1 and W_2 shall describe the weather prevailing before the type of weather indicated by ww began.

12.2.5.5.3

When W_1 and W_2 are used in hourly reports, they cover a short period of time and Regulation 12.2.5 5.2 shall apply.

12.2.5.5.4

If, using Regulation 12.2.5.5.2, more than one code figure may be given to W_1 with regard to the past weather, the highest figure shall be reported for W_1 and the second highest code figure shall be reported for W_2.

12.2.6

Group $8N_hC_LC_MC_H$

12.2.6.1

This group shall be omitted when there are no clouds (N = 0) and when the sky is not discernible (N - 9).

12.2.6.2

This group shall also be omitted from the reports of automatic weather stations not equipped to report those data.

12.2.7

Group 9hh//

This group shall be used only when the height of the base of low cloud is required to be reported to the nearest 30 metres.

12.2.8

One or more of the following words shall be added at the end of Section 1, when the weather conditions specified for each of them justify their inclusion:

HAIL - when a shower or a thunderstorm, accompanied by hail, occurs in the period covered by ww;

PAST HAIL - when a shower or a thunderstorm, accompanied by hail, occurred in the period covered by W_1 and/or W_2;

SNOW OR SLEET - when a snow shower or a shower of rain and snow mixed, with a temperature above $0^{\circ}C$, has been observed during the period covered by W_1 and/or W_2;

SANDSTORM - when a sandstorm, with a temperature below $0^{\circ}C$, has occurred in the period covered by W_1 and/or W_2;

COTRA - when the cloud reported consists in whole or in part of condensation trails.

12.3

Section 2

12.3.1

Group $222D_s v_s$

12.3.1.1

This group shall always be included in reports from sea stations and from coastal stations which observe maritime conditions.

12.3.1.2

This group shall be encoded as:

(a) 22200 for a stationary sea station;

(b) 222// for a coastal land station which reports maritime conditions.

12.3.2

Group $0s_n T_w T_w T_w$

This group shall always be included in reports from ocean weather stations, when data are available.

12.3.3

Groups $(1P_{wa} P_{wa} H_{wa} H_{wa})$ $(2P_w P_w H_w H_w)$

12.3.3.1

Regulation 12.3.2 applies to these groups.

12.3.3.2

The group $1P_{wa} P_{wa} H_{wa} H_{wa}$ shall be used to report instrumental wave data.

12.3.3.3

The group $(2P_w P_w H_w H_w)$ shall be used to report wind waves.

12.3.3.4

(a) When no waves are observed owing to a calm sea, $P_{wa} P_{wa}$ and $H_{wa} H_{wa}$, or $P_w P_w$ and $H_w H_w$, shall be reported as 00.

(b) When the estimation of the period is impossible owing to confused sea, $P_w P_w$ shall be reported as 99.

(c) When the period was not measured (or observed) for any other reason, $P_{wa} P_{wa}$ (or $P_w P_w$) shall be reported as //. When the same situation occurs for the height of waves, $H_{wa} H_{wa}$ (or $H_w H_w$) shall be reported as //.

12.3.3.5

If there is a swell and no wind waves, the group $(2P_w P_w H_w H_w)$ shall not be included.

12.3.4

Groups ($(3d_{w1}d_{w1}d_{w2}d_{w2})$ $(4P_{w1}P_{w1}H_{w1}H_{w1})$ $(5P_{w2}P_{w2}H_{w2}H_{w2})$)

12.3.4.1

When swell can be distinguished from wind waves, the swell shall be reported by the groups

($(3d_{w1}d_{w1}//)$ $(4P_{w1}P_{w1}H_{w1}H_{w1})$)

12.3.4.2

The group with indicator figure 5 shall be used when a second system of swell can be distinguished. The direction shall be encoded in the position indicated by $d_{w2}d_{w2}$ in the group with indicator figure 3.

12.3.4.3

Ocean weather stations shall always include wind wave and swell data in their reports when data are available.

12.3.5

Group $(6I_sE_sE_sR_s)$

When the ice accretion on ships is reported in plain language, it shall be preceded by the word ICING.

12.3.6

Groups (ICE + $\begin{bmatrix} \text{plain language} \\ \text{or} \\ c_iS_ib_iD_iz_i \end{bmatrix}$)

12.3.6.1

The reporting of sea ice and ice of land origin in FM 13-VII shall not supersede the reporting of sea ice and icebergs in accordance with the International Convention for the Safety of Life at Sea.

12.3.6.2

The group $c_i S_i b_i D_i z_i$ shall be reported whenever sea ice and/or ice of land origin are observed from the ship's position at the time of observation, unless the ship is required to report ice conditions by means of a special sea-ice code.

12.3.6.3

When an ice edge is crossed or sighted between observation hours, it shall be reported as a plain-language addition in the form "ice edge lat. long." (with position in degrees and minutes).

12.3.6.4

If the ship is in the open sea reporting an ice edge, the concentration c_i and stage of development S_i shall be reported only if the ship is close to the ice (i.e. within 0.5 nautical mile).

12.3.6.5

The situation in which the ship is in open lead more than 1.0 nautical mile wide shall be coded as $c_i = 1$ and $D_i = 0$. The situation in which the ship is in fast ice with ice boundary beyond limit of visibility shall be coded as $c_i = 1$ and $D_i = 9$.

12.3.6.6

If *no sea ice is visible and the code group is used to report ice of land origin* only, the group shall be coded as $0/b_i/0$; e.g. 0/2/0 would mean 6 - 10 icebergs in sight, but no sea ice.

12.3.6.7

In coding concentration or arrangement of sea ice (code c_i), that condition shall be reported which is of the most navigational significance.

12.3.6.8

The bearing of the principal ice edge reported shall be to the closest part of that edge.

N O T E:

The requirements for sea-ice reporting are as follows:

Symbolic code letter c_i

(a) The purpose of the first code figure (0) is to establish in relation to code z_i (code figure 0) and code b_i whether the floating ice that is visible is only ice of land origin;

(b) The possible variations in sea-ice concentration and arrangement within an area of observation are almost infinite. However, the field of reasonably accurate observation from a ship's bridge is limited. For this reason, and also because minor variations are of temporary significance, the choice of concentrations and arrangements has been restricted for reporting purposes to those representing significantly different conditions from a navigational point of view. The code figures 2 - 9 have been divided into two sections depending on:

(i) Whether sea-ice concentration within the area of observation is more or less uniform (code figures 2 - 5); or

(ii) Whether there are marked contrasts in concentration or arrangement (code figures 6 - 9).

Symbolic code letter S_i

(a) This table represents a series of increasing navigational difficulties for any given concentration - i.e. if the concentration is, for example, 8/10ths, then new ice would hardly have any effect on navigation while predominantly old ice would provide difficult conditions requiring reductions in speed and frequent course alterations;

(b) The correlation between the stage of development of sea ice and its thickness is explained in the Guide to Meteorological Instrument and Observing Practices.

Symbolic code letter b_i

(a) This code provides a scale of increasing navigational hazard;

(b) Growlers and bergy bits, being much smaller and lower in the water than icebergs, are more difficult to see either by eye or radar. This is especially so if there is a heavy sea running. For this reason, code figures 4 and 5 represent more hazardous conditions than code figures 1 to 3.

Symbolic code letter D_i

There is no provision in this code for the reporting of distance from the ice edge. It will be assumed by those receiving the report that the bearing has been given to the closest part of the ice edge. From the reported code figures for concentration and stage of development, it will be clear whether the ship is in ice or within 0.5 nautical mile of the ice edge. If the ship is in open water and more than 0.5 nautical mile from the ice edge, the ice edge will be assumed to be aligned at right-angles to the bearing which is reported.

Symbolic code letter z_i

(a) The purpose of this element in the code is to establish:

(i) Whether the ship is in pack ice or is viewing floating ice (i.e. sea ice and/or ice of land origin) from the open sea; and

(ii) A qualitative estimate, dependent on the sea-ice navigation capabilities of the reporting ship, of the penetrability of the sea ice and of the recent trend in conditions;

(b) The reporting of the conditions represented by code figures 1 - 9 in code table 5239 can be used to help in the interpretation of reports from the two code tables (concentration c_i and stage of development S_i).

12.4

Section 3

This section shall be used for regional exchange.

12.5

Section 4

12.5.1

The inclusion of this section shall be fixed nationally.

12.5.2

The top of persistent condensation trails and cloud masses which have obviously developed from condensation trails shall be reported, using the appropriate C_t code figure.

12.5.3

Regulations 12.2.2.2.1 to 12.2.2.2.6 inclusive shall apply.

12.5.4

Spaces occupied by mountains emerging from the cloud layers shall be counted as occupied by cloud.

12.6

Section 5

12.6.1

The use of this section, the symbolic form of groups and the specifications of symbolic letters shall be determined by national decision.

12.7

Section 6

12.7.1

This section shall be used to report the ship's call sign from a sea station.

12.8

Section 7

12.8.1

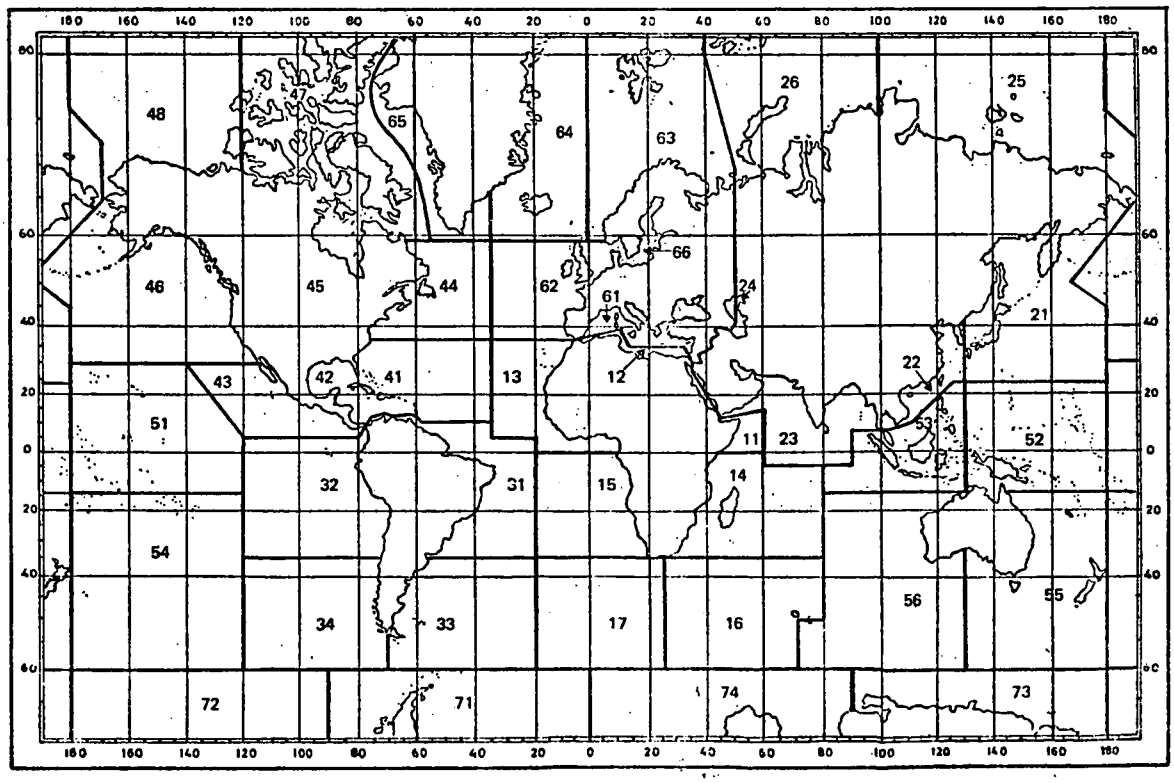
This section shall be used to report the identifier of an environmental data buoy.

SPECIFICATIONS OF NEW SYMBOLIC LETTERS

A_1	WMO Region in which buoy has been deployed (1 - Region I, 2 - Region II, etc.).
b_w	Sub-area belonging to the area indicated by A (see geographical map on the next page).

$H_{wa}H_{wa}$	Height of waves, obtained by instrumental methods.
hh	Height of base of lowest cloud.
i_v	Indicator for units of wind speed used (0 = m s^{-1}, 1 = knots).
i_R	Indicator for precipitation data (Code table 1819).
i_x	Indicators for type of station operation (manned or automatic) and for present and past weather phenomena (Code table 1810).
$P_{wa}P_{wa}$	Period of waves, obtained by instrumental methods.
$n_b n_b n_b$	Type and serial number of buoy.
RRR	Amount of precipitation which has fallen during the period indicated by t_R (Code table 3590).
t_R	Period of reference for amount of precipitation, expressed in units of 6 hours, and ending at the time of the report.
W_1 W_2	Past weather (Code table 4500).

CHART OF WATER AREAS (A_1b_w) FOR USE IN ASSIGNING BUOY IDENTIFIERS



NEW CODE TABLES

1819

i_R - Indicator for precipitation data

Code figure	Precipitation data are reported:	Group 6RRRt$_R$ is:
1	in Section 1	included
2	in Section 3	included
3	in none of the two Sections 1 and 3	omitted (precipitation amount is zero)
4	in none of the two sections 1 and 3	omitted (precipitation amount not available)

1860

i_x - Indicator for type of station operation and for present and past weather data

Code figure	Type of station operation:	Group 7wwW$_1$W$_2$ is:
1	manned	included
2	manned	omitted (no significant phenomenon to report)
3	manned	omitted (not observed, data not available)
4	automatic	included
5	automatic	omitted (no significant phenomenon to report)
6	automatic	omitted (not observed, data not available)

0264

a_3 - Indicator for standard isobaric level of which the geopotential is reported

Code figure	
0	1000 mb
1	Not used
2	
3	
4	
5	500 mb
6	Not used
7	700 mb
8	850 mb
9	Not used

3590

RRR - Amount of precipitation which has fallen during the period preceding the time of observation as indicated by t_R

Code figure	mm	Code figure	mm
000	0	990	Trace
001	1	991	0.1
002	2	992	0.2
.	.	993	0.3
.	.	994	0.4
.	.	995	0.5
.	.	996	0.6
.	.	997	0.7
988	988	998	0.8
989	989 or more	999	0.9

Amendments to Volume I of Manual on Codes

1. Remove FM 11-V, FM 14-V, FM 21-V, FM 22-V, FM 23-V, FM 24-V } and the corresponding notes and regulations.

2. Insert FM 12-VII, FM 13-VII } and the corresponding notes and regulations.

3. Introduce new specifications i_v, i_R, i_x, W_1, W_2, t_R, $P_{wa}P_{wa}$, $H_{wa}H_{wa}$, hh, RRR, A_1, b_w, $n_bn_bn_b$.

4. Introduce new Code tables 1819, 1860, 0264 and 3590.

5. Remove Code tables 1819, 0264, 0264+, 3590, 0200+, 1555, 1855, 2855, 2955, 3551+, 3577, 3590, 3852, 4019, 4300+, 4577, 4677+, 4080.

6. Adopt specifications for D_s and v_s and add one code figure for D_s -/ and v_s -/.

7. Delete all references to code forms listed under 1 above from sections A, B, C and D of the Manual on Codes.

8. Code table for $M_iM_iM_jM_j$: replace the first 7 code forms by the following:

Code form	M_iM_i			M_jM_j
	LAND STATION	SEA STATION	AIRCRAFT	unchanged
FM 12-VII SYNOP	AA			
FM 13-VII SHIP		BB		
FM 20-V RADOB	FF	GG		

9. Change heading of Table 4500 to read: W_1W_2 - Past weather.

10. Replace symbolic letter W_1 as used in FM 61-IV MAFOR by W_m (pages I-A-105/106, I-C-46 and I-D-100).

11. Make all other small editorial amendments, as required.

Rec. 20 (CBS-VII) - CONVERSION OF PRODUCTS IN ALPHANUMERIC (GRID/GRAF CODE) FORM INTO PICTORIAL FORM

THE COMMISSION FOR BASIC SYSTEMS,

NOTING:

(1) Recommendation 3 (CBS-VI),

(2) The existing GRID code FM 47-V,

(3) Recommendation 5 (CBS-VII) - Abbreviated code for the transmission of processed data in the form of grid-point values, FM 49-VII GRAF,

CONSIDERING:

(1) The need to reduce the time of transmission of processed information on telecommunication circuits, and that this need may be met by the use of the GRID/GRAF code form instead of the analogue facsimile form,

(2) That many non-computerized NMCs continue to wish to receive output products of WMCs and RMCs in pictorial form,

(3) That it is necessary to have facilities, at appropriate centres, for the conversion of processed data in alphanumeric form into pictorial form,

RECOMMENDS:

(1) That Members operating NMCs be invited to equip their respective centres with appropriate facilities for the conversion of processed data in alphanumeric (GRID/GRAF code) form into pictorial form as soon as possible;

(2) That Members operating WMCs/RMCs be invited to equip their respective centres with appropriate facilities for the conversion of processed data in alphanumeric (GRID/GRAF code) form into pictorial form for regional distribution, as soon as possible;

(3) That until the conversion facilities become available at all the centres concerned, facsimile and other types of transmission should be continued as appropriate to meet the requirements of Members.

LIST OF DOCUMENTS

I. "DOC" series

Doc. No.	Title	Agenda item	Submitted by
1	Provisional agenda	2.2	-
2	Explanatory memorandum relating to the provisional agenda	2.2	-
3	Global Data-processing System Report by the chairman of the Working Group on the GDPS and the report of the fifth session of the CBS Working Group on the GDPS ADD. 1; ADD 2; ADD. 3	7.1	Chairman, working group
4	Global Data-processing System Establishment of RMC in Jeddah	7	Secretary-General
5	Codes Implementation aspects of common surface code FM 12-VII and FM 13-VII Amendments to existing WMO codes ADD. 1	6.2 6.3	Secretary-General
6	Global Observing System Amendments to the Manual on the Global Observing System Amendments to the Guide on the Global Observing System	5.2 5.3	Secretary-General
7	Global Observing System Report by the chairman of the Working Group on the GOS	5.1	Chairman, working group
8	Report by the chairman of the Working Group on Codes	6.1	Chairman, working group

Doc. No.	Title	Agenda item	Submitted by
9	Global Data-processing System Report by the chairman of the Working Group on the GDPS and the report of the fifth session of the Working Group on the GDPS	7.1	Chairman, working group
10	Report by the president of the Commission	3	President of CBS
11	Global Telecommunication System Monitoring of the operation of the WWW Final report of the ninth session of the CBS Working Group on the Global Telecommunication System ADD. 1; ADD. 2	8 9	Chairman, working group
12	The Integrated WWW System Study	4	Secretary-General
13	Review of the previous resolutions and recommendations of the Commission and relevant Executive Committee resolutions	11	Secretary-General
14	CBS's contribution to the World Climate Programme (WCP) in particular to climate data component World Climate Data Programme	10	Secretary-General
15	Report of the chairman of the Working Group on the Global Telecommunication System	8.1	Chairman, working group
16	Monitoring of the operation of the WWW Consideration of monitoring results Review of the monitoring procedures	9 9.1 9.2	Secretary-General
17	Global Telecommunication System Exchange of processed information on the MTC and its branches ADD. 1	8.3	Secretary-General
18	The Integrated WWW System Study Automated aircraft reporting	4	United States of America

Doc. No.	Title	Agenda item	Submitted by
19	Codes Implementation aspects of common surface code FM 12-VII and FM 13-VII	6.2	U.S.S.R. State Committee for Hydrometeorology and Control of the Natural Environment
20	Global Data-processing System Report by the chairman of the Working Group on the Global Data-processing System and the report of the fifth session of the working group	7.1	U.S.S.R. State Committee for Hydrometeorology and Control of the Natural Environment
21	Global Observing System Drifting buoys in the observing system	5	United States of America
22	Global Data-processing System Report by the chairman of the Working Group on the GDPS and the report of the fifth session of the working group unit on wind speed	7.5	U.S.S.R. State Committee for Hydrometeorology and Control of the Natural Environment
23	Global Data-processing System Views of the EC Panel of Experts on Satellites	7	Secretary-General

II. "PINK" series

1	Draft report of Committee A to plenary on item 7 Global Data-processing system ADD. 1; REV. 1	7	Chairman, Committee A
2	Report to plenary on items 1, 2 and 3 Opening of the session Organization of the session Report by the president of the Commission	1, 2, 3	President of the Commission
3	Draft report of Committee A to plenary on item 4 The Integrated WWW System Study ADD. 1; CORR.	4	Chairman, Committee A

Doc. No.	Title	Agenda item	Submitted by
4	Draft report of Committee B to plenary on item 5 Global Observing System ADD. 1; REV. 1	5	Chairman, Committee B
5	Draft report of Committee B to plenary on item 8 Global Telecommunication System CORR.	8	Chairman, Committee B
6	Draft report of Committee B to plenary plenary on item 9 Monitoring of the operation of the WWW REV. 1	9	Chairman, Committee B
7	Draft report of Committee A to plenary on item 6 Codes CORR.	6	Chairman, Committee A
8	Draft report of Committee A to plenary on item 10 CBS's contribution to the World Climate Programme (WCP), in particular to climate data component	10	Chairman, Committee A
9	Draft report of Committee B to plenary on item 11 Review of previous resolutions and recommendations of the Commission and relevant Executive Committee resolutions	11	Chairman, Committee B

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

Supplement to WMO Publication No. 569

Abridged Final Report of the Extraordinary Session of the Commission for Basic Systems

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Decisions of the Executive Committee on the Abridged Final Report of the Extraordinary Session of the Commission for Basic Systems

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This document should be considered as a guide to the status of the decisions adopted at the extraordinary session of the Commission for Basic Systems.

A. DECISIONS RECORDED IN THE GENERAL SUMMARY OF THE WORK OF EC-XXXIII (Relevant extracts)

3.1.1 Report of the president of CBS and report of the extraordinary session (1980) of CBS

3.1.1.1 The Executive Committee noted with appreciation the report of the president of CBS on the activities of the Commission since EC-XXXII. It also noted the report of the extraordinary session (1980) of CBS and recorded its decisions in Resolution 1 (EC-XXXIII).

3.1.1.2 The Executive Committee endorsed the action taken by the President of WMO, in accordance with the authority given to him in WMO General Regulation 9 (5), in approving certain recommendations of the extraordinary session of CBS (1980), dealing with code matters to be implemented on 1 January 1982. The President's action enabled the early distribution of the relevant information to all concerned.

3.1.1.3 The Executive Committee also noted with approval the updating of the priority items on the work programme of CBS working groups for the period 1981-1982.

3.1.1.4 The Executive Committee noted that the extraordinary session of CBS proposed amendments to the Technical Regulations, Volumes I, II and III, resulting mainly from the establishment of the Manual on the GOS. In view of the urgent nature of those amendments, the Executive Committee decided to approve them, in conformity with Sixth Congress and Seventh Congress decisions, as regards approval of Manuals and corresponding amendments to Volumes I, II and III of the Technical Regulations.

3.1.1.5 The Executive Committee noted with approval that the extraordinary session of CBS developed basic principles and guidelines for determining the evolution of the WWW through the integrated WWW system study as well as the study areas for an improved WWW and the arrangements for carrying out the integrated study.

3.1.1.6 The Executive Committee, at the invitation of CBS, considered the question of uniformity of the definitions of meteorological and other related terms used in WMO publications. It noted that WMO Publication No. 182TP.91 - International Meteorological Vocabulary, which was issued in 1966, is being reviewed and that the responsibility for this work falls within the terms of reference of CAS. Consequently, and with the aim of ensuring uniformity of terminology in WMO programmes, publications and documentation, the Committee decided to invite CAS to expedite revision and updating of the vocabulary in consultation with other Commissions concerned, particularly as regards operational terms.

3.1.1.7 The Executive Committee considered, at the request of CBS, the view expressed by the observer from ICAO at the extraordinary session (1980) of CBS, during the review of the Manual on the GOS, that aeronautical meteorological stations should only be part of the Global Observing System when they are making meteorological observations for synoptic purposes and that such stations should be excluded from the GOS when they are intended for aeronautical purposes only. It was noted during the discussions that observations from aeronautical meteorological stations are also of value for general weather forecasting and other purposes. On this understanding, the Committee felt that aeronautical meteorological stations should be retained in the Manual on the GOS.

3.1.1.8 The Executive Committee recalled that EC-XXXII requested the President of CBS to arrange for a study of the proposal to include the Beijing-Offenbach circuit in the GTS plan as an additional segment of the MTC. The Committee noted that the extraordinary session of CBS (1980) considered this matter and felt that some improvements in the re-routeing of the MTC and its branches could be achieved relatively soon if presently existing circuits established directly between WMCs and RTHs or between RTHs on the MTC and its branches would, upon agreement between Members concerned, be included as segments of the MTC or as additional branches. Therefore, the Committee approved the recommendation of CBS to include the circuit between Offenbach and Beijing as a new segment of the MTC and its branches (see Recommendation 10 (CBS-Ext.(80)).

3.1.1.9 The Executive Committee noted that all the circuits constituting the Main Trunk Circuit (MTC) should, in general, conform with Part III - 1 (Technical Characteristics and Specifications of the GTS) of Volume I of the Manual on the GTS.

3.1.1.10 The Executive Committee noted that the extraordinary session of CBS (1980) considered an offer from the European Centre for Medium-Range Weather Forecasts (ECMWF) to make available, as from 1 July 1981, ECMWF products to non-Member states of the ECMWF via the GTS. The Committee further noted with appreciation that the Secretary-General had already initiated an enquiry amongst WMO Members to identify their requirements for the products of the ECMWF and that the matter was being co-ordinated with the ECMWF for the exchange of these products on the GTS.

3.1.1.11 In respect of Recommendation 15 (CBS-Ext.(80)) - Implementation of the World Weather Watch, the Executive Committee agreed that one of the main factors for efficient operation of the WWW is adequate training of personnel engaged in WWW operations. However, the Committee noted that there were very limited resources allocated for this purpose both nationally and in the WMO budget, VCP and other assistance programmes.

3.1.1.12 In this respect, the Executive Committee also expressed grave concern about progress in the implementation of the WWW as a whole. The Committee considered it imperative that the implementation of World Weather Watch be given highest priority in the consideration of various organizational measures, WMO programme resources, VCP and other assistance programmes. Therefore, the Committee requested the Secretary-General to study ways and means for the allocation of adequate funds to high priority WWW activities.

3.1.1.13 The Executive Committee noted that during the extraordinary session of CBS (1980), for budgetary reasons, only one team of interpreters could be made available. This hampered to some extent the smooth running of this session, also in view of the short duration of the session. Therefore, the Committee made the necessary budgetary provisions to make available two teams of interpreters for the forthcoming eighth session of CBS (1982) so as to ensure that two committees could meet at the same time. The decision on this matter was recorded under agenda item 11.1.

3.1.2 Integrated WWW System Study

3.1.2.1 The Committee stressed that the basic purpose of the Integrated WWW System Study is not to create a new WWW system but to fulfill more completely the objectives in the WWW plan through careful co-ordination of the further implementation of new facilities for observation, collection, processing and transmission of data for the benefit of all Members. The study should thus provide a realistic and practical long-term plan to assist Members in developing national programmes for future improvements in the WWW.

3.1.2.2 When considering the basic purpose of the integrated study, the Committee emphasized the need for the study to consider the current WWW system and its problems as well as its future development. The design of the improved WWW system must not create more problems for Members than it solves, and an awareness of operational problems and their solutions needs to be the basis of the integrated study. Exchange of observational data and products within certain WMO Regions needs to be improved, as well as the exchange between Regions.

3.1.2.3 The Committee also reviewed the progress of work on the study in view of the rather ambitious schedule of work proposed by the extraordinary (1980) session of CBS. In this connexion, the Committee was informed that the work programme proposed by CBS was proceeding on schedule and the sixth session of the CBS Advisory Working Group (September-October 1981) would be invited to approve a consolidated list of individual studies to be carried out over the next two years. Preliminary results of these studies would be reviewed by CBS at its eighth session, in 1982. The Committee expressed satisfaction at the progress of work on the study, and requested the president of CBS to provide information on the status of the integrated study at its thirty-fourth session.

3.1.2.4 The Executive Committee reaffirmed its views that CBS is the lead technical commission to carry out the Integrated WWW System Study in co-ordination, as appropriate, with the other technical commissions as well as other bodies and WMO programmes, as necessary.

3.1.3 Global Observing System

3.1.3.1 The Executive Committee noted with appreciation that a number of activities and actions have been initiated by the Secretary-General, CBS and Members in following up the decision of EC-XXXII leading towards the introduction of new observing systems into the current WWW.

Operational Automatic Aircraft Reporting System (AARS)

3.1.3.2 The Committee reviewed the progress made in the implementation of the Operational ASDAR System Plan and Implementation Programme adopted at its thirty-second session (Resolution 1 (EC-XXXII)). It noted with satisfaction the interest of Members in the early establishment of an operational Automatic Aircraft Reporting System (AARS) for wide-bodied aircraft, incorporating both the Aircraft to Satellite Data Relay (ASDAR) system and the VHF Communications Addressing and Reporting System (ACARS), and also the designation of experts by 13 Members and of observers from three international organizations (ESA, IATA and ICAO) for the Interim Committee of ASDAR Participants (ICAP). Furthermore, the Committee noted that the Secretary-General has taken action on the request of the extraordinary session of CBS (CBS-Ext. (1980), paragraph 5.4.2) to conduct an inquiry among Members on the nature and extent of their possible participation, including funding, in an AARS programme and their intention to purchase and operate flight hardware on aircraft of the national airline(s). The Committee agreed that once operational flight units are available, Members may negotiate with their national airlines concerning their installation and operation. It also recognized that international co-ordinated action may be required in respect of use of the data collection capability of geostationary meteorological satellites, and appropriate VHF/HF facilities. The selection of air routes traversing the most critical data-sparse areas is another important aspect requiring international co-ordination.

3.1.3.3 The Committee also noted with appreciation action taken by the USA within the goals and objectives of the plan towards formulation of specifications for "operational" flight hardware, which combines both ASDAR (satellite) and ACARS/MOAT (VHF) data collection capabilities. The flight unit as conceived, at present, is modular so either one of them or both can be selected for installation on suitable aircraft. The initial specifications, prepared at the request of NOAA, USA, must be converted into formal characteristics for acceptance by airlines. The Committee recognized the need for concerted action towards the establishment of an operational Automatic Aircraft Reporting System (AARS), including the development of the operational flight unit(s), possibly through multinational co-operation. Therefore, it requested the Secretary-General to arrange a meeting of the Interim Committee of ASDAR Participants (ICAP) as soon as possible in 1981. The Committee requested the Secretary-General to continue his action with ICAO and IATA for obtaining general acceptance of the AARS by the aeronautical community.

Drifting Buoy Programmes

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3.1.3.6 The Committee also supported the proposal for a review of the DRIBU code by CBS in close consultation with CMM and the Joint IOC/WMO Working Committee for IGOSS with a view to making the code more suitable for both meteorological and oceanographic purposes. In this respect it was mentioned that the DRIBU code had proved to be simple and efficient for meteorological purposes, and changes should be made only if a clear need exists.

3.1.4 Global Data-Processing System

Units of wind speed and atmospheric pressure

3.1.4.1 The Committee was informed that further consultations between WMO, ICAO and IMCO had failed to produce any common agreement on units of wind speed to be used for international exchange of meteorological data or for meteorological applications. ICAO has requested that amendment of common WMO/ICAO regulatory material in respect of the unit hectopascal be carried out at the same time as amendments concerned with wind speed. The Committee was also informed that an agreement with ICAO and IMCO to carry out the desire of Eighth Congress, to use a single unit of wind speed in order to avoid confusion and errors in use of internationally exchanged wind data, was probably not possible within the foreseeable future. Therefore, the Committee recommended that the Secretary-General bring this matter to the attention of Ninth Congress with a view to inviting the Congress to reconsider its decision on the use of a single unit of wind speed (Cg-VIII), general summary, paragraph 3.1.2.1.14).

3.1.4.2 In its consideration of the problem, the Executive Committee noted that there appear to be three main options open to WMO in the long term:

(a) Retention of the present situation in which the unit of wind speed is a choice of the individual country, even in messages designed for international exchange;

(b) Adoption of a specific unit of wind speed for individual message types, e.g.

- for aeronautical messages, km/h or knot as may be agreed with ICAO
- for messages destined for marine users, the knot
- for all other messages exchanged between weather services on the GTS, the unit of choice of Congress;

(c) The coding of wind speed (similar to the approach used with visibility) which can be converted through code tables into the unit of choice of the user. Such a code would be direct reading in the unit of choice of Congress.

3.1.4.3 Recognizing that three units of wind speed (kt, m/s and km/h) would most probably be in use during the period 1981 to 1990, the Committee considered that further efforts should be made to reach an agreement with ICAO and IMCO on the following matters:

(a) The units of wind speed to be used in those messages intended primarily for use by specialized users of meteorological data (e.g. METAR, TAF);

(b) The possible arrangements and responsibilities for conversion of unit wind speed in those meteorological messages, used regularly in both basic and specialized meteorological purposes, at a suitable point (e.g. the use interface) in their transmission, so as to minimize confusion and errors;

(c) The arrangements for alignment of joint ICAO/WMO documents, in the light of (a) and (b) above and of ICAO's decision that Contracting States of ICAO should be able to use either the unit kt or km/h as from 25 November 1981 until at least 31 December 1990 for meteorological messages used in air navigation;

(d) The arrangements between ICAO and WMO on a date for action to amend WMO and ICAO common regulatory material in respect of the use of hectopascal as the unit of atmospheric pressure.

In connexion with (a) and (b) above the Committee recalled the decision of Fifth Congress on the use of the unit metres per second for the international exchange of wind data.

3.1.4.4 Therefore, the Committee requested the Secretary-General to arrange a meeting with representatives of ICAO and IMCO at an early date to discuss the matters listed in paragraph 3.1.4.3 above. The presidents of CBS, CAeM and CMM should also participate in this meeting. The Committee further requested the Secretary-General to report to its thirty-fourth session concerning the results of this meeting.

3.1.5 Common code for reporting surface observations

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3.1.5.2 As a result of an inquiry sent to Members by the Secretary-General, 58 countries requested assistance in implementation of the new code. A workshop was held in Geneva in March 1981 at which 7 coding experts were trained in procedures and other matters involved with the implementation of the new code. These experts are now conducting and will conduct a series of roving seminars in the various WMO regions to provide the necessary assistance to those Members who requested it. Some difficulties have been experienced in scheduling visits to countries because of travel problems. However, most of the visits are being completed as scheduled. The Committee agreed that training aids on the new code would be helpful for observers and requested the Secretary-General to distribute these aids, as required. The Committee also requested the Secretary-General to follow closely Members' progress in putting the common code into operation after 1 January 1982, and to take any necessary action to assist Members, when requested.

3.1.6 Global Telecommunication System

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3.1.6.8 The Executive Committee decided on the following action programme:

(a) To urge Members concerned:

(i) to continue upgrading the operation of the GTS, in particular the automation of telecommunication centres and the introduction of higher transmission speeds (data and facsimile) in order to increase the capacity and efficiency of the GTS;

(ii) to continue their efforts to replace HF radio circuits by satellite/cable circuits in order to improve the efficiency and reliability of the operation of the GTS;

(iii) to carry out pilot projects for the use of DCPs for the collection of observational data from stations without access to well-functioning reliable conventional telecommunication facilities;

(b) To request regional associations to promote the necessary studies on regional meteorological telecommunication procedures, in particular the re-routeing arrangements of meteorological information in case of outage of circuits and/or centres;

(c) To request CBS:

(i) on the basis of the monitoring results, to continue to study and propose, in co-ordination with regional associations, measures to improve the operation of the GTS with a view to filling the existing deficiencies, in particular on the regional level and their linkage with the MTC;

(ii) to continue to promote the necessary studies on meteorological telecommunications, taking into account the recent telecommunication techniques developed by ITU and ISO;

(iii) to initiate a study for the extensive use of the data collection capability of satellites;

(d) To authorize the Secretary-General:

(i) in consultation with the president of RA I, to continue negotiations with the Director-General of ESA on the testing of the SIRIO-2 space and ground segment;

(ii) to take appropriate action for the preparation and distribution of posters, leaflets and films on meteorological telecommunication operations.

3.1.7 Monitoring of the operation of the WWW

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3.1.7.5 The Executive Committee noted with satisfaction that CBS amended the plan for monitoring the operation of the WWW with a view to making the monitoring more efficient and pinpointing the specific deficiencies so that appropriate remedial action can be taken as quickly as possible. Furthermore, it also noted that, in order to indicate clearly problem areas in the operation of the WWW, the method of presentation of the monitoring results had been improved. The Committee requested CBS to continue to review, as necessary, the monitoring procedures with a view to increasing their efficiency.

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3.1.7.8 In addition to the actions prescribed in paragraph 3.1.6 above, the Executive Committee requested the Secretary-General, taking into account the monitoring analysis:

(a) To convene, as appropriate, co-ordination meetings between centres concerned in order to improve the efficiency of the operation of the GTS;

(b) To initiate WMO expert missions to critical areas in order to assist and advise centres concerned on the operation of the WWW.

3.1.8 Antarctic meteorology

3.1.8.1 The Executive Committee noted with appreciation the report of the Chairman of the EC Working Group on Antarctic Meteorology. It was informed of the increase in the number of signatories to the Antarctic Treaty. The Committee agreed that there was a need to review the requirements for observational and processed meteorological data to be received by stations inside and outside the Antarctic as well as the distribution of observational data on the GTS through the designated RTHs. Since the EC Working Group on Antarctic Meteorology has not had a session since 1969, the Committee agreed with the proposal of the chairman of the working group to convene a meeting in 1982. The Committee felt that in addition to meteorologists, it might be desirable for specialists in Antarctic telecommunications to participate in the forthcoming session of the working group.

3.1.8.2 The Executive Committee noted with appreciation that the chairman of the EC Working Group on Antarctic Meteorology had prepared regional coding procedures for use in the Antarctic. The Committee was informed that most of the proposals made by Members which are States signatory to the Antarctic Treaty had been included in the regional coding procedures for use in the Antarctic. However, the Committee agreed that some of the proposed procedures could be included as national coding procedures valid for stations in the Antarctic and should be published as national coding procedures in Chapter VII - Antarctic, Volume II of the Manual on Codes. The Committee requested the EC Working Group on Antarctic Meteorology to review the regional coding procedures for use in the Antarctic at its next session. Resolution 2 (EC-XXXIII) was adopted.

B. RESOLUTIONS

Resolution 2 (EC-XXXIII)

REPORT OF THE EXTRAORDINARY SESSION (1980) OF THE COMMISSION FOR BASIC SYSTEMS

THE EXECUTIVE COMMITTEE,

HAVING CONSIDERED the abridged final report of the extraordinary session of the Commission for Basic Systems,

DECIDES:

(1) To note the report;

(2) To note Resolution 1 (CBS-Ext.(80));

(3) To take action on the recommendations as follows:

Recommendation 1 (CBS-Ext.(80)) - Proposed amendments to Volumes I, II and III of the Technical Regulations

(a) Approves this recommendation in conformity with Cg-VI and Cg-VII decisions as regards approval of Manuals and corresponding amendments to Volumes I, II and III of the Technical Regulations;

(b) Decides that the above amendments to the Technical Regulations come into force on 1 January 1982;

(c) Requests the Secretary-General to incorporate the proposed amendments in Volumes I, II and III of the Technical Regulations.

Recommendation 2 (CBS-Ext.(80)) - Proposed amendments to the Manual on the Global Observing System, Volume I (Global Aspects)

(a) Approves this recommendation;

(b) Decides that the above amendments come into force on 1 January 1982;

(c) Requests the Secretary-General to arrange for the necessary amendments to be included in Volume I of the Manual on the Global Observing System.

Recommendation 3 (CBS-Ext.(80)) - Deletion of FM 26-IV SPESH from Volume I of the Manual on Codes

Recommendation 4 (CBS-Ext.(80)) - Amendments to the Manual on Codes, Volume I

Recommendation 5 (CBS-Ext.(80)) - Corrections in aeronautical codes

Recommendation 6 (CBS-Ext.(80)) - Amendment to Code FM 35-V TEMP, FM 36-V TEMP SHIP and FM 37-VII TEMP DROP

(a) Endorses the President's approval of these recommendations in accordance with Regulation 9 (5) of the WMO General Regulations;

(b) Confirms that code FM 26-IV SPESH be deleted from Volume I of the Manual on Codes as from 1 January 1982 and the amendments in Recommendations 4 to 6 be implemented as soon as possible;

(c) Notes the Secretary-General's arrangements for amending Volume I of the Manual on Codes.

Recommendation 7 (CBS-Ext.(80)) - Amendments to the Manual on the GDPS, Volume I

Recommendation 8 (CBS-Ext.(80)) - Guidelines for Storage and Retrieval of Satellite Data

Recommendation 9 (CBS-Ext.(80)) - Layout of Guide on Automation of Data-processing Centres

(a) Approves these recommendations;

(b) Requests the Secretary-General:

(i) to include the amendments in Recommendation 7 (CBS-Ext.(80)) in Volume I of the Manual on the GDPS as soon as possible but not later than 1 January 1982;

(ii) to include the guidelines in Recommendation 8 (CBS-Ext.(80)) in an appropriate part of Volume I of the Manual on the GDPS;

(iii) to make the necessary arrangements for drafting the full text of the Guide on the Automation of Data-processing Centres using as a basis the layout in Recommendation 9 (CBS-Ext.(80)).

Recommendation 10 (CBS-Ext. (80)) - Proposed amendments to the Manual on the Global Telecommunication System, Volume I (Global Aspects), Part I - Organization of the Global Telecommunication System

Recommendation 11 (CBS-Ext.(80)) - Proposed amendments to the Manual on the Global Telecommunication System, Volume I (Global Aspects), Part II - Meteorological Telecommunication procedures for the Global Telecommunication System

Recommendation 12 (CBS-Ext.(80)) - Compilation of meteorological reports containing surface observations - FM 12-VII and FM 13-VII

Recommendation 13 (CBS-Ext.(80)) - Proposed amendments to the Manual on the Global Telecommunication System, Volume I (Global Aspects), Part III - Technical Characteristics and Specifications for the Global Telecommunication System

(a) Approves these recommendations;

(b) Invites Members:

(i) to implement the procedures in Recommendation 11 (CBS-Ext.(80)) as soon as possible;

(ii) to spare no effort to implement one of the procedures in Recommendation 12 (CBS-Ext.(80)) as from 1 January 1982.

(c) Requests the Secretary-General to arrange for the necessary amendments to be included in Volume I of the Manual on the Global Telecommunication System.

Recommendation 14 (CBS-Ext.(80)) - Aircraft weather reports

Recommendation 15 (CBS-Ext.(80)) - Implementation of the World Weather Watch

(a) Approves these recommendations;

(b) Requests the Secretary-General:

(i) to bring these recommendations to the attention of all Members to implement them as appropriate;

(ii) to invite ICAO and CAeM to take action, as appropriate, on Recommendation 14 (CBS-Ext.(80));

(iii) to arrange for the implementation, as appropriate, of the measures in Recommendation 15 (CBS-Ext.(80)) and report to EC-XXXIV.

Recommendation 16 (CBS-Ext.(80)) - Review of the resolutions of the Executive Committee based on previous recommndations of the Commission for Basic Systems

(Action on this recommendation was taken by the Executive Committee when reviewing its previous resolutions);

REQUESTS the Secretary-General to bring the above decisions to the attention of all concerned.

Resolution 3 (EC-XXXIII)

REGIONAL CODING PROCEDURES FOR USE IN ANTARCTICA

THE EXECUTIVE COMMITTEE,

NOTING:

(1) Resolution 5 (EC-XXXI) - Common code for reporting surface observations from different types of surface station,

(2) Recommendation 12 (CBS-VII) - Standardization of Volume II of the Manual on Codes,

CONSIDERING that sufficient time should be given for Members to make the necessary arrangements for the introduction of the new common code,

URGES Signatories of the Antarctic Treaty:

(1) That the regional coding procedures, given in the annex to this draft resolution, be introduced for use in Antarctica as from 1 January 1982,

(2) That unavoidable deviations from the regional coding procedures for use in Antarctica be included in Chapter VII - Antarctica, of Volume II of the Manual on Codes as national coding practices,

REQUESTS the Secretary-General to include the regional coding procedures for use in Antarctica and the unavoidable national deviations from the regional coding procedures in Chapter VII - Antarctica, of Volume II of the Manual on Codes in lieu of the present text.

Annex: 1

Annex to Resolution 3 (EC-XXXIII)

REGIONAL CODING PROCEDURES FOR USE IN ANTARCTICA

Draft regional coding procedures - Antarctica

A-1 GLOBAL CODE FORMS, NOTES AND REGULATIONS

FM 12-VII SYNOP

(a) Section 1

7/12.1 Groups 4PPPP or $4a_3hhh$

7/12.1.1 If Regulation 12.2.3.4.2 applies, i.e., if a station cannot report MSL pressure with reasonable accuracy, it shall report the agreed standard constant levels corresponding to the station elevation as follows, using the group $4a_3hhh$:

Pressure	Station elevation	
	From greater than	To equal to or smaller than
850 mb	750 m	2 300 m
700 mb	2 300 m	3 700 m

7/12.1.2 Group $4a_3hhh$ shall indicate the geopotential of the suitable pressure level expressed in geopotential metres.

7/12.2 Group $6RRRt_R$ (Section 1)

7/12.2.1 This group shall be included in Section 1 at 0000, 0600, 1200 and 1800 GMT, in accordance with Regulation 12.2.5.4.

7/12.2.2 RRR shall indicate the amount of precipitation (water equivalent) accumulated since the last 0000 GMT observation.

7/12.2.3 If the measurement of precipitation amount is impossible (very frequently due to blowing snow), i_R shall be coded 4 in the group i_Ri_xhVV and the group $6RRRt_R$ shall be omitted.

(b) Section 2

7/12.3 Coastal stations shall add this section to their reports on request by the Antarctic Weather Centre to report data on sea ice, sea temperature and state of the sea.

(c) Section 3

7/12.4 Group (0....)

7/12.4.1 This group shall be used in the form $0d_m d_m f_m f_m$.

7/12.4.2 The group $0d_m d_m d_m d_m$ shall be included whenever the speed of the maximum wind observed during the preceding six hours has equalled or exceeded 33 knots.

NOTE:

Only stations equipped with an anemograph should transmit this group.

7/12.5 Group ($1s_n T_x T_x T_x$)

This group shall be included at 0000 and 1200 GMT to report the maximum temperature of the preceding 12 hours whenever this temperature is measured.

7/12.6 Group ($2s_n T_n T_n T_n$)

This group shall be included at 0000 and 1200 GMT to report the minimum temperature of the preceding 12 hours whenever this temperature is measured.

7/12.7 Group ($6RRRt_R$) (Section 3)

Regulations 7/12.2.1 to 7/12.2.3 shall apply.

7/12.8 Group (7....)

7/12.8.1 This group shall be used in the form $7D_m D_L D_M D_H$.

7/12.8.2 The group $7D_m D_L D_M D_H$ shall be included in the report when:

(a) The prevailing wind direction during the preceding six hours is significantly different from the current wind direction (e.g., a difference in the order of 45° is considered significant); and/or

(b) Whenever the direction of movement of clouds reported for C_L, C_M and/or C_H can be determined.

7/12.9 Group ($8N_s Ch_s h_s$)

One or more of these groups shall be reported when appropriate.

7/12.10 Group ($9S_pS_ps_ps_p$)

7/12.10.1 This group shall be reported, when appropriate, using the code established for this purpose (code 768).

NOTES:

(1) Care should be taken, however, to avoid unnecessary duplication of information given in other groups of the report.

(2) Basic needs would be covered by code figures 904, 905, 909, 910, 918, 920, 921, 922, 923, 930, 931, 94, 95, 96, 970 to 979 inclusive, 99718 and 99744 and efforts should be made to report these groups when applicable.

7/12.10.2 A group $995R_Gs'$ shall be used, when appropriate, to report the depth of the snow freshly fallen since the last 0000 GMT observation and shall be included at 0000, 0600, 1200 and 1800 GMT when precipitation has occurred since the last 0000 GMT report.

7/12.10.3 Each time the phenomenon WHITEOUT is observed, the group 93200 shall be included.

NOTE:

In the absence of hydrometeors and blowing snow, and with a completely overcast sky over an unbroken snow cover, contours of landscape may vanish because all shadows disappear and the horizon cannot be distinguished. This phenomenon is called WHITEOUT.

FM 15-METAR ....
FM 32-V PILOT ....
FM 35-V TEMP ....
FM 71-V CLIMAT ....

Comment: Following the layout given in the annex to Recommendation 12 (CBS-VII) - Standardization of Volume II of the Manual on Codes, the notes and regulations to these code forms will be edited by the Secretariat.

A-2 REGIONAL CODE FORMS WITH NOTES AND REGULATIONS

RF 7-01 MOBIL - Report of surface observation from a mobile land station

CODE FORM:

Section 0 - MOBIL $HHHHI_5$ $YYGGi_w$ $99L_aL_aL_a$ $Q_cL_oL_oL_oL_o$

Section 1 - i_Ri_xhVV Nddff $1s_nTTT$ $2s_nT_dT_dT_d$ $3P_oP_oP_oP_o$

$5appp$ $6RRRt_R$ $7wwW_1W_2$ $8N_hC_LC_MC_H$

Section 3 - 333 $(8N_sCh_sh_s)$ $(9S_PS_Ps_ps_p)$

NOTE:

MOBIL is the name of the code form for reporting a surface observation from a mobile land station.

REGULATIONS:

7/01.1 General

7/01.1.1 The code name MOBIL shall appear as a prefix to individual reports.

7/01.1.2 The code name MOBIL shall be included as the first line of the text of a meteorological bulletin of MOBIL reports. Individual MOBIL reports in the bulletin shall not contain the code name MOBIL.

7/01.2 Section 1

7/01.2.1 Regulations 12.2.1 to 12.2.3.3.2 shall apply.

7/01.2.2 If the position of the station has not changed during the three hours preceding the time of observation, group 5appp shall be included and ppp shall be determined from appropriate readings of the barometer corrected to station level.

7/01.2.3 If the position of the station has changed appreciably, group 5appp shall be omitted.

7/01.2.4 Group $3P_oP_oP_oP_o$ shall always be included.

7/01.2.5 Regulations 7/12.2 to 7/12.2.3 shall apply to stations capable to report group $6RRRt_R$, only when they have been stationary since the last 0000 GMT report.

7/01.2.6 Regulations 12.2.5.4 to 12.2.7.4 shall apply.

7/01.3 Section 3

7/01.3.1 Regulations 12.4.9 to 12.4.10 shall apply.

7/01.3.2 Regulations 7/12.9 to 7/12.10.2 shall apply.

B. SYMBOLIC WORDS AND GROUPS

MOBIL Report of surface observation from a mobile land station (RF 7-01).

C. SPECIFICATION OF SYMBOLIC LETTERS

Comment In addition to editorial amendments (e.g., replacing FM 11.E by FM 12-VII), the following amendments should be introduced in the table:

(a) Delete specification for D_H, D_L and D_M;

(b) Amend specification for $d_x d_x$ to read:

$d_m d_m$ Direction of maximum wind (from which it blew) during the preceding six hours. (International code 0877) (0-group in Section 3 of FM 12-VII);

(c) Amend $f_x f_x$ to read $f_m f_m$ and make the appropriate amendments in the specification;

(d) Amend sss to read SSS;

(e) Amend s_n to read s' and replace "International code 3800" by "code 777";

(f) Delete specification for ss.

D. SPECIFICATION OF CODE FIGURES (code tables)

Comment The appropriate editorial amendments of the numbering system and the following amendments of the code tables should be introduced:

(a) Delete code 741;

(b) Insert in code 768 the specification 93200 WHITEOUT;

(c) Amend in code 768 group 94sss to read 94SSS;

(d) Amend in code 768 group 995ss to read $995R_G$s'. Time at which precipitation given by RRR began or ended and depth of fresh snow;

(e) Delete in code 768 specification 996ss;

(f) Delete code 776;

(g) Insert code 777.
s' Depth of newly fallen snow accumulated since the last 0000 GMT report and use the present international code 3800.