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COMMISSION FOR BASIC SYSTEMS

ABRIDGED FINAL REPORT

OF THE

SEVENTH SESSION

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NOTE

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LIST OF PERSONS ATTENDING THE SESSION

1. Officers of the session

O. Lönnqvist	president	
J. Brinkmann	vice-president	

2. Representatives of Members of WMO

M. Andaloussi	principal delegate	Algeria
M. Benabderrahmane	delegate	
D. S. Alaimo	principal delegate	Argentina
A. Muffatti	principal delegate	Australia
H. Maier	principal delegate	Austria
M. S. Mawla	principal delegate	Bangladesh
G. Doumont	principal delegate	Belgium
E. D. Moraes	principal delegate	Brazil
I. Kanchev	principal delegate	Bulgaria
S. Miloushev	delegate	
S. Vasilev	delegate	
V. D. Savouts	principal delegate	Byelorussian Soviet Socialist Republic
P. I. Johns	principal delegate	Canada
H. B. Kruger	delegate	
W. L. Gutzman	delegate	
Tsou Ching-meng	principal delegate	China
Chao Lo-keng	delegate	
Liu Tse	delegate	
Chang Hsun-liang	delegate	
Chin Kuei	delegate	
Wang Tsai-fang	delegate	
Han Chi	delegate	
G. Mankedi	principal delegate	Congo
M. R. Núñez	principal delegate	Cuba
J. C. Rubial	delegate	

2. Representatives of Members of WMO (contd.)

A. Papež	principal delegate	Czechoslovakia
J. W. Larsen	principal delegate	Denmark
B. Jensen	delegate	
M. S. Harb	principal delegate	Egypt
K. A. Khalil	delegate	
D. Söderman	principal delegate	Finland
A. Durget	principal delegate	France
F. Duvernet	delegate	
R. Garnier	delegate	
M. Merlet	delegate	
J. M. Rainer	delegate	
E. Peters	principal delegate	German Democratic
K. H. Hartmann	delegate	Republic
T. Mohr	principal delegate	Germany, Federal
W. Bopp	delegate	Republic of
J. H. Brinkmann	delegate	
J. Lieckfeld	delegate	
A. M. Pereira	principal delegate	Guinea-Bissau
J. A. M. Ferraz	delegate	
P. Sham	principal delegate	Hong Kong
A. Kapovits	principal delegate	Hungary
F. H. Sigurdsson	principal delegate	Iceland
S. K. Das	principal delegate	India
P. K. Rohan	principal delegate	Ireland
W. H. Wann	delegate	
M. Levi	principal delegate	Israel
C. Todaro	principal delegate	Italy
R. Balzano	delegate	
J. Djigbenou	principal delegate	Ivory Coast
M. D. Bahi Zahiri	delegate	
J. Blake	principal delegate	Jamaica
S. Kubota	principal delegate	Japan

2. Representatives of Members of WMO (contd.)

R. Shaker	principal delegate	Jordan
E. A. Mukolwe	principal delegate	Kenya
J. H. Kinuthia	delegate	
A. Aboulhosn	principal delegate	Lebanon
M. A. Issa	principal delegate	Libyan Arab
A. M. Ashaafi	delegate	Jamahiriya
M. J. El Ghadi	delegate	
S. Kamara	principal delegate	Mauritania
J. Kastelein	principal delegate	Netherlands
A. C. Bakker	delegate	
C. F. Reudink	principal delegate	Netherlands Antilles
A. A. Neale	principal delegate	New Zealand
F. O. Okulaja	principal delegate	Nigeria
S. O. Sanu	delegate	
J. M. Babalola	delegate	
O. Haug	principal delegate	Norway
O. Bremnes	delegate	
A. R. El-Harmi	principal delegate	Oman
A. L. Huneidi	delegate	
J. A. Mendez	delegate	Peru
J. F. da Fonseca E. Silva	principal delegate	São Tomé and Príncipe
M. Nowailaty	principal delegate	Saudi Arabia
H. Sagur	delegate	
Sanz Vega Mateo	principal delegate	Spain
O. Lönnqvist	principal delegate	Sweden
L. Moen	delegate	
G. Bleckert	delegate	
M. Haug	principal delegate	Switzerland
A. Jeannet	delegate	
T. Montrivade	principal delegate	Thailand
B. Saragganonda	delegate	

2. Representatives of Members of WMO (contd.)

M. Feki	principal delegate	Tunisia
V. Akyildiz	principal delegate	Turkey
P. A. Byarugaba	principal delegate	Uganda
P. M. Gwage	delegate	
V. A. Shumovitch (Mrs.)	principal delegate	Ukrainian Soviet Socialist Republic
E. I. Tolstikov	principal delegate	Union of Soviet Socialist Republics
A. A. Vasiliev	delegate	
A. D. Chistiakov	delegate	
I. A. Ravdin	delegate	
G. M. Ryabkov	delegate	
S. M. Tupitsyn	delegate	
F. H. Bushby	principal delegate	United Kingdom of Great Britain and Northern Ireland
D. McNaughton	delegate	
D. R. Grant	delegate	
E. J. Cuerden	delegate	
M. E. Mlaki	principal delegate	United Republic of Tanzania
K. R. Johannessen	principal delegate	United States of America
A. Hernhuter	delegate	
W. D. Bonner	delegate	
C. A. Spohn	delegate	
B. Zavos	delegate	
D. Olson	delegate	
J. R. Neilon	delegate	
S. R. Barbagallo	delegate	
C. A. Grezzi Roldan	principal delegate	Uruguay
R. R. Silva	delegate	
J. José Infante	principal delegate	Venezuela
V. Jurčec (Mrs.)	principal delegate	Yugoslavia
M. Y'Ikwa	principal delegate	Zaire
M. Maticali	delegate	

3. Observers from Non-Member countries (contd.)

Rev. Father M. McCarthy	Holy See
A. P. Monese	Lesotho
G. S. Jayamaha	

4. Observers from other international organizations

J. Labrousse	European Centre for Medium-Range Weather Forecasts (ECMWF)
A. Mead	Food and Agriculture Organization (FAO)
M. L. Huerta	International Air Transport Association (IATA)
U. Rath	International Civil Aviation Organization (ICAO)
G. Withee J. Churgin	Intergovernmental Oceanographic Commission (IOC)
A. A. Hughes	International Seismological Centre (ISC)

5. Observer

P. Peridier	Commission for Aeronautical Meteorology (CAeM)

6. Lecturers

E. M. Carlstead
R. Gird
O. Haug
P. Julian
R. McGrew
R. McPherson
J. K. Sparkman
E. I. Tolstikov

7. WMO Secretariat

G. K. Weiss	Representative of the Secretary-General
H. A. Bari	
F. P. Alves	
E. B. Fawcett	

AGENDA

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8.	Codes (including the report by the chairman of the Working Group on Codes)	5; 6; 8; 9; 10; 13; 15; 16; 22; 27; 34; 36; 38; 39; 44; 46; PINK 5; PINK 6; PINK 7; PINK 18	4	4; 5; 6; 7; 8; 9; 10; 11; 12; 13; 14

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9.	Telecommunication system (including the GTS part of WWW and the report by the chairman of the Working Group on the GTS)	11; 20; 20, ADD. 1; ADD. 2; ADD. 3; ADD. 4; 23; 23, CORR. 1; 28; 37; 39; 40; 43; PINK 8; PINK 9; PINK 14	5	15; 16; 17
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15.	Scientific lectures and discussions	PINK 11		
16.	Election of officers	2; PINK 2; PINK 21		
17.	Date and place of eighth session			
18.	Closure of the session			

GENERAL SUMMARY OF THE WORK OF THE SESSION

1. OPENING OF THE SESSION (Agenda item 1)

1.1 At the kind invitation of the Government of the United States of America, the seventh session of the Commission for Basic Systems was held in the International Conference Suite of the Department of State, Washington, D.C., from 6 to 17 November 1978. The session was opened by the president of the Commission, Dr. O. Lönnqvist, at 10.00 a.m. on 6 November 1978.

1.2 Mr. C. W. Maynes, Assistant Secretary of State for International Organization Affairs, greeted participants and warmly welcomed them to the U.S.A. He mentioned that for several years he had been familiar with WMO's activities and its major programmes, in particular the World Weather Watch. He specifically referred to the need for protecting human beings and their possessions against adverse meteorological conditions such as tropical cyclones and floods. In doing so, he mentioned the major role played by CBS in the area of observing systems, data processing and telecommunications. In concluding, he extended his best wishes for successful accomplishment of all items on the session's agenda and assured participants that the U.S.A. would continue to support major WMO programmes and CBS activities in full awareness of their significance in the contemporary world.

1.3 Dr. D. A. Davies, Secretary-General of the World Meteorological Organization, expressed his pleasure at being present at the opening of the seventh session of CBS and his deep appreciation to the Government of the United States of America for its kind invitation to host the session. He took the opportunity to thank the Government of the U.S.A. for the full support it had given to the activities of WMO at all times. In wishing participants a successful session, he referred to the Commission's responsibilities in respect of the planning and implementation of the World Weather Watch (WWW). He specifically mentioned the need for careful planning of the future WWW and the introduction of new technology and possible new concepts to make the GOS, GDPS and GTS more responsive to the needs of both developed and developing countries alike. In this connexion, he expressed his conviction that CBS, with the expertise available to it, would be able to come forward with the best possible plan to ensure the continued progress of the WWW as the basic programme of WMO. In concluding, Dr. Davies hoped that the Commission would take bold and constructive decisions which would open the way to a further period of progress and development in the work of CBS and hence in international meteorology as a whole.

1.4 Dr. G. S. Benton, Permanent Representative of the U.S.A. with WMO and Associate Administrator of NOAA, welcomed the participants to Washington, D.C. He mentioned the important role CBS and its predecessor, the Commission for Synoptic Meteorology, had played in the development and advancement of operational meteorology throughout the world. In congratulating the Commission on its past accomplishments, he mentioned that the future held even more of a challenge for the World Meteorological

Organization and the Commission for Basic Systems due to the increasing importance of science and technology in environmental sciences. In this connexion, he urged CBS to be at the forefront in helping Meteorological Services to apply new technology to the world's environmental problems. He felt that the Commission, through its responsibility for planning the WWW, could play a major role in providing environmental data needed to monitor, predict and understand weather and climate-related effects. He stressed that Meteorological Services had a key role to play in reducing the impact of natural disasters through the effective use of environmental data and knowledge, and highlighted the vital role of CBS in developing the WWW plan for the period 1980-1983. In conclusion, he expressed the hope that the Commission would continue to attack its responsibilities, as in the past, with vigour, perception and determination.

1.5 Dr. O. Lönnqvist, president of CBS, in his address reviewed the Commission's activities since its extraordinary session in 1976. He mentioned the great achievements made by the Commission in the further development of the World Weather Watch. He paid tribute to the Commission's working groups and rapporteur who had contributed so much to the inter-sessional work as well as to the preparation of the present session of the Commission. He mentioned the continued progress in the implementation of the WWW, particularly in respect of the space-based sub-system of the GOS. He also mentioned the tasks before the session concerning the preparation of the WWW plan for the period 1980-1983, the development of new procedures and codes, as well as the need for a review of the present accomplishments of the WWW and the development of the WWW system in the future. In this respect he particularly drew the attention of participants to the need for continued efforts in monitoring the WWW and subsequent action for improving the overall performance of the various elements such as the GOS, GDPS and GTS. He felt that an effective WWW would assist in aiding the social and economic development of mankind. He referred to the support given by the WWW to the Global Weather Experiment under way which would start its operational phase in the following few months. He stressed that CBS, through its wide range of responsibilities, stood in the forefront of meteorology; the session would therefore need to take constructive decisions in respect of the WWW and its support to other WMO programmes. In conclusion, he expressed the hope that the traditional spirit of friendly co-operation would result in a fruitful session.

1.6 There were 129 participants at the seventh session. These included 118 representatives from 61 Members of WMO, three representatives of non-Member countries of WMO, representatives from five international organizations and one non-governmental body, and one observer from a WMO technical commission. 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 provisional list of participants whose credentials were found valid. This list was accepted as the first report on credentials and further reports were submitted to the seventh 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 the numbers of resolutions and recommendations.

2.3 Establishment of committees (Agenda item 2.3)

In accordance with Regulation 23 of the WMO General Regulations, the Commission established the following committees for the duration of the session.

2.3.1 Nomination Committee

A Nomination Committee was established composed of the principal delegates of Australia, Brazil, Canada, the Ivory Coast, Japan and Yugoslavia. Mr. P. I. Johns (Canada) was elected chairman of this committee.

2.3.2 Co-ordination Committee

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

2.3.3 Working committees

The following two working committees were set up to examine in detail the various agenda items:

(a) Committee A to consider agenda items 4, 7, 8 and those parts of items 5, 10, 11 and 12 dealing with GDPS and code matters. Mr. F. Duvernet (France) was elected chairman and Mr. F. H. Bushby (United Kingdom) vice-chairman of the committee;

(b) Committee B to consider agenda items 6, 9, 14 and those parts of items 5, 10, 11 and 12 dealing with GOS and GTS matters. Mr. J. Neilon (U.S.A.) was elected chairman and Mr. M. S. Harb (Egypt) vice-chairman of the committee.

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 seventh session could be approved by the president on behalf of the Commission.

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

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

3.2 The Commission reviewed its work programme for the next four years. It fully took into consideration the terms of reference given to CBS. It also noted the documentation presented to the session as a result of the preparatory work carried out by the CBS working groups since the extraordinary session of the Commission. It was felt that the progress achieved was due to the efforts made by the working groups, informal planning meetings and the Secretariat. It was noted with gratitude that Members had supported the work of CBS by providing appropriate expertise and by carrying out specific tests and experiments when requested by the Commission or its working groups. The Commission felt that this continued support by Members to the activities of CBS was essential in order to carry out the important tasks given to it by Congress.

3.3 When considering the implementation of the WWW, the Commission recognized that progress had been made. In some areas, however, deficiencies still existed and bold action was needed in order to improve the overall operation of the WWW with a view to achieving a higher efficiency of operation. It was felt that in order to overcome existing difficulties and also to ensure the long-term development and improvement of the entire WWW, an integrated system study comprising all elements of the system was required. In this study the WWW would have to be considered as a fully integrated system and new technology should be taken into consideration, as well as the ability of Member countries to implement new facilities, services and procedures. It was therefore felt that the above-mentioned study should include:

(a) A study of the shortcomings of the current WWW system including both real-time and non-real-time aspects;

(b) A study of the requirements imposed on the WWW by Members and by other WMO programmes;

(c) Proposals for technical solutions in the areas of observing, data processing, telecommunications and codes. Particular care should be taken to assure that these solutions are suitable for implementation in developing countries;

(d) Discussion of the economic aspects involved with implementation of the improved system (i.e. cost/performance estimates).

A detailed implementation plan should be developed, giving complete information on what is to be done to improve the WWW system and how and when the implementation is to take place.

The Commission agreed that the study should be completed as soon as possible, in about one year, and the results be made available to the proposed extraordinary session of CBS in 1980. The Commission agreed that the study should be carried

out within the framework of CBS with the full participation of the CBS working groups. It was pointed out, however, that the study would require substantial expert support in specialized fields. These specific studies could be carried out through informal planning meetings and through experts seconded by the Secretary-General. The Commission requested the Secretary-General to support the integrated system study within the resources available. With respect to overall co-ordination, it was felt that the CBS Advisory Working Group should assist in the co-ordination of the study.

3.4 In discussing the best way of implementing the work programme of the Commission, it was agreed that the present structure and number of CBS working groups (Working Groups on Codes, the GOS, GDPS and GTS, as well as the Advisory Working Group) should be maintained. In this connexion it should be mentioned that more emphasis should be put on co-ordination of the work of the CBS working groups. This co-ordination could be achieved if chairmen of working groups were invited to sessions of other working groups when matters of common interest were discussed. It was also mentioned that for matters covering a wider field than that of CBS, the president of CBS should invite the presidents of other technical commissions to arrange for an appropriate input, either by designating an appropriate expert or by presenting working papers reflecting the opinion of the other Commission, for consideration by the appropriate CBS bodies.

3.5 In reviewing the specific points to be dealt with by the Commission in the next few years, a list of major tasks was established as reproduced in Annex I to this report.

3.6 It was agreed that this list would be kept up to date by the president of the Commission. The Commission felt that in the period 1979-1982 each of the following CBS working groups should have two sessions with a duration of ten working days: the Working Groups on Codes, the GOS, GDPS and GTS. In addition, four meetings of study groups of CBS working groups should be foreseen in the budget for 1980-1983. Furthermore, there is a need for at least four informal planning meetings dealing with specific studies covering the fields of more than one CBS working group, such as the integrated system study mentioned in paragraph 3.3 above. As regards the CBS Advisory Working Group, it was felt that in the period 1979-1982 at least three sessions were required to co-ordinate the work programme of the Commission. In this connexion, the Commission felt that the sequence of meetings must be carefully planned and that the programme of sessions of CBS working groups should be co-ordinated in such a way as to facilitate the carrying out of studies covering more than one field.

3.7 With regard to the Advisory Working Group, the Commission felt that this group should be re-established and be composed of the president and vice-president of the Commission, the outgoing president of the Commission, and two further experts, including the chairmen of the Working Groups on Codes, the GOS, GDPS and GTS. The terms of reference and composition of the Advisory Working Group are given in Resolution 1 (CBS-VII). Resolution 1 (CBS-VII) was adopted.

3.8 The Commission was also of the opinion that there was a need for an extraordinary session with a duration of about ten working days. It was agreed that the extraordinary session should be held in 1980 with a limited agenda dealing with urgent matters.

3.9 The Commission recognized that the work programme as outlined above could only be carried out if the Secretary-General continued to give technical and administrative support. In this connexion, it was stressed that sessions of the Commission and working groups required carefully and well-prepared documents which should be distributed well in advance of sessions.

3.10 Finally, the Commission invited its president to bring the above work programme to the attention of Eighth Congress and the Executive Committee in order that it be taken into consideration during the preparation of the programme and budget of the Organization for the eighth financial period.

3.11 The Commission also considered its terms of reference and felt that they were adequate for the Commission to carry out its work programme. In this connexion, it noted that the responsibilities of the Commission in respect of processing, storage and retrieval of data for basic meteorological, climatological and other purposes were mentioned in the WWW plan and had been included in the work programme of the Commission for the following four years. However, some clarification of the terms of reference of CBS and CoSAMC might be desirable to avoid possible overlap of the work of the two Commissions.

3.12 The Commission noted the decision of the thirtieth session of the Executive Committee (paragraph 3.1.3 of the general summary) which requested Members to designate experts in the field of climatology to participate in CBS activities. It therefore encouraged Members to make climatologists available for participation in the work of CBS and, in particular, of the Working Group on the GDPS.

4. CO-ORDINATION OF DATA NEEDS FOR VARIOUS USES (Agenda item 4)

Several matters concerned with data needs which have been considered by CBS working groups or referred to CBS by other WMO bodies are discussed in paragraphs 4.1 and 4.2 below. Further action on some of these matters is also discussed under items 7, 8 and 9 of the agenda. In this connexion, the Commission also noted that a major review of requirements for observational and processed data involving both the surface-based and space-based observing systems of the WWW, as well as the GDPS, would take place after the results of the FGGE are known.

4.1 Requirements for observational data (Agenda item 4.1)

4.1.1 The Commission reviewed the observing programmes of stations included in the regional basic synoptic networks, adopted by the regional associations concerned. The Commission noted that regional associations had adopted identical programmes for surface synoptic stations, but that the decisions of the regional associations showed differences in upper-air observation programmes and in heights to be obtained by soundings. Consequently, the Commission decided that global guidelines on the upper-air programmes and heights to be obtained were needed to encourage a higher degree of uniformity. It also decided that all available radiosonde and radiowind observations were required for global exchange. The Commission also agreed that a world-wide goal of 10 mb was desirable for altitudes to be attained by radiosonde and radiowind observations.

4.1.2 The Commission was informed that, at its seventh session (Jakarta, July 1978), Regional Association V had again raised the question of the required frequency of radiowind and radiosonde observations in the tropics. The Commission discussed this matter at its sixth session (general summary, paragraph 6.1.2) and included in its future work programme a study of future observing systems based on the results of the FGGE (CBS-Ext. (76), paragraph 4.7(e)). In this connexion, the Commission also discussed the requirements for an adequate density of upper-air observations over the oceans in view of finer-mesh models now in use for numerical weather prediction. The Commission noted that the requirements for spacing and density of observations were given in the draft Manual on the GOS, which was presented for approval by the session (see paragraph 6.2). The Commission also noted that dropsonde information from aircraft is justified at 500 km intervals and flight-level information at 250 km intervals, or more frequently, when the aircraft crosses a jet stream. The Commission agreed that the Working Groups on the GOS and the GDPS should continue to study these two matters, particularly in connexion with their study of the best mix of observing systems.

4.1.3 The Commission considered a proposal for the international exchange of data at 925 mb which had been referred to it by the Executive Committee. The Commission agreed that the exchange of such data would be very useful for forecasting meteorological conditions in the atmospheric boundary layer, and especially for forecasting transport of atmospheric pollution. The Commission recognized that the global exchange of Part B of the TEMP messages would improve the situation in this regard. The Commission, however, taking account of the fact that requirements for the frequency and levels of these data vary from Region to Region, concluded that the regional associations should develop appropriate regional coding procedures for reporting of low-level data in Part B of the TEMP code.

4.1.4 The Commission was informed that data from the experimental Aircraft to Satellite Data Relay (ASDAR) system were now available on some parts of the GTS. These data are collected from a limited number of wide-bodied aircraft via geostationary meteorological satellites and distributed on the GTS. The Commission expressed the view that these data were a valuable addition to the WWW basic data. In this connexion, the Commission recalled that it had included in its future work programme a study of methods for increasing the use of aircraft reports, especially those involving automated systems (CBS-Ext. (76), paragraph 4.7(b)). It therefore requested its Working Groups on the GOS and the GDPS to include the use of ASDAR reports, in particular regarding the required space and time resolution at flight level, in their future study of the use of aircraft reports (see also paragraph 4.1.2). The Commission also agreed that the question of the proper code form for exchange of these data should be examined, and requested its Working Group on Codes to conduct such an investigation using the results of the study by the Working Groups on the GOS and the GDPS.

4.1.5 The Commission noted that EC-XXIX had approved the proposal of CMM-VII that the Beaufort scale in the Technical Regulations continue to be used for all purposes. However, in paragraph 2.4.7 of the general summary of the report of its session, Seventh Congress requested "the appropriate technical commissions to consider whether there was a continuing need for a Beaufort scale of wind for use over land." Accordingly, the Commission agreed that there continued to be a need for use of the Beaufort scale over land, in particular at those observing stations where instrumental wind-measuring devices were not available.

4.1.6 The Commission discussed the requirement for a new code, as proposed by CIMO, for the exchange of information on specific characteristics of radiosonde stations' equipment and techniques. This information, which would allow for data adjustments to be made, was considered necessary for both manual and automated upper-air analyses in order to ensure compatibility of upper-air data between various sounding systems. The Commission, however, did not believe that it was necessary to exchange these data via the GTS and therefore requested its president, in consultation with the president of CIMO and the Secretary-General, to develop procedures for exchanging this information by mail or some other appropriate means.

4.1.7 In connexion with a request by EC-XXX to update requirements for satellite data, the Commission agreed that receipt of satellite products presently offered by satellite operators for transmission on the GTS was of great importance in the operation of WWW centres. In particular, the need for such products as temperature profiles, winds, sea-surface temperatures, humidity and cloud data were mentioned. The Commission agreed that its Working Group on the GDPS should keep the requirements for satellite products under review in order to update the lists of types of meteorological message for global exchange published in the Manual on the GDPS.

4.1.8 The Commission considered a proposal concerning the need for global exchange of Parts B and D of the TEMP and TEMP SHIP codes as well as data on the state of the ground and precipitation amount. These data were considered necessary for the running and verification of complex global numerical forecast models at large centres. The Commission noted that Parts B and D of TEMP and TEMP SHIP and the 7RRjj group of FM 11-V were authorized for global exchange when the capacity of the MTC and its branches permits. Realizing that the limited capacity of the GTS in certain parts of the world would not permit, for some time to come, exchange of large quantities of data available regionally, the Commission requested its Working Groups on the GDPS and the GTS to study the requirements and arrangements for the exchange of Parts B and D of TEMP and TEMP SHIP and precipitation data on the GTS. This study should be carried out in consultation with the Commission for Atmospheric Sciences.

4.2 Requirements for processed data (Agenda item 4.2)

4.2.1 The Commission considered the need for an abbreviated version of the GRID code for exchange of processed data on the GTS. The Commission noted that the Working Group on Codes had developed such a code form, FM 49-VII GRAF. The Commission agreed that, in view of the requirements of many Members for a simplified version of the GRID code for use in data processing, a separate code with its own numerical designator would be most useful. It accordingly felt that Members should be encouraged to use this code for transmission of processed data in grid form. This matter, including aeronautical requirements, is given further consideration under agenda item 8.

4.2.2 The Commission noted two proposals made by RA VI, namely:

(a) Consideration of the possibility of satisfying Members' needs for grid products in both hemispheres from a single WMC so that users may avoid discontinuities of data along the Equator;

(b) Standardization of the type of grid and grid size to be used for the exchange of WMC and RMC products in the GRID or GRAF codes, i.e. a latitude-longitude grid of 5 degrees by 5 degrees for global exchange and of 2.5 degrees by 2.5 degrees (or, alternatively, 2.5 degrees latitude by 5 degrees longitude north of 60°N) for exchange within the Region.

The Commission felt that both of these proposals were important and accordingly requested the Working Group on the GDPS to carry out a study of the first of these problems, given in (a) above. Concerning the second proposal given in (b) above, the Commission agreed that a standard grid length of 5 degrees by 5 degrees of latitude-longitude, or multiples thereof, whenever this can be done without loss of accuracy, should be used for global exchange of processed data.

4.2.3 The Commission was informed that the results of the latest survey concerning the minimum requirements of Members for receipt of products from the WMCs and RMCs on the Main Trunk Circuit were now available in the WMO Secretariat and would be made known to those Members operating the centres concerned. Also, the Commission was informed of a similar survey carried out in RA VI concerning the exchange of products in GRID or GRAF code form. Therefore, recalling the decision at its extraordinary (1976) session (contained in paragraph 6.6 of the general summary of the report of the session) concerning the need for the Working Group on the GTS to make appropriate plans for the transmission of products on the MTC and its branches, the Commission agreed to include in its future work programme an implementation coordination meeting of data-processing and telecommunication experts to consider such a plan.

5. DRAFT WWW PLAN FOR THE PERIOD 1980-1983 (Agenda item 5)

5.1 The Commission noted the request of the Executive Committee that CBS should prepare the final text of the WWW plan for the period 1980 to 1983 which will be submitted to Eighth Congress by the President of WMO, on behalf of the Executive Committee. The examination of the draft plan was based on a document submitted by the Secretary-General. The Commission felt that a number of amendments needed to be made to the proposed text.

5.2 As regards the GOS, these changes referred mainly to an updating of the GOS by the inclusion of new elements in the surface-based sub-system. These were, in particular, ozone stations, stations for measurement in the planetary boundary layer, and climatological and agrometeorological stations. Furthermore, the part dealing with the space-based sub-system was amended to incorporate the comments made by the Working Group on the GOS on this subject.

5.3 With regard to the GDPS, the Commission felt that basic processing activities in respect of climatological data should be more clearly defined in the WWW plan and appropriate amendments were therefore inserted in the GDPS part.

5.4 A number of amendments were incorporated in the GTS part of the plan in order to define the purposes of the GTS more clearly. Two new branches were added to the configuration of the MTC, namely Algiers - Paris and Buenos Aires - Washington (see also paragraph 9.1.1.4 below).

5.5 With respect to the implementation part of the WWW plan, the Commission felt that this part is intended to be used as guidance for implementation action during the period 1980-1983 and that this part should be based on information available in the Secretariat. It therefore requested the Secretary-General to update this part of the plan in the light of more recent information received on this subject.

5.6 The text of the revised WWW plan for the period 1980-1983 is included as Annex II to this report.

6. OBSERVING SYSTEM (INCLUDING THE GOS PART OF WWW AND THE REPORT BY THE CHAIRMAN OF THE WORKING GROUP ON THE GOS) (Agenda item 6)

6.1 General

The Commission noted with satisfaction the report of the chairman of the Working Group on the Global Observing System, Dr. T. Mohr (Federal Republic of Germany). It also noted the excellent work accomplished by the working group, its study groups and rapporteurs, particularly in preparing the draft Manual on the Global Observing System, in elaborating the GOS portion of the draft WWW plan for 1980-1983 and in determining methods for reduction of Level I data from automatic weather stations.

6.2 Manual on the GOS and review of the Technical Regulations

After examining the draft Manual on the Global Observing System, prepared by the working group, and the comments received prior to the session as well as those made at the session, the Commission agreed on the text and adopted Recommendation 1 (CBS-VII). It noted, however, that the publication of Volume I of the Manual, which will constitute an annex to the WMO Technical Regulations, will necessitate the amendment of WMO Publication No. 49 - Technical Regulations - in order to ensure consistency and to eliminate unnecessary duplication between the two publications. The required amendments to the Technical Regulations were discussed under agenda item 12.

6.3 Quality-control procedures

The Commission expressed satisfaction with the good co-operation existing between the Working Groups on the GOS and the GDPS. It particularly appreciated the joint efforts made, through a study group, in the elaboration of minimum standards of quality control to be used in the monitoring of the operations of the WWW (see also agenda item 7). The Commission requested that close collaboration be established with CIMO and in particular with its Rapporteur on Accuracy of Measurements and Representativeness to enable the working group to follow progress in this field.

6.4 Best mix of observing systems and new observing technology and methods for inclusion in the GOS

The Commission noted that the working group, through a study group, was continuing its participation in studies on the best mix of observing systems. Experts

from the Working Groups on the GOS and the GDPS and also from CAS and the GARP JOC are involved in the work of this study group. It also noted that a report on the new observing technology and methods for inclusion in the GOS had been prepared by a rapporteur and agreed that the Study Group on the Best Mix of Observing Systems should give further consideration to this matter as well as pursue studies on its titular subject. The Commission therefore supported the proposed convening in early 1979 of an Informal Planning Meeting on Integrated Observing System Study over the Ocean. This meeting will have two purposes, namely:

(a) To evaluate the role of the NAOS scheme in the integrated observational system of the North Atlantic area and to report its findings to the fourth session of the NAOS Board in June 1979;

(b) To develop plans for a longer-term study on the best mix of observing systems to be based on expertise and knowledge gained from the FGGE.

The Working Groups on the GOS and the GDPS and two Commissions, CIMO and CMM, have been invited to designate experts to attend the meeting.

6.5 Methods for reduction of Level I data from automatic weather stations

The Commission learnt with interest that a report had been prepared on this subject by rapporteurs of the working group and that it had been circulated amongst members of the working group. Views were expressed that the report was of high quality but that further contributions should be obtained from a larger number of Members. The Commission consequently requested the Working Group on the GOS to continue studies of the subject and to submit a report to the eighth session of the Commission. It decided that, in the meantime, the available material on the reduction of Level I data from automatic weather stations should be included in the Guide on the GOS.

6.6 Volume II of the International Cloud Atlas

The Commission considered proposals for updating Volume II of the International Cloud Atlas, at present out of print. These proposals consisted of the inclusion of cloud photographs from aircraft and of photographs of tropical cumuliform clouds. The Commission requested the Secretary-General to make appropriate arrangements for the updating and reissuing of Volume II of the Cloud Atlas. During the discussion, views were expressed that the updated Volume II of the Cloud Atlas should contain only the minimum number of additional photographs. It should be published in loose-leaf form. The U.S.A. offered to assist the Secretary-General in the selection of photographs.

6.7 Difficulties encountered in maintaining the observing programmes and standard times for observations required by the GOS

6.7.1 The Commission noted with appreciation the information provided by the Delegate of Denmark concerning the efforts being made by his country in response to

Recommendation 17 (CBS/Ext.(76). In addition to the information provided to the seventh session of RA VI on the possibility of an interruption in the observing programmes at a number of stations on the east coast of Greenland, from 1 July 1979 until 1 January 1980, as a result of the withdrawal of financing for the operation of several stations under the ICAO Joint Support Agreement on 1 July 1979, the session was informed that arrangements had now been made by Denmark to ensure at least the regular operation of some surface synoptic stations and of two upper-air stations without any interruptions. Furthermore, the Commission noted that, as already reported at the seventh session of RA VI, the present observing programme at Icelandic stations would, due to the successful efforts made by Iceland, be maintained after the reduction of the ICAO joint support.

6.7.2 The Commission noted the concern expressed by some Members of RA III (South America) over the increasingly high cost of expendables and the resulting difficulties in maintaining the two daily upper-air observations required by the GOS. The Commission supported the course of action suggested by the seventh session of RA III to conduct a detailed study of this matter and requested the Secretary-General to assist the Association as necessary and to submit the results of this study to the president of the Commission.

6.7.3 The Commission noted that standard times for surface and upper-air observations were not completely adhered to in all parts of the world. It also noted the difficulties which prevented some Members from strictly adhering to these standards, as well as their efforts to overcome such problems. The Commission, while recognizing the serious practical and economic problems involved, decided to invite Members concerned to do their utmost in order to eliminate existing deviations from the standard times of observations as laid down in the WMO Technical Regulations.

6.8 Future work programme of the GOS

6.8.1 The Commission considered in detail the involvement of the GOS in the major tasks of CBS working groups for the period 1979-1982 (see agenda item 3). The Commission felt that, for the accomplishment of the tasks relevant to the GOS, the president of the Commission should be invited, in consultation with the Secretary-General, to make the necessary arrangements to ensure co-ordination and closer collaboration between the CBS working groups themselves and with the EC Panel of Experts on Satellites and also with CIMO.

6.8.2 The Commission, noting the foreseeable adoption by Congress of the World Climate Programme and the inclusion of climatological stations and observation networks in the GOS, considered and accepted their inherent responsibilities and felt that the president of the Commission should be invited, in consultation with the presidents of CoSAMC and other technical commissions concerned and with the Secretary-General, to make necessary arrangements to ensure the required co-ordination and collaboration with these technical commissions in matters relating to climatological observations.

6.8.3 The Commission expressed the view that among the major tasks in the field of the GOS the following should be treated in this order of priority:

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

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

(c) Monitoring of the operation of the GOS;

(d) Review of the Guide on the Global Observing System, adjustments to the Manual on GOS and relevant WMO Technical Regulations;

(e) Quality control of observational data;

(f) Study of new observing technology and methods for inclusion in the GOS.

6.8.4 Taking into account the future work programme on the GOS, the Commission decided to re-establish its Working Group on the Global Observing System with the terms of reference and composition as given in Resolution 2 (CBS-VII). Resolution 2 (CBS-VII) was consequently adopted.

7. DATA-PROCESSING SYSTEM (INCLUDING THE GDPS PART OF WWW AND THE REPORT BY THE CHAIRMAN OF THE WORKING GROUP ON THE GDPS) (Agenda item 7)

7.1 Report by the chairman of the Working Group on the GDPS

The Commission noted with appreciation the report by the chairman of the Working Group on the GDPS, Mr. F. Duvernet (France), reviewing the considerable amount of work accomplished by the group at its fourth session (March-April 1978) and by the Joint GOS/GDPS Study Group on Minimum Standards for Quality Control (January-February 1978). The proposals contained in the report were considered under the appropriate agenda items.

7.2 Guide on the GDPS (Volumes I and II)

7.2.1 Volume I

7.2.1.1 The Commission reviewed the proposals concerning Volume I of the Guide made by the Working Group on the GDPS and agreed that the following should be done:

(a) Revision and updating of Chapter 3 - Description of Numerical and Manual Methods used in Real-time Analysis and Prognosis, and Chapter 5 - Observational Data Requirements;

(b) Elimination of Chapter 6 - Time of Availability of WMC and RMC Products and Statements of Requirements for the Receipt of Processed Products, and Chapter 7 - Priorities for the Transmission of Data and Products, since both chapters are now included in Volume I of the Manual on the GDPS;

(c) Inclusion of detailed information on methods and techniques of quality control (see paragraph 7.5.2 below);

(d) Inclusion of information on requirements and technical aspects of conversion of information in alphanumeric form into pictorial form.

The Commission agreed that the Secretary-General should make appropriate arrangements to complete the revision of the Guide using the proposed outlines given in Annex III to this report.

7.2.1.2 In connexion with its consideration of the revision of Chapter 3 of the Guide, the Commission was informed that Members were experiencing difficulties in obtaining copies of the NCAR Summer School Publication referred to in the annex to paragraph 7.2.1.1 above. It therefore requested the Secretary-General to investigate the possibility of making this publication available to Member countries and members of the Commission. The Commission also agreed that the list of scales of meteorological systems in the Guide should be co-ordinated with those given in the Manual on the GOS. The chairmen of the Working Groups on the GOS and the GDPS were requested to co-ordinate on this matter.

7.2.1.3 The Commission also agreed that there was a need for a WMO Guide on the automation of data-processing centres which would describe all aspects of setting up such a centre. The Commission felt that information on hardware systems, software programming, tendering of contracts, etc. would be very useful, especially for the developing countries. The Commission accordingly requested the Secretary-General to make arrangements for the preparation of a detailed layout of such a Guide.

7.2.2 Volume II

The Commission reviewed the status of Volume II of the Guide, particularly in view of publication of the Manual on the GDPS and the need for updating the material contained in this volume, which was published in 1971. The conclusions of the Commission from its review of Volume II are given in Annex IV to this report.

7.2.3 Combining of Volumes I and II

In view of the substantial revisions involved in both Volumes I and II of the Guide, the Commission agreed that a one-volume edition of the Guide would be useful and practical. In this connexion, it noted that Volume I of the Manual on the GDPS had been issued in a loose-leaf type format which was much easier to keep up to date than the present printed edition of the Guide. The Commission therefore requested the Secretary-General to proceed with reissuing the Guide in a one-volume edition using the same loose-leaf format as in the present edition of the Manual on the GDPS.

7.3 Preparation of Volume II of the Manual on the GDPS

7.3.1 The Commission considered the draft layout of Volume II of the Manual on the GDPS which had been approved by the Working Group on the GDPS. The Commission

noted that the material included in Volume II will not form part of the WMO Technical Regulations and will be applicable only to Members of the regional associations concerned.

7.3.2 The Commission agreed that each regional section should contain, in the relevant paragraphs, the regional and national aspects and that the regional associations and Members should be invited to provide suitable material for inclusion in Volume II of the Manual. Recommendation 2 (CBS-VII) was adopted.

7.4 The Marine Environmental Data Information (MEDI) Referral System

7.4.1 The Commission was informed that EC-XXVII had agreed in principle to WMO participation in the MEDI Referral System, subject to further technical studies by CMM and CBS. The Commission was also informed that CMM had at its seventh session endorsed the decision of the Executive Committee and recommended that Members of WMO should participate in MEDI by registering their marine data holdings with the Intergovernmental Oceanographic Commission (IOC).

7.4.2 The Commission reviewed the results of a study of the technical aspects of WMO participation in MEDI, which was made by the Working Group on the GDPS. The Commission agreed that there were several aspects of this study which needed further development. In particular, the Commission felt that a referral system for data stored within the WWW needed to be elaborated before WWW centres could participate in MEDI. The Commission also agreed that the MEDI categories used for registering meteorological data should be expanded to include certain analyses of value to marine users. It therefore requested its Working Group on the GDPS to give the matter further study, in consultation with IOC, through the Secretary-General of WMO, and report its findings to the next session of the Commission.

7.5 Minimum standards for quality control

7.5.1 The Commission reviewed a draft attachment to the Manual on the GDPS which contained proposed minimum standards for quality control of data for use in the GDPS. This attachment had been approved by the Working Group on the GDPS. The Commission was informed that these standards had been developed at the first session of the Joint GOS-GDPS Study Group on Minimum Standards for Quality Control (January-February 1978). The corresponding standards for quality control of data in the GOS have been included in the Manual on the GOS (see paragraph 6.2 above).

7.5.2 The Commission agreed that the proposed standards would provide a satisfactory basis for Members to set up their quality-control programmes. However, the Commission agreed that the Secretary-General should arrange as soon as possible for publication in the Guide on the GDPS of detailed quality-control methods and techniques (see paragraph 7.2.1.1 above). Recommendation 3 (CBS-VII) was adopted.

7.6 Archiving of satellite data

7.6.1 The Commission was informed of a request by EC-XXX for CBS "to study the physical arrangements and techniques to be used for archiving of satellite data and information" (paragraph 3.1.29 of the general summary, abridged report of EC-XXX).

The Commission agreed that requirements for archival of satellite data must be available before such a study could be made. These requirements should include those for storage of satellite data to be used in research for analysis and forecasting and in hydrological, agricultural, marine and climatological studies.

7.6.2 The Commission accordingly requested:

(a) Its president to obtain requirements from other technical commissions (e.g. CAS, CoSAMC, CHy, CAgM, CMM) concerning the storage of satellite data; and

(b) Its Working Group on the GDPS to elaborate arrangements and techniques for storage of satellite data, based on the requirements determined in (a) and using the aid of certain satellite experts with a view to publishing a global plan for storage of satellite data in Volume I of the Manual on the GDPS.

7.7 Report of the Rapporteur on the State of the Sky in the Tropics

7.7.1 The Commission noted with appreciation the report of the Rapporteur on the State of the Sky in the Tropics (Mr. R. L. Holle, U.S.A.). The report summarized in an excellent manner the work accomplished by the rapporteur since CBS-VI and in particular the development of a set of photographs of tropical clouds for use with the state-of-the-sky code developed by RA IV. In this connexion, the Commission also noted with appreciation the recommendations of the rapporteur concerning the revision of Volume II of the International Cloud Atlas (see also paragraph 6.6 above).

7.7.2 The Commission agreed that the use by RA IV of a special regional section, with photographs of tropical clouds, in FM 11-V SYNOP was an excellent aid for observers in many parts of the tropics. The Commission therefore requested its president to bring the RA IV code and photographs for the state of the sky in the tropics to the attention of presidents of other regional associations with a view to adoption of revision of the code and photographs for their own use.

7.8 Collection of Level II-c data during the FGGE

The Commission was informed of the recent consideration by the Executive Committee Inter-governmental Panel on the FGGE of a Joint Organizing Committee proposal to collect additional data during the FGGE operational year. These data, known as the Level II-c data set, would be collected in non-real time on a global basis. The Commission noted that the EC inter-governmental panel had not yet approved a detailed Level II-c data-management plan and that, in particular, the global collection of precipitation data needed further study. The Commission noted that some data on precipitation amount were currently being exchanged when available and circuit capacity permitted. The Commission felt that action must await the adoption of a detailed plan for the collection of Level II-c data by the EC inter-governmental panel.

7.9 Re-establishment of the CBS Working Group on the GDPS

7.9.1 In view of the substantial work programme in the area of data processing to be accomplished by the Commission during the next four years, the Commission agreed

to re-establish the Working Group on the GDPS. When considering the terms of reference of the working group, the Commission agreed to add a term of reference taking account of the Commission's term of reference (g) concerning non-real-time processing of basic data for climatological and other uses.

7.9.2 Resolution 3 (CBS-VII) was adopted.

8. CODES (INCLUDING THE REPORT BY THE CHAIRMAN OF THE WORKING GROUP ON CODES) (Agenda item 8)

8.1 Report by the chairman of the Working Group on Codes

The Commission noted with appreciation the report by the chairman of the Working Group on Codes, Mr. G. Doumont (Belgium). The Commission also expressed its satisfaction with the important work carried out by the group at its fifth session and by correspondence since CBS-Ext.(76). The matters covered by the chairman in his report are discussed in detail in the documentation for the session. Details of action taken by the Commission on these matters are given in the paragraphs which follow.

8.2 Amendment to FM 87-VI Ext. SARAD

8.2.1 The Commission considered a proposed amendment to the SARAD code, allowing for greater precision in the exchange of clear-radiance values. This matter was brought to the attention of the WMO Secretariat and the Working Group on Codes. It was explained that some difficulties were experienced in maintaining the high degree of relative precision required in the clear-radiance data to be obtained from satellites of the TIROS-N type.

8.2.2 The problem concerned the present provision for reporting of clear-radiance data directly in the code. This procedure did not allow for the maintenance of a relative precision of one quarter of one per cent between radiance values from the various satellite channels. Atmospheric temperature profiles derived from radiances with this error level are accurate to about 1 K. The Commission agreed to add a fourth optional section to the SARAD code which would provide for reporting of clear-radiance data with the required accuracy. Recommendation 4 (CBS-VII) was adopted.

8.3 Abbreviated code for the transmission of processed data in the form of grid-point values

In view of its decision that an abbreviated GRID code should be presented as a separate code with its own numerical designator (see paragraph 4.2.1), the Commission examined the proposed code form FM 49-VII GRAF and included some minor amendments in the text of the code. The Commission felt that the code responded to the needs of CBS users and that it should therefore be introduced as soon as possible. The Commission recognized the possible unsuitability of the code FM 49-VII GRAF to meet aeronautical requirements for computer-to-computer exchange since the specifications and requirements had not been fully validated. This will require further co-ordination between CBS and CAeM. Recommendation 5 (CBS-VII) was adopted.

8.4 Amendments to codes FM 39-VI ROCOB and FM 40-VI ROCOB SHIP

The Commission examined a proposal concerning the addition of information to the ROCOB codes on the month and year of firing of the rocket. The Commission noted that the Secretary-General had requested comments on this proposal from Permanent Representatives whose weather services use the ROCOB codes and from the chairman of the Working Group on Codes. Replies received indicated support of the proposal. The Commission therefore agreed to amend the ROCOB codes by inserting the group MMJJJ immediately after the group YYGGg in FM 39-VI ROCOB and FM 40-VI ROCOB SHIP. Recommendation 6 (CBS-VII) was adopted.

8.5 Amendments to FM 71-VI CLIMAT code

8.5.1 The Commission considered some modifications to the CLIMAT code in view of requirements by agriculture and other users for climatological data. This matter was first considered by the Commission at its extraordinary (1976) session (see paragraph 5.13, CBS-Ext.(76)) and the president of CBS was requested to seek clarification from the president of CAgM on whether the weather phenomena involved were of a global or regional nature. The president of CAgM subsequently confirmed that the phenomena involved were global in nature.

8.5.2 When examining the proposed revision of the CLIMAT code, the Commission found that the amendments proposed would require further study and clarification, in particular regarding the use of the sunshine group and specification of phenomena of climatological significance. The Commission therefore decided that the matter should be studied further by the Working Group on Codes. In this connexion, the Secretary-General was requested to obtain more detailed requirements for the code from the presidents of CAgM and CoSAMC. Finally, the Commission emphasized that the international exchange of sunshine data should be encouraged, although it continues to remain optional.

8.6 Amendments to FM 63-V BATHY and FM 64-V TESAC

The Commission considered a proposal for reporting in FM 63-V and FM 64-V the values taken at selected levels other than IAPO standard levels. The Commission made several changes to the proposed code. Recommendation 7 (CBS-VII) was adopted.

8.7 Buoy identifier group

The Commission considered a proposal concerning the relocation of the data buoy identifier group in codes FM 24-V SHIP, FM 63-V BATHY and FM 64-V TESAC. In order that all these code forms be made consistent in the position of the location indicator as an aid in automatic processing, it was proposed that the location indicator should be near the beginning of the message. After consideration of several possible amendments to this proposal, the Commission decided that the matter required careful study and referred the proposal to its Working Group on Codes for further consideration, and requested the Secretary-General to consult IOC on this matter.

8.8 International code for reporting information on compatibility between soundings and instrument types (SONDE)

In view of its decision not to exchange data over the GTS to provide users of high-level radiosonde data with information for comparisons and compatibility studies (see paragraph 4.1.6 above), the Commission agreed that a detailed code form was not needed.

8.9 Amendments to aeronautical codes METAR, SPECI, ARMET and TAF

8.9.1 The Commission recalled that it had agreed on several amendments to FM 51-V TAF, FM 53-V ARFOR and FM 54-V ROFOR at its extraordinary (1976) session, which were later approved by Resolution 3 (EC-XXIX) and then included in Supplement No. 4 to the Manual on Codes. The Commission also recalled that certain proposals concerning amendments to the aeronautical codes METAR, SPECI, TAF and ARMET had been made to CBS Ext.(76) and referred to the Working Group on Codes for further study. After considering these proposals, the working group had proposed several amendments to these codes. These amendments to the METAR, SPECI, TAF and ARMET codes, which as yet have no official status in CBS, were inadvertently combined with the amendments to the TAF, ARFOR and ROFOR by the WMO Secretariat.

8.9.2 As a result, the texts now appearing in the Manual on Codes, Volume I, under the above-mentioned code forms, include some parts which have not yet been formally approved by CBS. Since 1 January 1978, when these texts came into force, the Secretariat had not received any communication from Members about them. The Commission therefore inferred from such absence of reaction that the proposals of the working group did not cause any operational problems.

8.9.3 Nevertheless, the Commission considered it proper to review the proposals as given in the documentation of the session. Recommendation 8 (CBS-VII) was adopted.

8.10 Continuation of TEMP DROP after the FGGE

The Commission reviewed a proposal to accept the TEMP DROP code, adopted for use during the FGGE, as a permanent WMO code to be included in Section A of Volume I of the Manual on Codes. The Commission agreed that there was a need for this code to continue in use for reporting sounding data from carrier balloons or aircraft after the First GARP Global Experiment was over. It felt, however, that TEMP DROP should be combined with the present FM 35-V TEMP and FM 36-V TEMP SHIP codes. Recommendation 9 (CBS-VII) was adopted.

8.11 Use of FM 20-V RADOB

The Commission was informed that the seventh session of RA III had noted some difficulties with the use of the FM 20-V RADOB code. Further discussion at the session revealed that these difficulties were involved with Part B of the code, which is intended for international exchange of information on significant features seen on radar. The Commission felt, however, that it needed more information on the specific

problems encountered in the use of this code and therefore requested the Secretary-General, in consultation with the president of CIMO, to conduct an inquiry among Members concerning the use of the code RADOB. The results of this survey should be made known to the Working Groups on the GDPS and Codes for further study.

8.12 Revision of Volumes I and II of the Manual on Codes

8.12.1 The Commission considered several matters concerned with re-editing and improvement of the Manual on Codes. In particular, it considered several specific proposals for improving the general quality of presentation and structure of Volume I. In this connexion, several delegations recalled that the Spanish edition of the Manual did not exist, and that supplements to the other language editions were often issued late. The Commission was of the opinion that immediate action should be taken for the Manual on Codes to be available in the official languages of the Organization.

8.12.2 In considering all these matters, the Commission emphasized that the Manual on Codes was one of the most important documents in use by Members of WMO and that it should, above all, be properly maintained and kept up to date. The Commission also agreed that substantial editorial revision of Volume I would facilitate the use of the Manual. The Commission was of the opinion that the Secretary-General should make arrangements to accomplish this.

8.12.3 Volume I

8.12.3.1 The Commission considered two urgent amendments to aeronautical codes and agreed that these should be included in the Manual on Codes after consultation with the Commission for Aeronautical Meteorology. The Commission also considered several other amendments of a substantial nature which require consultation with other WMO technical commissions. The Commission was informed that the WMO Secretariat had requested comments on these proposed amendments from the presidents of the technical commissions concerned. The Commission agreed that these amendments should be referred to the Working Group on Codes for further study in light of the replies received from other technical commissions.

8.12.3.2 The Commission also reviewed a long list of amendments to Volume I, mostly of editorial nature, and agreed that these should be included as necessary in a future edition of the Manual. The Commission therefore requested the Secretary-General to take account of this list (given in Annex XIV to this report) when arranging for the preparation of the future edition of the Manual.

8.12.3.3 Recommendation 10 (CBS-VII) was adopted.

8.12.3.4 The Commission reviewed a proposal which enumerated detailed principles for reorganizing the structure of Volume I. These principles are designed to bring the Manual up to the standard necessary for an annex to the Technical Regulations. It was agreed that these principles should be included as an annex to the existing Volume I of the Manual on Codes. In its present form the Manual contains some ambiguities and lacks a standard presentation in some respects. The Commission recognized that the present Manual, with its imperfections, could still be used in daily operations.

However, the Commission agreed to invite the Secretary-General to arrange for a general revision of Volume I, taking account of these principles, and that these principles should also be used in the elaboration of new codes. Recommendation 11 (CBS-VII) was adopted.

8.12.3.5 The Commission considered a layout for a special section of Volume I of the Manual on Codes, which would contain material related to the principles on development of codes and the encoding and decoding procedures. Since this material would not be of a regulatory nature, it could be printed on coloured paper to distinguish it from the rest of the Manual. The Commission considered several alternatives for the content and arrangement of material in this special section. In particular, it agreed that the special section should contain basic information on programming for use of WMO codes in computer science as well as all necessary information on codes, including code tables used in the past. In view of the importance of the contents of this section, the Commission requested its Working Groups on the GDPS and Codes to prepare a draft of this special section.

8.12.4 Volume II

The Commission recalled the decision taken at its extraordinary (1976) session to standardize Volume II of the Manual on Codes in order to bring it into conformity with the present structure of Volume I, concerning the inclusion of "regulations" and "notes" applicable to WMO Regions. The Commission agreed that a draft text presented to it, taking Region VI as a practical example, would provide a good basis for the regional associations to review the regional and national parts of Volume II in order to bring them into conformity with the structure of Volume I of the Manual. Recommendation 12 (CBS-VII) was adopted.

8.13 Publication of the International Seismic Code

The Commission considered a proposal that a code for the transmission of seismic data be published in Volume I of the Manual on Codes. This proposal arose from action taken by the Executive Committee which has resulted in seismic data being transmitted routinely on the GTS. Some delegations expressed doubts on the advisability of including in Volume I of the Manual on Codes a code which is not an official WMO code. Other delegations felt that, as messages containing seismic data were exchanged globally, it was necessary to include them in the global part of the Manual, i.e. Volume I. In this connexion, it was also mentioned that non-regulatory material was included in Volumes I of the Manuals on the GDPS and the GTS in attachments to these Manuals. The Commission agreed to include the seismic code in the attachment to Volume I which contains material given for information only. Recommendation 13 was adopted.

8.14 Common surface synoptic code

8.14.1 The Commission considered a proposal for the development of a common code for surface observations which could better meet the data needs of WMO programmes and Members as well as be more suitable for manual and automatic data processing. The Commission based its deliberations on the substantial work carried out within CBS and its working groups since 1962. It also took into consideration the trials and tests conducted by Members in 1973.

8.14.2 The Commission noted the increased need for the early introduction of a common code suited to various types of surface station, manned and automatic, on land and at sea, and developed a common code for surface synoptic observations. Recommendation 14 (CBS-VII) was adopted.

8.14.3 The Commission noted a proposal made by the U.S.S.R. for the coding of sea-ice data, given in the appendix to CBS-VII/Doc. 22. It felt that this proposal needed further study. However, in view of the fact that a change in the reporting of sea-ice data requires co-ordination with CMM, it invited its president to carry out necessary consultations with the president of CMM concerning the given proposal with the view to including it in the codes FM 12-VII and FM 13-VII.

8.14.4 The Commission noted that Fifth Congress, in Resolution 30 (Cg-V), had decided that metres per second should be used in all meteorological messages for international exchange as soon as agreement was reached with other international organizations concerned. The Commission encouraged Members to use metres per second to the extent possible.

8.15 Re-establishment of the Working Group on Codes

The co-ordinated future work programme of the Commission was discussed under item 3. During the discussion of code matters, the Commission noted that there were several important code matters which would need to be considered during the next years. It therefore agreed to re-establish the Working Group on Codes. Resolution 4 (CBS-VII) was adopted.

9. TELECOMMUNICATION SYSTEM (INCLUDING THE GTS PART OF WWW AND THE REPORT BY THE CHAIRMAN OF THE WORKING GROUP ON THE GTS) (Agenda item 9)

The Commission noted with appreciation the report by the Chairman of the Working Group on the Global Telecommunication System (GTS), Mr. I. A. Ravdin (U.S.S.R.), as well as the reports of two study groups of this working group, on data-transmission techniques and coded digital and analogue facsimile. The details of the three reports were discussed under the various paragraphs of this agenda item, as appropriate. The Commission also noted that the Secretary-General had initiated action on certain urgent conclusions of the Working Group on the GTS and its two study groups.

9.1 Organization of the Global Telecommunication System

9.1.1 The Main Trunk Circuit

9.1.1.1 The Commission noted that the seventh session of RA I (Africa) had made certain amendments to its Regional Meteorological Telecommunication Plan. Namely, the replacement of the RTH Pretoria by the RTH Lusaka and the RTH Brazzaville, and the rearrangement of some circuits in the southern part of Africa as a consequence of this replacement. The Commission agreed to make the consequent changes in Attachment I-3 to Volume I of the Manual on GTS.

9.1.1.2 The Commission also noted that VII-RA I had agreed to the transfer of the RTH Algiers to Oran. However, the Delegate of Algeria informed the Commission that his country, for technical reasons, had reconsidered this decision and that the RTH would be in Algiers, at least for some years to come. The Commission therefore agreed not to make the corresponding changes in Attachment I-3 referred to above and requested the Secretary-General to follow up this matter with the Permanent Representative of Algeria and the president of RA I and make any necessary amendments to Attachment I-3 after approval by the president of CBS.

9.1.1.3 The Commission had a lengthy discussion on the present and future configuration and operation of the MTC and its branches. It was 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 (see also agenda item 4 and paragraph 9.5 below).

9.1.1.4 The Commission considered two proposals from RA I and RA III to include in the WWW GTS plan two additional branches of the MTC, namely, Oran - Paris and Buenos Aires - Washington, respectively. The Commission agreed on the following course of action:

(a) To request the Secretary-General to enquire of the Members operating the centres concerned whether they are willing to operate the proposed branches of the MTC during the period 1980-1983 according to the specifications given in the Manual on the GTS;

(b) Pending results of this enquiry, to include in the draft WWW Plan 1980-1983 the inter-regional circuits Oran (or Algiers) - Paris and Buenos Aires - Washington, which are operational at present as branches of the MTC (see also paragraph 5.3 above);

(c) Upon approval by Eighth Congress of the WWW Plan 1980-1983, the Working Group on the GTS should work out the necessary revision of the responsibilities of the centres as well as the routeing arrangements on the MTC and its branches as a consequence of the designation of those two new branches of the MTC.

9.1.2 Collection of aircraft reports

9.1.2.1 The observer from ICAO informed the Commission that the collecting centres designated by ICAO experienced some difficulties in routeing the aircraft reports to the regional collecting centres designated by WMO regional associations on account of the different routeing arrangements developed by ICAO and WMO. This might also be one of the reasons for the inadequate number of aircraft reports available on the GTS. The Commission agreed that this matter should be studied by its Working Group on the GTS in order to streamline the routeing arrangements used by both ICAO and WMO.

9.1.2.2 In this respect, attention was drawn to paragraph 2.6 of Part I of Volume I of the Manual on GTS where mention is made of collecting centres in another concept not related to ICAO. The Commission agreed to delete the word "collecting" from this paragraph.

9.1.3 Exchange of BATHY/TESAC reports on the GTS

9.1.3.1 The Commission was informed of a statement made by the first session of the Joint IOC/WMO Working Committee for IGOSS (Paris, 18-27 September 1978) concerning the statistical summaries of the exchange of BATHY/TESAC reports on the GTS during the period January to July 1978, which indicated that a considerable loss of reports occurred on the GTS between the WMCs Moscow and Washington. The Commission was also informed of Resolution I (IGOSS-I) which, inter alia, invited CBS to take appropriate action to ensure the efficient exchange of BATHY/TESAC reports on the GTS.

9.1.3.2 Some delegates informed the Commission that they had experienced difficulties in handling BATHY/TESAC reports, both in respect of the exchange via the GTS and in the collection from, and distribution to, the oceanographic authorities. The Commission was of the opinion that the arrangements included in Volume I of the Manual on the Global Telecommunication System, in WMO Publication No. 9, Volume C, Chapter I, Catalogue of Meteorological Bulletins, and in other WMO publications should be strictly adhered to; but it also expressed the view that improved and more detailed procedures need to be developed to ensure the efficient collection and distribution of BATHY/TESAC reports. The Commission therefore requested the Working Groups on the GTS and on Codes to recommend such action as may be required for this purpose. Handling procedures between the oceanographic authorities and the centres of the GTS may require special attention.

9.1.3.3 The Commission adopted Recommendation 15 (CBS-VII).

9.2 Telecommunication procedures for the GTS

9.2.1 Definition of "meteorological bulletin"

9.2.1.1 The Commission was informed that the definition of "meteorological bulletin" adopted by CBS-Ext.(76) had caused ICAO difficulties because it made reference to the term "meteorological message". The definition of the latter term, which has to be included in Annex 3 to the ICAO Convention together with the definition of "meteorological bulletin", contains reference to specific WMO telecommunications arrangements that do not apply to ICAO. The ICAO Air Navigation Commission had invited WMO to reconsider the definition with a view to deleting the reference to "meteorological message".

9.2.1.2 The Commission, in the spirit of aligning ICAO and WMO procedures to the maximum extent possible, found no difficulty in complying with the ICAO request. It agreed that a "meteorological bulletin" would be defined as "a text comprising meteorological information preceded by an appropriate heading". This calls for an amendment in Volume I of the Technical Regulations (see agenda item 12).

9.2.2 "nnn"

The Commission considered a proposal to make the use of the transmission sequence number "nnn" in a cyclic manner mandatory on the GTS for both International Alphabets No. 2 and No. 5. The Commission, while recognizing the advantage of using

a unified procedure throughout the GTS, noted that some automated centres could not allocate sequential numbers. It was also mentioned that sequential numbering did not necessarily include the possibility of automatic retrieval in case of a request for repetition. The Commission therefore agreed not to make changes for the moment in the existing procedures.

9.2.3 Identification of routine meteorological messages

9.2.3.1 The Commission noted that almost insuperable difficulties were already being experienced by some centres in the allocation of message identifiers to meteorological messages, and expressed the opinion that these difficulties would become more widespread in the next few years, before major changes in the identification of meteorological messages could be introduced. Noting that these difficulties were mainly experienced in the allocation of message identifiers (and, in particular, of catalogue numbers) to bulletins containing satellite data, processed information in the form of grid-point values and pictorial information, the Commission decided that the best interim solution would be to remove certain restrictions in the allocation of "ii" and to make certain amendments in the manner in which catalogue numbers "CLLLL" are assigned. The changes introduced concern only satellite data and processed information. The method of allocation of "ii" and of assigning catalogue numbers is unchanged for addressed messages and for messages containing observational data and analyses, forecasts and warnings in normal alphanumeric form (i.e. C = 0-6 inclusive in Attachment II-5 to Volume I, Manual on the Global Telecommunication System (table of CL_3 specifications, Column C = 7, 8 and 9 are affected).

9.2.3.2 The Commission recognized that minor difficulties might arise in the application of the new and more flexible procedures, but took the view that such difficulties were inevitable if the Global Telecommunication System procedures in their existing form were to be capable of handling the large volume of processed information and satellite data becoming available and which were essential for the efficient operation of the World Weather Watch and the First GARP Global Experiment.

9.2.3.3 The Commission stressed that Members making use of the more flexible arrangements provided for in the amendments to the procedures should inform the Secretary-General of the manner in which this would be done at individual centres, in order that the necessary information be published for general use in WMO Publication No. 9, Volume C, Chapter 1, Catalogue of Meteorological Bulletins, and elsewhere.

9.2.4 Geographical designator "AA"

9.2.4.1 The Commission was informed that the ICAO Council had requested the Secretary-General of ICAO to bring to the attention of WMO the matter that some of the geographical designators "AA" in the abbreviated headings of meteorological bulletins developed by WMO were not always sufficiently self-evident and could benefit from attempts to make them correspond closely to the names of the countries to which they referred.

9.2.4.2 The Commission requested the Secretary-General to carry out a review of the geographical designators contained in Table B of Attachment II-6, Volume I of the Manual on the GTS. The review should be made in co-ordination with ICAO and the Members concerned and any changes should be approved by the president of CBS on behalf of the Commission.

9.2.5 International four-letter indicator "CCCC"

9.2.5.1 The Commission noted that some confusion had arisen as regards the application of the contents of paragraph 2.3.2.2 of Part II, Volume I of the Manual on the GTS concerning the use of "CCCC". It was felt that if a bulletin compiled by the NMC concerned were received incorrectly at the associated RTH, the inclusion of the "CCCC" of the RTH might cause rejection of this bulletin by meteorological telecommunication computers during its further transmission over the GTS, since the correspondence between the "CLLLL" and "CCCC" would no longer exist.

9.2.5.2 The Commission was of the opinion that it was important that the "CCCC" of the station originating the bulletin be kept throughout the transmission on the GTS. If, because of mutilated reception, the bulletin were corrected by a centre other than the originating centre, this should not be considered as recompilation and therefore the "CCCC" should not be changed. However, if for any reason a centre changed the contents of a bulletin, this would be considered as recompilation and the "CCCC" of the recompiling centre should be used, provided that the correct entries are in the Catalogue of Meteorological Bulletins and are adhered to. The Commission amended the text in the Manual on the GTS with a view to providing the above clarification.

9.2.6 Use of "NIL"

The Commission also noted that difficulties arose in the application of the instructions for the use of "NIL" contained in the Manual on the Global Telecommunication System, Volume I, Part II, paragraph 2.3.3.7, and decided that a minor amendment was necessary to ensure that the instructions are applied in a uniform manner when bulletins containing upper-air observations are being prepared.

9.2.7 Data designators for information transmitted by analogue facsimile

The Commission noted that the data designators for information transmitted by analogue facsimile as specified in the Manual on the GTS, Volume I, Part II, Attachment II-9, Table B, indicated some discrepancies as compared with the data designators for alphanumeric information specified in Attachment II-6, Table A. The Commission reviewed Table B referred to above with a view to eliminating the discrepancies and the inconsistency in Table B itself as well as updating Table B by including new designators for oceanographic analysis and prognosis products. The Commission adopted Recommendation 16 (CBS-VII) incorporating the above-mentioned changes in Part II of Volume I of the Manual on the GTS.

9.2.8 Message acknowledgment

The Commission considered the problem of messages being transmitted from one centre but not received at the next centre. This occurred mostly on low-speed circuits operated without any line protocol. The Commission felt that there were different methods to ensure regular flow of data. It therefore agreed that this matter should be studied by its Working Group on the GTS with a view to developing procedures to ensure regularity of data flow on low-speed circuits and which could also be used on medium- and high-speed circuits for the exchange of addressed messages.

9.2.9 Notification of emergency changes in the operation of meteorological satellites

The Commission was informed that the seventh session of Co-ordination of Geostationary Meteorological Satellites (CGMS) had requested WMO to examine the feasibility of the satellite operators using the GTS to provide notification of emergency changes from normal operation to the other satellite operators and users. It was indicated that the GTS would be used only for massive, severe emergency conditions, e.g. loss of transponders or viewing instruments. The Commission agreed that for notifications between satellite operators, addressed messages on the GTS (administrative) would be used in accordance with the provisions of paragraph 2.4, Part II, Volume I of the Manual on the GTS. As regards notification to users, this should be made by a normal meteorological message as for satellite data. The Commission requested the Secretary-General to inform the CGMS of those possibilities.

9.3 Technical characteristics and specifications for the GTS

9.3.1 Modems for data-signalling rates up to 9600 bit/s

9.3.1.1 The Commission reviewed the study made on the possibilities provided by the modems described in CCITT Recommendations V-26, V-27, V-27 bis and V-29. It noted that the modem V-29 differs favourably from the other modems as it permits the use of a number of data-signalling rates, e.g. 4800, 7200 9600 bit/s, and also permits circuit multiplexing in different alternatives which enables the use of circuits for simultaneous data and digital facsimile transmissions on the same circuit.

9.3.1.2 Concern was expressed that the use of different types of modem on the GTS might cause serious difficulties. The Commission therefore agreed that the V-29 modem should be used by agreement between the centres concerned.

9.3.1.3 The Commission adopted Recommendation 17 (CBS-VII).

9.3.2 High-level Data Link Control (HDLC) procedures

9.3.2.1 The Commission reviewed the state of development of HDLC procedures by CCITT and ISO. It was of the opinion that the time was not yet ripe to adopt the HDLC as a WMO standard; it agreed, however, that any future changes in the GTS procedures should be based on the HDLC procedures. The Commission requested its Working Group on the GTS to complete its study of the HDLC as a matter of urgency, with a view to developing WMO procedures based on the HDLC procedures which may be introduced on some segments of the MTC by 1982.

9.3.2.2 In order to achieve the above goal, the Commission was of the opinion that WMO should participate actively in the work of ISO for further development of the HDLC procedures to meet with WMO specifications. It therefore requested the Secretary-General to take the necessary steps for close co-ordination with ISO and CCITT in this field and for WMO participation in the further development of the HDLC procedures. Close co-ordination should also be maintained between WMO and ICAO in this respect to ensure that the procedures developed by the two organizations are as compatible as possible.

9.3.3 Channel multiplexing for data and digital facsimile transmissions

The Commission noted that multiplexing of circuits for data and digital facsimile transmissions had its advantages and shortcomings. It noted nevertheless that this technique could be used on some parts of the GTS, for example where it is necessary to transmit a large number of charts for many users in real time. The Commission considered it necessary to develop procedures for the use of this technique and therefore agreed to include this matter as an urgent item on the work programme of its Working Group on the GTS.

9.3.4 Digital facsimile transmission

The Commission noted that its Working Group on the GTS had for several years been studying questions related to digital facsimile transmission techniques suitable for use on the GTS in general and the MTC in particular. In view of the urgent need to increase the efficiency of the GTS, the Commission was of the firm opinion that its working group should intensify its work in this respect with a view to the early introduction of digital facsimile transmission and the elimination, as soon as possible, of analogue facsimile transmission, at least on some segments of the MTC. This elimination would involve finding a satisfactory solution to the difficult question of transmitting half-tone cloud images.

9.3.5 Radio frequency requirements for meteorological purposes

The Commission noted with satisfaction the conclusion of the eighth session of its Working Group on the GTS relating to the radio frequency bands allocated for meteorological purposes, in particular meteorological aids and meteorological satellites, as well as the follow-up action by the Secretary-General and Members in this respect. The course of action taken prior to the XIVth Plenary Assembly of the CCIR (Kyoto, 7-23 June 1978) led to maintenance of the present frequency allocations for meteorological purposes and their protection from interference from other services. The Commission requested the Secretary-General to follow this matter closely at any forthcoming ITU meetings, in particular the WARC 1979.

9.4 Re-establishment of the Working Group on the GTS

9.4.1 In view of the efficient manner in which the Working Group on the GTS had conducted its work in the past and the need to continue this work for the development of the WWW Global Telecommunication System, the Commission decided to re-establish this working group. Resolution 5 (CBS-VII) was adopted.

9.4.2 The Commission was of the opinion that the outcome of the deliberations of the Working Group on the GTS would be more fruitful if there were a wide representation of telecommunication centres from the different WMO Regions. The Commission felt that the attendance of experts from the different telecommunications centres and Regions at sessions of the Working Group on the GTS would be facilitated if those sessions were held, as far as possible, consecutively in different WMO Regions. It therefore invited Members to consider favourably the possibility of hosting those sessions as indicated above, as well as the participation of experts from their telecommunications centres in those sessions, in particular, experts from the centres on the MTC and its branches.

9.5 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 HDLC procedures;
- 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.

10. MONITORING OF THE OPERATION OF THE WWW (Agenda item 10)

10.1 The Commission reviewed the present status of implementation of the WWW Plan as well as the results of the non-real-time monitoring of the operation of the WWW carried out in the previous four years, in particular the GOS and the GTS. The Commission was informed of the follow-up action taken by the Secretary-General with the Members concerned as regards the deficiencies revealed by the monitoring.

10.2 The Commission noted that the implementation of the GOS surface-based sub-system had progressed during the previous four years, but that, despite Members' constant efforts to implement the WWW Plan, all the targets for the development of the GOS surface-based sub-system had not been achieved and its operation had not attained the anticipated level.

10.3 As regards the real-time functions of the GDPS, there has been a small increase in the number of products available from WMCs. The number of products available from RMCs has remained about the same for the last two years. Concerning the non-real-time functions of the GDPS, the Commission noted that the GDPS centres were now introducing, to an increasing extent, modern archiving and storage methods.

10.4 The Commission further noted that there had been some progress in the implementation of the GTS, namely by establishing new circuits and upgrading existing ones. However, the implementation of the GTS did not reach the required level and its operation was still unsatisfactory in various areas.

10.5 The Commission realized that during the previous four years, some progress in the implementation of the WWW Plan had been made in some areas, but that in others there had been hardly any progress. The Commission was of the opinion that, in order to achieve greater progress, a study of the possibility of improving the WWW system should be conducted (see agenda item 3).

10.6 The results of monitoring carried out in June 1978 indicated that there were a certain number of implemented radiosonde stations from which no TEMP 0000 GMT data and/or 1200 GMT data were available; their regional distribution was as follows:

REGION	TEMP, 0000 GMT		TEMP, 1200 GMT	
	No. of stations implemented	No. of stations whose availability was NIL	No. of stations implemented	No. of stations whose availibility was NIL
I	38	17	62	23
II	283	21	276	20
III	16	7	47	15
IV	144	4	157	9
V	81	10	24	3
VI	134	4	139	4
Antarctic	12	-	10	5
Ocean weather stations	6	-	6	-
Total	714	63	721	79

10.7 In respect of timeliness of collection of TEMP and PILOT data, it was noted that more than 95 per cent of the total number of reports which were received at the centres on the MTC were available within three hours of the standard observation times.

10.8 As regards SYNOP data, the monitoring results indicated that the availability of such data at centres on the MTC was about 75 per cent of the expected number of stations included in the list for global exchange. It was also noted that the availability of SYNOP data from Regions II, IV and VI exceeded 80 per cent for all main synoptic observation times. However, the availability of SYNOP data from Region I did not reach 60 per cent. The availability from Region III was about 70 per cent, except for 0600 GMT (local night) where it was about 50 per cent. The availability from Region V for 0000 and 0600 GMT was about 80 per cent but that for 1200 and 1800 GMT (local night) was about 70 per cent.

10.9 As regards the timeliness of the collection of SYNOP data, it was noted that more than 95 per cent of the total number of reports which were received at the centres on the MTC were available within three hours of observation times, except for the 0000 and 0600 GMT data from Region I.

10.10 The information obtained from Members concerning the above deficiencies indicated the following problems:

(a) Difficulties in the regular operation of upper-air observations due to lack of consumables or shortage of qualified meteorological observers;

(b) Difficulties in HF propagation and in the availability of suitable frequencies to ensure highly reliable night-time operation of point-to-point circuits;

(c) Difficulties in collecting directly at the NMC, within the time limit prescribed in the Manual on the GTS, all SYNOP reports from those SSB networks which comprise more than ten synoptic stations;

(d) Difficulties in the maintenance of telecommunication equipment at remote stations, in particular those located at inaccessible places;

(e) Difficulties in transmitting reports through a non-exclusive meteorological channel of the national telecommunication network;

(f) No alternative arrangement for routeing of meteorological information in cases of outages of circuits and centres.

10.11 The Commission noted with appreciation that some Members, following up the results of real-time monitoring carried out by their centres, had contacted Members concerned with a view to finding out the means to assist them in eliminating shortcomings either by bilateral assistance or through the VAP.

10.12 In view of the above, the Commission was of the firm opinion that certain measures needed to be taken by Members and the Secretary-General with a view to improving the operation of the WWW and identifying the exact reason for the deficiencies and irregularities in the operation so that remedial action could be taken.

10.13 The Commission noted that there were discrepancies between the monitoring results provided by the various centres, in particular the automated centres. This could be due to different reasons, such as the routeing of data and different criteria used at automated centres for acceptance of data by the meteorological processors; furthermore, some centres experienced great difficulties in relaying bulletins not in conformity with the standard meteorological procedures and the Catalogue of Meteorological Bulletins. The Commission agreed that this matter should be thoroughly investigated in order to ensure that the different centres receive sufficient data to meet their requirements. The Commission strongly urged all Members to play a full part in the work of monitoring the operation of the WWW and to provide active assistance in making studies, co-ordinated by the Secretary-General, of the deficiencies revealed by the monitoring and how they may be resolved.

10.14 The Commission adopted Recommendation 18 (CBS-VII).

10.15 The Commission recalled that the statistical results of the monitoring, on a both real-time and non-real-time basis, were based on the list of stations for global exchange and the Catalogue of Meteorological Bulletins. Regular updating of those publications is therefore essential for the effective operation of the WWW and its monitoring. In this connexion, the Commission noted with satisfaction that the Secretariat had developed computer programs for updating and cross-checking the contents of the list of stations for global exchange (as included in Volume I of the Manual on the GTS), Volume A and the Catalogue of Meteorological Bulletins. The Commission was of the opinion that, in accordance with Technical Regulations [A.1.1.]7.1 and [A.3.1.]2.1.3, as well as the Manual on the GTS, Members concerned should send up-to-date information to the Secretariat for inclusion in Volumes A and C and for the issue of advance notification of changes to Members through the METNO service.

10.16 Plan for monitoring the operation of the WWW

10.16.1 The Commission considered that the plan for monitoring the operation of the WWW, developed by CBS-Ext.(76) and approved by EC-XXIX, called for no changes. It reaffirmed the decision of CBS-Ext.(76) regarding the need for detailed procedures with a view to carrying out effective monitoring of the operation of the WWW.

10.16.2 GTS aspects of monitoring

The Commission noted that its Working Group on the GTS had developed detailed procedures for the internationally co-ordinated monitoring of the operation of the GTS on a real-time and non-real-time basis. Those procedures were communicated to all Members and were used in the June 1978 monitoring. The Commission was informed that the procedures had not created significant difficulties for the Members participating in the June 1978 monitoring. It therefore agreed not to make any change in those procedures and urged all Members to implement them at the earliest possible date. The Commission stressed the need for the exchange of monitoring results between adjacent centres in order to enable the different centres to identify the areas where urgent remedial action is needed.

10.16.3 GDPS aspects of monitoring

10.16.3.1 The Commission noted that a joint study group had developed minimum standards for quality control of observational and processed data which could also be considered as detailed procedures for monitoring of the GDPS. These standards are discussed under agenda item 7.

10.16.3.2 Furthermore, the Commission agreed that an important aspect of monitoring of the GDPS was the development of standard procedures for verification of the technical quality of output products of WWW centres. The Commission was informed that its president had appointed Dr. D. Söderman (Finland), a member of the Working Group on the GDPS, as a CBS expert to serve on the Working Group on Weather-prediction Research of the Commission for Atmospheric Sciences (CAS). This had been done at the request of the president of CAS. The Commission was further informed that Dr. Söderman

would soon report to the CBS Working Group on the GDPS on verification studies being carried out by the CAS working group. In this connexion, the Commission noted with interest a project being carried out by Finland, with the assistance of the WMO Secretariat, in which numerical analyses and forecasts will be assembled during 1979 for use in making comparative verification studies and as a basic data set for research.

10.16.4 GOS aspects of monitoring

10.16.4.1 The Commission noted that its Working Group on the GOS, at its second session (Geneva, March 1978), had considered the minimum standards for quality control of observational data developed by the Joint GDPS/GOS Study Group on Minimum Standards for Quality Control.

10.16.4.2 As regards the detailed procedures for monitoring the GOS, the Commission agreed with the action taken by its Working Group on the GOS to incorporate in the Manual and Guide on the GOS the relevant parts of the minimum standards referred to in the above paragraph.

11. EDUCATION AND TRAINING IN THE FIELD OF CBS (Agenda item 11)

11.1 General considerations

11.1.1 When considering education and training in the field of CBS, several delegates from developing countries expressed appreciation of the programme carried out by WMO. However, the Commission emphasized that all aspects (e.g. training publications, fellowships, training seminars and special training courses) must be made more responsive to the needs of developing countries. The Commission noted that the greatest needs for assistance were in the areas of maintenance of surface and upper-air observing stations, synoptic meteorology, satellite meteorology, operational numerical weather prediction, and maintenance and use of electronic equipment. As regards future activities under education and training, the Commission felt that the results of the monitoring of the operation of the WWW should be taken into account in the formulation of these programmes.

11.1.2 The Commission agreed that there should be more emphasis on climatology in connexion with its involvement in the World Climate Programme. It therefore requested the Secretary-General, in consultation with CBS and other technical commissions as required, to develop an education and training programme in climatological observations and in synoptic climatology and to assist in its implementation as required.

11.1.3 The Commission recognized the importance of training in meteorological observations and in the maintenance of required equipment and instruments and agreed that the Secretary-General should inform Members of this matter and offer to assist them in carrying out training in these areas if requested.

11.2 Review of WMO training publications and syllabi

The Commission reviewed the training publications prepared and issued by the Organization since the last session of CBS. The Commission noted with satisfaction that the Guidelines for the Education and Training of Personnel in Meteorology

and Operational Hydrology (WMO - No. 258), second edition (1977), included new or revised syllabi in synoptic meteorology and meteorological telecommunications. The Commission agreed that the new publications, in addition to those already in existence, went a long way towards satisfying needs for such training aids in the fields of meteorological observations, data processing and telecommunications. However, the Commission felt that WMO Publication No. 364 - Compendium of Meteorology, Volume I, Part 3, Synoptic Meteorology, could be improved since, in its existing form, it did not contain lecture notes of sufficient depth for Class I and II meteorologists. The Commission also agreed that more up-to-date information was needed on tropical meteorology and forecasting techniques in tropical areas. WMO publications in education and training should be translated into all the official languages of the Organization and kept up to date. In this connexion, the Compendium of Meteorology for Use by Class I and Class II Meteorological Personnel (WMO - No. 364) was again mentioned.

11.3 Organization of training seminars and workshops

11.3.1 The Commission was informed of several training seminars and workshops held since its previous session which covered such subjects as uses of radar and satellite data, tropical cyclones, precipitation and flooding, and management of telecommunications. It felt that such seminars provided an excellent training opportunity, particularly for developing countries, and that the programme of seminars and workshops during the following four years should continue to feature the subjects mentioned in paragraph 11.1.1 above. In this connexion, the Commission emphasized the need for more regional training seminars, particularly in the area of meteorological telecommunications, with the participation of candidates from developing countries.

11.3.2 When discussing the organization of training courses and workshops in the field of the GDPS, the Commission agreed that short-term courses were preferred, since longer courses required an extended absence from operational duties at home. Longer training courses should be of an academic nature and should lead to some sort of certificate or diploma.

11.4 Requirements for fellowships and specialized training

The Commission was informed that many fellowships for studies in various aspects of meteorology had been awarded by WMO since 1974. Most of these fellowships were for studies in the field of synoptic meteorology and related subjects as applied to local forecasting. The Commission re-emphasized the need for increasing fellowships for specialized training in synoptic meteorology and related subjects. The Commission also agreed that the WMO Secretariat should ensure that available fellowships are given the widest possible distribution. More fellowships are needed in all areas of training mentioned in paragraph 11.1.1 above.

12. REVIEW OF TECHNICAL REGULATIONS OF INTEREST TO CBS (Agenda item 12)

12.1 The Commission considered a number of proposals made by its working groups concerned with amendments to the Technical Regulations. A summary of these

proposals and the conclusions of the Commission on them is given in paragraphs 12.2 to 12.8 below. The order of this summary follows the sequence of the relevant texts in the Technical Regulations.

Definitions

12.2 The Commission was of the opinion that the definitions given in Volume I of the Technical Regulations should be supplemented by additional definitions, mainly related to the GOS space-based sub-system. It consequently proposed the insertion of a number of new definitions of terms concerned with the space-based sub-system under "Definitions" in Volume I of the Technical Regulations.

12.3 The Commission recommended that the definition of "prognostic chart" as it now appears in Volume II of the Technical Regulations and in the ICAO Annex 3 should also be included in Volume I. It agreed, however, that this definition needed improvement and requested the Working Group on the GDPS to redraft it for consideration at a later session of the Commission. It also agreed that there was a need for a definition of "prognosis" to be included in Volume I of the Technical Regulations, since this term already was being used in the Manual on Codes.

12.4 The Commission was informed of a request of ICAO to reconsider the existing definition of "meteorological bulletin" in Volume I of the Technical Regulations. This definition contains the term "meteorological message", which ought to be included in Annex 3 to the ICAO Convention along with the definition of "meteorological bulletin". However, the term "meteorological message" refers to specific WMO telecommunications arrangements that do not apply to ICAO, and is not acceptable to ICAO. The Commission therefore recommended that the definition "meteorological bulletin" be changed to avoid this difficulty.

12.5 A.1 - The Global Observing System

In accordance with a decision of Seventh Congress, the Commission recommended that amendments be made to Section /A.1/ to eliminate duplication and to ensure consistency with the draft Manual on the GOS which had now been submitted for adoption (see paragraph 6.2 above) and requested the Secretary-General to make the applicable changes.

12.6 A.2 - The Global Data-processing System

Also in accordance with the decision of Seventh Congress, the Commission recommended amendments to Section /A.2/ to avoid duplication and ensure consistency with the Manual on the GDPS.

12.7 Annexes to Volume I of the Technical Regulations

The Commission recommended several amendments to Annex III to the Technical Regulations, the Manual on the GTS. These are discussed under agenda item 9. Certain proposals on the revision of Annex I, Volume II of the International Cloud Atlas, are discussed under agenda item 6.

12.8 The Commission adopted Recommendation 19 (CBS-VII) concerning the proposed amendments to the Technical Regulations. The precise wording of all the amendments proposed is given in Annex XXI to this report.

13. NOMINATION OF MEMBERS OF WORKING GROUPS AND NOMINATION OF RAPPORTEURS (Agenda item 13)

13.1 The Commission re-established five working groups, namely:

- Advisory Working Group;
- Working Group on the Global Observing System;
- Working Group on the Global Data-processing System;
- Working Group on the Global Telecommunication System;
- Working Group on Codes.

The chairmen of the working groups, as well as the members of the Advisory Working Group, were nominated at the session. It was agreed that the members of the other working groups should be nominated by correspondence after the session since all Members of WMO should be invited to nominate experts to serve on these groups.

13.2 Details of the composition and terms of reference of the working groups are given under the relevant agenda items. The Commission felt that, although the WMO General Regulations do not contain any specific provisions concerning vice-chairmen of working groups, it might be advantageous for the working groups of CBS to elect vice-chairmen who would assist the chairmen in carrying out the different work programmes. It was agreed, therefore, that in view of the evident advantages, the working groups should elect their vice-chairmen and that these elections should take place at the first session of the working groups after the seventh session of the Commission.

14. REVIEW OF PREVIOUS RESOLUTIONS AND RECOMMENDATIONS OF THE COMMISSION AND RELEVANT EXECUTIVE COMMITTEE RESOLUTIONS (Agenda item 14)

14.1 In accordance with the current practice, the Commission examined those resolutions and recommendations adopted prior to its seventh session and which were still in force. This review also included inter-sessional recommendations adopted by correspondence in the field of telecommunications.

14.2 The Commission noted that the action on most of its previous recommendations had already been taken and completed. It also noted that the action on the four recommendations mentioned below was of a continuous nature.

Recommendation 3 (CBS-VI) - Conversion of products in alphanumeric (GRID code) form into pictorial form

Recommendation 6 (CBS-VI) - Aircraft weather reports

Recommendation 20 (CBS-VI) - Reporting of Parts B and D of FM 36.E - TEMP SHIP by voluntary observing ships

Recommendation 20 (CBS-Ext.(76)) - Exchange of BATHY/TESAC data over the Global Telecommunication System.

The Commission agreed, however, that the text of Recommendation 3 (CBS-VI) needed updating. The revised version was adopted as Recommendation 20 (CBS-VII).

14.3 As regards Recommendation 24 (CBS-Ext. (76)) - Guide on the Automation of Meteorological Telecommunications Centres, the Commission noted that the Guide was at present published in English only. It agreed not to keep this recommendation in force. However, it requested the Secretary-General to publish the Guide in other official languages as required.

14.4 As regards Resolutions 1 to 6 (CBS-VI), the Commission agreed not to keep them in force as they were replaced by other resolutions.

14.5 In view of the above, the Commission agreed not to keep in force all recommendations and resolutions adopted by the Commission prior to its seventh session except the four recommendations referred to in paragraph 14.2 above. Resolution 6 (CBS-VII) was adopted.

14.6 The Commission then examined the Executive Committee's resolutions within the field of activity of CBS and agreed that Resolution 2 (EC-XXX) need no longer be kept in force. Recommendation 21 (CBS-VII) was adopted.

15. SCIENTIFIC LECTURES AND DISCUSSIONS (Agenda item 15)

15.1 Two afternoons were partly devoted to scientific lectures and discussions. The meetings were presided over by Dr. J. Brinkmann, vice-president of CBS. The general topic of the lectures was "New observing and processing techniques." The papers presented were as follows:

- Aircraft-to-Satellite Data Relay (ASDAR) observations and their contribution to weather analysis and forecasting, by Dr. J. K. Sparkman and Dr. R. McPherson (U.S.A.)

- Buoys as part of an integrated observing system, by Mr. O. Haug (Norway)

- The potential contribution of constant-level balloon observations to operational weather analysis and forecasting, by Dr. P. Julian (U.S.A.)

- U.S.S.R. observations and research on the state of the atmosphere in polar regions, by Dr. E. I. Tostikov (U.S.S.R.)

In addition, the following lectures were given as an introduction to an excursion to the facilities of the WMC/NMC Washington and National Environmental Satellite Service (NESS) at the World Weather Building, Camp Springs, Maryland:

- The tasks of the WMC/NMC Washington, by Mr. E. M. Carlstead
- The NOAA satellite system and the central processing facilities, by Mr. R. Gird
- The Automation of Field Operations and Services (AFOS) programme, by Mr. R. McGrew

15.2 The Commission requested the Secretary-General to publish the papers after consultation with the authors as appropriate.

16. ELECTION OF OFFICERS (Agenda item 16)

Mr. J. R. Neilon (U.S.A.) and Dr. A. A. Vasiliev (U.S.S.R.) were unanimously elected president and vice-president respectively.

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

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

18. CLOSURE OF THE SESSION (Agenda item 18)

18.1 In his closing address, the president of the Commission, Dr. O. Lönnqvist, reviewed the work of the seventh session and recalled the major important results accomplished by the session. He thanked all the participants for the hard work done and the spirit of co-operation which had greatly helped to finalize all the work that the session had achieved in the rather short time. He also thanked the vice-president and the chairmen of the two working committees for their able work during the session. The president then stressed the need for co-operation, not only internationally, but also in national Services, among the different WMO technical commissions and also among the technicians and scientists of the world. He thanked the authorities of the Government of the U.S.A. and NOAA for the excellent facilities provided for the session and for the warm hospitality shown to all the participants. The president also expressed his thanks to WMO and the local secretariat staff who had given important support to the work of the session. Dr. Lönnqvist said that he was glad to have presided over the seventh session of CBS, where the needs for co-operation and integration had been stressed by many speakers and where important decisions in this respect had been made. In concluding, the president congratulated once more the newly elected president and vice-president on their election and wished them good luck and every success in their future work for the Commission.

18.2 Mr. A. Durget (France), speaking on behalf of all the delegates, thanked the president for his excellent guidance throughout the session and compared him to a captain guiding a ship carefully through waters which were often difficult and troubled. He felt that all members of CBS would always remember and appreciate Dr. Lönnqvist's expert understanding as regards the work of the Commission. Mr. Durget wished the outgoing president every success in his future life.

18.3 The session was closed at 1.00 p.m. on Friday, 17 November 1978.

RESOLUTIONS ADOPTED BY THE SESSION

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 Intergovernmental 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.

Res. 6 (CBS-VII) - REVIEW OF THE PREVIOUS RESOLUTIONS AND RECOMMENDATIONS OF THE COMMISSION FOR BASIC SYSTEMS

THE COMMISSION FOR BASIC SYSTEMS,

CONSIDERING that Resolutions 1, 2, 3, 4, 5 and 6 (CBS-VI) need not be kept in force,

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

DECIDES:

(1) To keep in force Recommendations 6 and 20 (CBS-VI) and 20 (CBS-Ext.(76));

(2) Not to keep in force the resolutions and other recommendations adopted before its seventh session;

(3) To publish in the final report of the seventh session the texts of the recommendations kept in force.*

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* These recommendations are reproduced on page 241.

RECOMMENDATIONS ADOPTED BY THE SESSION

Rec. 1 (CBS-VII) - PUBLICATION OF THE MANUAL ON THE GLOBAL OBSERVING SYSTEM

THE COMMISSION FOR BASIC SYSTEMS,

NOTING:

(1) Resolution 2 (CBS-VI),

(2) Paragraph 2.4.14 of the general summary, abridged report of the Seventh World Meteorological Congress,

(3) Paragraph 4.7 of the general summary, abridged final report of the extraordinary session (1976) of the Commission for Basic Systems,

CONSIDERING:

(1) That Volume I of the Manual on the Global Observing System will be an annex to the WMO Technical Regulations,

(2) That practical information on matters pertaining to the Global Observing System such as the description of practices, procedures and specifications is contained in the Guide on the Global Observing System,

(3) That the Manual* should be published in a form permitting its further updating,

RECOMMENDS the adoption of the Manual on the Global Observing System;*

INVITES the president of CBS to arrange for WMO Publication No. 49 - Technical Regulations - to be revised after the publication of the Manual on the GOS so that both these publications are compatible;

REQUESTS the Secretary-General to publish the Manual on the Global Observing System in the four official languages of the Organization in loose-leaf form as soon as possible.

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* The Manual on the GOS is published separately.

Rec. 2 (CBS-VII) - DRAFT LAYOUT OF VOLUME II OF THE MANUAL ON THE GDPS

THE COMMISSION FOR BASIC SYSTEMS,

NOTING:

(1) Paragraph 2.4.14 of the general summary of the report of Seventh Congress,

(2) Paragraph 7.2.3 of the general summary of the abridged final report of CBS-Ext.(76),

CONSIDERING that there is a need for a standard layout for the presentation of regional and national GDPS aspects,

RECOMMENDS:

(1) That the layout of Volume II of the Manual on the GDPS, given in the annex* to this recommendation, be adopted;

(2) That the WMO regional associations and Members be invited to provide appropriate material for Volume II of the Manual on the GDPS;

REQUESTS the Secretary-General to publish Volume II of the Manual on the GDPS in an appropriate form, as soon as possible, but not later than 15 July 1980.

* See Annex V.

Rec. 3 (CBS-VII) - DRAFT MINIMUM STANDARDS FOR QUALITY CONTROL

THE COMMISSION FOR BASIC SYSTEMS,

NOTING:

(1) Paragraph 7.8 of the general summary of the abridged final report of CBS-Ext.(76),

(2) Recommendation 13 (CBS-Ext.(76)),

(3) Resolution 3 (EC-XXIX),

CONSIDERING the need for standardization of quality-control procedures,

RECOMMENDS that the draft attachment, Minimum Standards for Quality Control of Data for Use in the GDPS, as given in the annex* to this recommendation, be approved for inclusion in Volume I of the Manual on the GDPS;

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

* See Annex VI.

Rec. 4 (CBS-VII) - AMENDMENTS TO FM 87-VI Ext. SARAD

THE COMMISSION FOR BASIC SYSTEMS,

NOTING the increase of relative precision requirements among channels of the satellite radiance observations,

CONSIDERING:

(1) That there is a need to preserve the clear radiance values from sounding systems in the TIROS-N type satellites to a precision of one quarter of one per cent (0.25%) in order to obtain meaningful vertical temperature information,

(2) That the above need could be covered by providing for the reporting of equivalent black-body temperatures instead of radiance values,

RECOMMENDS:

(1) That a supplementary optional section be added to the FM 87-VI Ext. SARAD code form, according to the specifications contained in the annex* to this recommendation;

(2) That the amendments to Code FM 87-VI Ext. SARAD given in the annex* to this recommendation be introduced from 1 July 1980;

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

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* See Annex VII.

Rec. 5 (CBS-VII) - ABBREVIATED CODE FOR THE TRANSMISSION OF PROCESSED DATA IN THE FORM OF GRID-POINT VALUES, FM 49-VII GRAF

THE COMMISSION FOR BASIC SYSTEMS,

NOTING:

(1) Recommendation 13/9 (CAeM-Ext.(74)/8th AN Conf.) - Aeronautical meteorological codes - GRID code form,

(2) Resolution 8 (EC-XXVII),

(3) Paragraph 5.8.3 of the general summary of the abridged final report of the extraordinary (1976) session of CBS,

(4) The final report of the fifth session of the CBS Working Group on Codes,

(5) The final report of the fourth session of the CBS Working Group on the GDPS,

CONSIDERING:

(1) That there is a need for an abbreviated code for the transmission of processed data in the form of grid-point values in order to facilitate the task of centres using such products,

(2) That such a code should be fully compatible with FM 47-V GRID,

(3) That there is a need for a code to meet aeronautical requirements for computer-to-computer exchange,

RECOMMENDS:

(1) That the code FM 49-VII GRAF and the amendments to the code FM 47-V GRID given in the annex* to this recommendation be introduced for international use as from 1 July 1980;

(2) That the code FM 49-VII GRAF and the amendments to the code FM 47-V GRID referred to above be included in the Manual on Codes, Volume I;

(3) That aeronautical needs for a code form suitable for computer-to-computer exchange be further co-ordinated between CBS and CAeM;

(4) That the code FM 49-VII GRAF be used for dissemination of processed data in the form of grid-point values wherever possible.

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* See Annex VIII.

Rec. 6 (CBS-VII) - AMENDMENTS TO CODES FM 39-VI ROCOB AND FM 40-VI ROCOB SHIP

THE COMMISSION FOR BASIC SYSTEMS,

NOTING a proposal to introduce an indication of month and year into the above-mentioned code forms,

CONSIDERING that such amendments improve the identification of ROCOB messages and facilitate the automatic archiving of rocketsonde data,

RECOMMENDS that the amendments contained in the annex* to this recommendation be introduced from 1 July 1980;

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

See Annex IX.

Rec. 7 (CBS-VII) - AMENDMENTS TO THE DEFINITIONS OF SYMBOLIC FIGURE GROUPS IN FM 63-V BATHY AND FM 64-V TESAC

THE COMMISSION FOR BASIC SYSTEMS,

NOTING:

(1) Paragraph 4.2.8 of the final report of the first session of the Joint IOC/WMO Working Committee for IGOSS,

(2) The requirement for reporting sub-surface temperatures (and salinity) taken at other selected depths than at IAPO standard depths,

CONSIDERING that such a requirement may be met by revising the definitions of symbolic figure groups in FM 63-V and FM 64-V,

RECOMMENDS that the amendments contained in the annex* to this recommendation be introduced from 1 July 1980 or as soon as possible after that date;

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

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* See Annex X.

Rec. 8 (CBS-VII) - AMENDMENTS TO AERONAUTICAL CODES METAR, SPECI, ARMET AND TAF

THE COMMISSION FOR BASIC SYSTEMS,

NOTING:

(1) Recommendation 12/10 (CAeM-Ext.(74)/8th AN Conf.) - Aeronautical meteorological codes - Order of information in METAR and SPECI code forms,

(2) Paragraph 5.8 of the general summary of the abridged final report of the extraordinary (1976) session of CBS,

(3) The final report of the fifth session of the CBS Working Group on Codes,

CONSIDERING:

(1) The need for improvement of some regulations in Codes FM 15-V, FM 16-V, FM 48-V and FM 51-V,

(2) That the amendments resulting from the report of the fifth session of the CBS Working Group on Codes were inadvertently included in Supplement No. 4 to the Manual on Codes, Volume I,

RECOMMENDS that the inclusion of the amendments to Codes FM 15-V, METAR, FM 16-V SPECI, FM 48-V ARMET and FM 51-V TAF given in the annex* to this recommendation (included in Supplement No. 4 to the Manual on Codes, Volume I) be formally adopted.

See Annex XI.

Rec. 9 (CBS-VII) - CODE FOR REPORTING UPPER-LEVEL PRESSURE, TEMPERATURE, HUMIDITY AND WIND FROM A SONDE RELEASED BY CARRIER BALLOON OR AIRCRAFT (TEMP DROP)

THE COMMISSION FOR BASIC SYSTEMS,

NOTING the code form TEMP DROP, adopted by Recommendation 5 (CBS-Ext.(76)), for reporting upper-level pressure, temperature, humidity and wind from a sonde released by carrier balloon or aircraft for international use during the First GARP Global Experiment,

CONSIDERING the need to continue the use of this international code for reporting sounding data from aircraft after the end of the FGGE,

RECOMMENDS:

(1) That the code for reporting upper-level pressure, temperature, humidity and wind from a sonde released by carrier balloon or aircraft, FM 37-VII TEMP DROP, be adopted as a permanent code form for international use after the end of FGGE, and be implemented from 1 December 1979;

(2) That this code form be included in Volume I of WMO Publication No. 306 - Manual on Codes, and be completed as indicated in the annex* to this recommendation.

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* See Annex XII.

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)).

* See Annex XIII.

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.

* See Annex XIV.

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.

* See Annex XV.

Rec. 13 (CBS-VII) - PUBLICATION OF THE INTERNATIONAL SEISMIC CODE IN VOLUME I OF THE WMO MANUAL ON CODES

THE COMMISSION FOR BASIC SYSTEMS,

NOTING:

(1) That the code forms for recording seismic data now published in Volume II of the WMO Manual on Codes are no longer in use,

(2) That the seismic data are now given in the International Seismic Code SEISMO,

CONSIDERING that seismic data are presently exchanged on the GTS for international purposes, according to a decision taken by EC-XXII,

RECOMMENDS:

(1) That the International Seismic Code, as presented in the annex* to this recommendation, be included for information in Volume I of the Manual on Codes;

(2) That code forms for exchange of seismic data now appearing in the appendix to Volume II of the Manual on Codes be eliminated;

REQUESTS the Secretary-General to arrange for inclusion of the international Seismic Code as an attachment to Volume I of the Manual on Codes and for the elimination of the seismic code form from the appendix to Volume II of the Manual on Codes.

* See Annex XVI.

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.

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* See Annex XVII.

Rec. 15 (CBS-VII) - 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 Resolution 11 (VII-RA I) - Amendments to the Manual on the Global Telecommunication System - Volume II - Regional Aspects - Africa,

RECOMMENDS:

(1) That the Manual on the Global Telecommunication System, Volume I, Part I - Organization of the Global Telecommunication System, be amended as indicated in the annex* to this recommendation;

(2) That the amendments given in the annex* to this recommendation be implemented as soon as possible but not later than 1 July 1979;

REQUESTS the Secretary-General of WMO to include the amendments given in the annex* to this recommendation in Volume I, Part I of the Manual.

* See Annex XVIII.

Rec. 16 (CBS-VII) - 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 that there is a need to adjust the meteorological telecommunication procedures for the Global Telecommunication System in the light of experience gained in the operation of the 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 but not later than 1 July 1979;

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.

* See Annex XIX.

Rec. 17 (CBS-VII) - 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 3 (Cg-VII) - World Weather Watch,

(2) The Manual on the Global Telecommunication System, Volume I - Global Aspects,

CONSIDERING the need to review the technical characteristics and specifications for the Global Telecommunication System to meet the requirements of Members and the World Weather Watch,

RECOMMENDS:

(1) That the Manual on the Global Telecommunication System, Volume I - Global Aspects, Part III - Technical characteristics and specifications for the Global Telecommunication System, be amended as indicated in the annex* to this recommendation;

(2) That the amendments given in the annex* to this recommendation be implemented as soon as possible but not later than 1 July 1979;

REQUESTS the Secretary-General of WMO to include the amendments given in the annex* to this recommendation in Volume I, Part III, of the Manual.

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* See Annex XX.

Rec. 18 (CBS-VII) - IMPLEMENTATION OF THE WORLD WEATHER WATCH

THE COMMISSION FOR BASIC SYSTEMS,

NOTING:

(1) Resolution 3 (Cg-VII) - World Weather Watch,

(2) Resolution 3 (EC-XXX) - Further measures to implement and improve the operation of the World Weather Watch,

(3) 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 yearly Status Reports on the Implementation of the WWW, and the action taken by the Secretary-General with the Members concerned,

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

Region I (several parts in the region)
Region II (the south-eastern and south-western parts)
Region III (the northern and central parts)
Region IV (the southern part)
Region V (the northern part)
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 expiration of the external assistance programme;

(c) Further focus of the VAP(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 VAP, 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;

REQUESTS the Secretary-General to include the substance of this recommendation in the documentation to Eighth Congress on the status of implementation of the WWW Plan for 1980-1983.

Rec. 19 (CBS-VII) - PROPOSED AMENDMENTS TO THE TECHNICAL REGULATIONS

THE COMMISSION FOR BASIC SYSTEMS,

CONSIDERING:

(1) The need expressed by Seventh Congress to formulate proposals for the revision of the Technical Regulations, taking into account the preparation and publishing of Manuals on the Global Observing System and the Global Data-processing System,

(2) The need to ensure consistency and to eliminate unnecessary duplication of the Technical Regulations and the different Manuals,

(3) Proposals for amendments made to the Commission by others,

RECOMMENDS to Eighth Congress that the amendments contained in the annex* to this recommendation be adopted.

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*See Annex XXI.

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.

Rec. 21 (CBS-VII) - 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 of the extraordinary (76) 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 3 (EC-XXVI)

Resolution 3 (EC-XXIX)

(2) That the following Executive Committee resolution be no longer considered necessary and should not be kept in force:

Resolution 2 (EC-XXX).

A N N E X I

Annex to paragraph 3.5 of the general summary

MAJOR TASKS OF CBS WORKING GROUPS FOR THE PERIOD 1979-1982

Task description	Working group involved			
	GOS	GDPS	GTS	Codes
1. Adjustments to the Guide on the GOS	P			
2. Adjustments to the Manual on the GOS	P			
3. Adjustments to the Manual on the GDPS, Vol. I		P		
4. Completion of Vol. II, Manual on the GDPS		P		
5. Review of the Guide on the GDPS		P		
6. Development of a Guide on the Automation of Data-processing Centres		P		
7. Adjustments to the Manual on the GTS			P	
8. Standardization and revision of the Manual on Codes				P
9. Reduction of Level I data from automatic stations	P			
10. Study of new observing technology and methods for inclusion in the GOS	P			
11. Study of new observational data requirements related to meso- and small-scale meteorological phenomena	S	P		
12. Study of operational methods of local forecasting based on numerical products		P		

Task description	Working group involved			
	GOS	GDPS	GTS	Codes
13. Co-operation with CAS				
- Keeping abreast of technical developments in analysis and forecasting (short, medium and long range)		P		
- Study of methods of comparative verification of prognoses		P		
14. Development of Level II and III data exchange format for use in WWW		P		
15. Preparation for operational use of 4-dimensional assimilation techniques		P		
16. Study of arrangements for archiving satellite data		P		
17. Study of requirements related to basic climatological data processing (with CoSAMC)		P		
18. Elaboration of technical characteristics and procedures of digital facsimile. Study of coded digital facsimile for half-tone transmission. Improvement of analogue facsimile transmission		S	P	
19. Elaboration of technical characteristics and procedures for transmission with data-signalling rates higher than 2400 bits/sec including HDLC procedures			p	
20. Technical problems in the distribution of satellite data - collection of observational data and relay of pictorial and alpha-numerical data			P	
21. Study of the further development of the MTC and its branches including its configuration and operation			P	
22. Elaboration of technical characteristics and procedures for transmission with data-signalling rates higher than 2400 bits/sec, including HDLC procedures			P	

Task description	Working group involved			
	GOS	GDPS	GTS	Codes
23. Review of procedures for reporting geographical positions in codes				P
24. Further development of GRID/GRAF code to meet aeronautical requirements and use of curves		S		P
25. Review of marine codes (with CMM)		S		P
26. Review of aeronautical codes (with CAeM/ICAO)		S		P
27. Quality control of observational and processed data	P	P_L		
28. Best mix of observation systems	P_L	P		
29. Increase use of aircraft meteorological data including the use of new automated observation methods and techniques	P	P_L		
30. Development of automated stations (with CIMO) and the use of such stations in the GOS	P_L	P		
31. Transmission of information in GRID/GRAF code form and conversion from GRID/GRAF to pictorial form		P	P	S
32. Plan for exchange of processed information (in GRID/GRAF and pictorial form) on MTC and branches		P	P_L	
33. New system of codes based on information theory and automation	S	P	S	P_L
34. Rationalization of message formats and code identifiers for use on the GTS	S	P	P_L	P
35. Detailed procedures for monitoring operation of the WWW	P	P	P	

Task description	Working group involved			
	GOS	GDPS	GTS	Codes
36. WWW support for FGGE and GARP regional programmes	P	P	P	S
37. WWW support for IGOSS and AFC	P	P	P	S
38. WWW support for World Climate Programme and WMO Desertification Programme	X	X	X	X

Legend : P : major contribution

P_L : leading working group

S : minor contribution

X : degree of contribution depending on the specific programme

ANNEX II

Annex to paragraph 5.6 of the general summary

DRAFT WORLD WEATHER WATCH PLAN FOR 1980-1983

INTRODUCTION

General

1. The World Weather Watch (WWW) is the basic programme of the World Meteorological Organization (WMO). The WWW was first established by the Fifth World Meteorological Congress (Geneva, 1967), which approved a plan for the period 1968-1971. The Sixth and Seventh World Meteorological Congresses (Geneva, 1971 and 1975), approved revised plans for the periods 1972-1975 and 1976-1979 respectively. This present plan, for 1980-1983, was approved by the Eighth World Meteorological Congress (Geneva, 1979) Progress in the implementation of the plan is reviewed annually in the WWW status reports issued by WMO.

2. While the basic approach of the WWW plan remains unaltered, important additions had to be brought in mainly due to two developments. The first is the rapid technological changes and the second is the existing and expected new demand from several applied fields and programmes of other international organizations, on the facilities created under the WWW plan.

3. Technological change has been rapid in many fields. Chief among these is satellite meteorology, where remarkable progress has culminated in a plan for a global system of geostationary and near-polar orbiting satellites. Continued advances are being made in data-processing techniques.

4. Important developments in applied meteorology have also resulted in suitable adjustments in the WWW plan to provide for stronger support to other WMO programmes and for closer collaboration with other international organizations and their programmes.

5. The WWW plan provides for three basic components, a Global Observing System (GOS), a Global Data-processing System (GDPS) and a Global Telecommunication System (GTS), to attain the primary purpose of the WWW. These systems could be useful and effective in meeting the practical needs and problems of the modern world, in particular those of our environment. The WWW must be specified so as to cover the GOS, GDPS and GTS aspects of all users of meteorology. The WWW plan also provides for the real-time and non-real-time monitoring of the operation of the WWW.

Purpose and basic concepts of the WWW

6. The WWW shall be used only for peaceful purposes, due account being taken of the national sovereignty and security of States, in accordance with the provisions of the Charter of the United Nations and the spirit and traditions of WMO.

7. The primary purpose of the WWW is to make available to each Member, within the limits of the agreed system, meteorological and other related environmental

information required in order to enjoy the most efficient and effective meteorological and other related environmental services possible, as regards both applications and research.

8. A further important purpose of the WWW is to stimulate and facilitate the research work which is necessary to improve the accuracy and extend the useful range of weather and related environmental forecasts and to enable the possibilities and consequences of weather and climate modification to be more accurately assessed.

9. In addition WWW facilities may be used, to the extent feasible, in support of other WMO programmes (operational hydrology, agrometeorology and weather modification) or international programmes jointly established with WMO in conformity with the policy decisions of the Organization provided that such utilization would not be detrimental to achieving the primary purpose of the WWW.

10. The WWW is an integrated global system but for many purposes it is convenient to consider it from three aspects, namely the global level, the regional level and the national level. General directives for the WWW as a whole are decided upon by Congress. Following these general directives, decisions on organizational and procedural details are left to appropriate bodies of the Organization. Planning at a national level to meet national needs is, of course, a matter for each individual Member to arrange.

11. The objectives of the WWW are to make available to Members the required observational data and processed information. For operational work it is essential that the information is received speedily and in a co-ordinated fashion. For research purposes speed is, in general, not of such vital importance, but the information must be readily accessible in convenient forms.

Essential elements of the WWW

12. The essential elements of the WWW are:

(a) The GOS, consisting of facilities and arrangements for making observations at stations on land and at sea, from aircraft, meteorological satellites and other platforms;

(b) The GDPS, consisting of meteorological centres with arrangements for the processing of the required observational data (real-time uses)* and for the storage and retrieval of data (non-real-time uses)*;

(c) The GTS, consisting of telecommunication facilities and arrangements necessary for the rapid and reliable collection and distribution of the required observational data and processed information.

13. This sub-division is largely a matter of convenience and it is emphasized that the various elements are closely interdependent and should not be considered as completely separate entities.

* Real-time uses are operations in which the information must be received and used or processed within, at most, a few hours after it is generated. Non-real-time uses are those operations which can be carried out over a more extended time period.

14. The arrangements for the monitoring of the operation constitute an important part of the WWW plan. They will apply to all three essential elements. During the period 1980-1983 special monitoring efforts will be applied to the GOS and GTS.

15. The WWW is conceived as an evolving system, flexible enough to be adapted to changing conditions. Periodic reviews should be made in order to incorporate the latest technological and scientific developments. New techniques of observation, data-processing and telecommunications should be introduced as soon as they have proved to be sufficiently reliable and economical.

Expected benefits of the WWW

16. The further implementation and development of the WWW will enable Members to provide improved meteorological and related environmental services for their respective national economies. Some of the actual and expected benefits of the WWW are described below:

(a) Improvements in short- and medium-range meteorological forecasting for general purposes and for many types of special activities, e.g. agriculture, aviation, shipping, fishing, transportation, hydrology, industry, recreation, etc.;

(b) Improvements in extended-range meteorological forecasts for the benefit of long-term planning of agriculture, water management, etc.;

(c) Improvements in the timeliness and accuracy of warnings against natural disasters caused by meteorological phenomena, particularly tropical cyclones;

(d) Provision of observational data and processed information for several types of applications;

(e) Provision of meteorological and other related environmental information for understanding many aspects of environmental pollution and taking remedial action;

(f) Easier access to stored data and information for all parts of the world for applied as well as basic atmospheric research or related environmental research projects.

Main tasks to be carried out in the framework of the WWW during the period 1980-1983

17. The main tasks during the period 1980-1983 are:

(a) Complete the implementation of the GOS, GDPS and GTS, where necessary, to bring the plan into full operation;

(b) Exploitation of new technology and research results to modernize and improve the operation of the GOS, GDPS and GTS, where appropriate;

(c) To provide support as required to other WMO programmes, such as aviation, marine, agrometeorology and hydrology, as well as to such special programmes as the World Climate Programme and the WMO Desertification Programme;

(d) Improvement of short- medium- and long-range forecasting through exploitation of research results (e.g. from the FGGE) and modern technology in analysis and forecasting.

18. To carry out the main tasks listed above, the following specific provisions should be made under the WWW plan for the period:

(a) Completion of the implementation of the regional basic synoptic networks of surface and upper-air stations, particularly in Regions I, II, III and in parts of other Regions where required;

(b) Implementation of new or improved observing and data-reduction technology and methods with particular attention to the automation of observing networks;

(c) Development of the optimum mix of observing stations, including those stations using new technology (see (b) above);

(d) Development of technical co-ordination and routine scheduling of the operation of polar-orbiting and geostationary satellites, within constraints dictated by the needs of the satellite operations;

(e) Improvement in the quality and variety of data available from polar-orbiting and geostationary satellites to meet the requirements of Members for analysis and forecasting and storm-warning services;

(f) Improvement of warning and forecasting services through the implementation of new dynamical and statistical techniques for analysis and forecasting, such as four-dimensional assimilation analysis techniques and fine-mesh numerical models;

(g) Continuing development and introduction of more complete procedures for quality control of data at observation stations, on the GTS and at GDPS centres;

(h) Development of procedures and techniques for storage and retrieval of satellite data for use in all types of research programmes;

(i) Elimination of remaining inadequacies in the operation of the GTS for the collection and dissemination of observational data in Regions I, II and III and in some parts of other Regions;

(j) Improvement of the overall operation of the GTS through the implementation of new techniques and procedures for more rapid and efficient transmission of digital and pictorial data;

(k) Development and implementation of detailed procedures for monitoring the operation of the WWW.

Relationship between WWW and some other international programmes

19. Some of the international programmes that will surely draw upon the facilities established under the WWW are the Global Atmospheric Research Programme (GARP), jointly approved by WMO and the International Council of Scientific Unions (ICSU), the ICAO Area Forecast System (AFCS), the joint IOC/WMO Integrated Global Ocean Station System (IGOSS) and the Global Environmental Monitoring System (GEMS) of the United Nations Environment Programme (UNEP).

Global Atmospheric Research Programme (GARP)

20. The purpose of GARP, as defined by the WMO-ICSU agreement, is to study those physical processes that are essential for an understanding of:

(a) The transient behaviour of the atmosphere as manifested in the large-scale fluctuations which control changes of the weather. This would lead to increasing the accuracy of forecasting over periods from one day to several weeks;

(b) The factors that determine the statistical properties of the general circulation of the atmosphere which would lead to a better knowledge of the physical basis of climate.

21. This programme consists of two distinct, but closely interrelated, parts:

(a) The design and testing of a series of numerical models of relevant aspects of the atmosphere's behaviour;

(b) Observational and experimental studies of the atmosphere such as CAENEX, GATE, AMTEX, FGGE, MONEX and WAMEX, to provide the data required for testing the above models.

22. The field phase of FGGE will be completed just prior to the period of the present WWW plan. Emphasis will be placed on the research aspects of the Experiment leading toward the attainment of the broad scientific objectives of the Experiment. These objectives are:

(a) To obtain a better understanding of atmospheric motion for the development of more realistic models for weather prediction;

(b) To assess the ultimate limit of predictability of weather systems;

(c) To design an optimum composite meteorological observing system for routine numerical weather prediction of the larger-scale features of the general circulation;

(d) To investigate, within the limitation of a one-year period of observation, the physical mechanisms underlying the fluctuations of climate in the time range of a few weeks to a few years and to develop and test appropriate climatic models.

23. The relationship between WWW and GARP is most focused in objective (c) above. During the present financial period a considerable effort will be directed toward utilizing the FGGE data in the design of an optimum composite meteorological observing system for routine numerical weather prediction of the larger-scale features of the general circulation. It is foreseen that a co-ordinated series of research programmes, carried out by research groups and weather services in countries participating in the FGGE, will be developed and completed during the period. Research into the optimum utilization of satellite data will be a central element of this effort.

24. The research phases of WAMEX and MONEX which will be initiated during this financial period will contribute to the future development of the WWW in the tropical region through the improvement of the basic understanding of the tropical atmosphere and its weather systems, thereby assisting in the definition and design of realistic observing systems for the tropics.

Area Forecast System

25. A close relationship exists between the components of the WWW and the ICAO Area Forecast System. Observational data provided through the GOS and processed information provided through the GDPS, and transmitted via the GTS, are essential for the functioning of Area Forecast Centres (AFCs).

Global Environmental Monitoring System (GEMS)

26. One of the major components of the UNEP action programme is the "Earthwatch", whose primary purpose is to monitor and assess the state of the oceans, the inland waters, the atmosphere, the land and human health in order that rational decisions can be made for the management of the environment. The monitoring of pollutants that affect weather, climate and human health will receive the first priority.

27. In many respects Earthwatch is similar to the WWW in that it is a global system comprising national facilities, services and research provided by individual Member nations. The monitoring of physical parameters of the atmosphere on a global basis for various environmental purposes has been in existence for many years through the WWW and other WMO programmes. As a result, plans for the implementation of the atmospheric monitoring part of the Earthwatch will inevitably rely heavily upon the WWW.

IOC/WMO Integrated Global Ocean Station System (IGOSS)

28. The IGOSS is a programme jointly undertaken by WMO and IOC. The main purpose of the programme is to provide extensive and timely information on, and prediction of, the state of the ocean, to the extent that a definite need for the information has been established, and to support research on the physical and dynamic processes of the ocean. The close co-operation of WWW and IGOSS should provide for the development of a comprehensive monitoring system for the ocean-atmosphere environment.

29. The plans for IGOSS and WWW are based on the principles:

(a) That appropriate observational facilities of both programmes, such as voluntary observing ships, research ships, buoys, coastal and island stations, ocean weather stations, ice stations and satellite systems, are used for common purposes and observational data originating thereof are exchanged between the two programmes;

(b) That IGOSS relies on the WWW Global Telecommunication System (GTS) for the collection and dissemination of observational data originating from its observing system;

(c) That the IGOSS Data Processing and Services System (IDPSS) is developed in close co-ordination with the WWW Global Data Processing System (GDPS) and the associated Marine Meteorological Services programme. Members have, therefore, the possibility to develop by their national decision, part or the whole of their national and international marine environmental services programmes through the GDPS of WWW, the Marine Meteorological Services programme or the IDPSS of IGOSS.

GLOBAL OBSERVING SYSTEM

Purpose and principles

30. The GOS is the co-ordinated system of methods, techniques and facilities for making observations on a world-wide scale within the framework of the WWW.

31. The GOS has been established to provide the meteorological and related environmental observations from all parts of the globe that are required by Members for operational and research purposes. It should be flexible and evolutionary in nature so that the mix of specific observational elements can be changed when needed to take advantage of advances in technology and meet changes in the requirements. However, changes will be made only after sufficient study has been conducted to determine the validity of the new requirements and the representativeness of the data from the new observational systems.

Components

32. The GOS consists of two sub-systems, the surface-based sub-system and the space-based (satellite) sub-system, the former being composed of the regional basic synoptic networks, other observational networks of stations on land and at sea, and aircraft meteorological observations, and the latter of near-polar orbiting and geostationary meteorological satellites.

33. The GOS provides observational information which falls broadly into two categories: quantitative information derived from instrumental measurements, and qualitative (descriptive) information. Examples of quantitative information which specify the physical state of the atmosphere are instrumental measurements of the atmospheric pressure and humidity, air temperature and wind velocity. Examples of qualitative (descriptive) information are observations of the state of sky, the forms of clouds and the types of precipitation.

Classification of requirements

34. The requirements of Members for observations may be put into three categories: global, regional and national.

35. Global requirements are for those observations needed to describe meteorological phenomena and processes which occur on the large and planetary scales.

36. Regional requirements are for those observations needed by two or more Members to describe in greater detail the large and planetary scale atmospheric phenomena, as well as to describe the smaller ones on the meso-scale and small scales as may be agreed by regional associations.

37. National requirements, which are defined by each Member, may vary greatly and reflect specialized needs of individual Members.

Scales of meteorological phenomena

38. The frequency and spacing of the observations should be adjusted to the physical scales of the meteorological phenomena to be described and specified.

39. For the purpose of the planning of the GOS the following classification of scales of meteorological phenomena has proved to be useful:

(a) Small-scale (less than 100 km); for example, thunderstorms, katabatic winds, tornadoes;

(b) Mesoscale (100-1 000 km); for example, fronts and cloud clusters;

(c) Large-scale (1 000-5 000 km); for example, depressions and anticyclones;

(d) Planetary-scale (more than 5 000 km); for example, long upper tropospheric waves.

40. At scale (a) most of the observational data for analyses to meet the needs of user groups will be of a specialized nature.

41. Within the GOS part of the WWW plan, the spacing and frequency of observations required for scales (b), (c) and (d) are given in the Manual on the GOS. Scales (b) and (c) can be considered as roughly corresponding to the regional level within the WWW, and (c) and (d) can be combined within the global level.

42. It must be stressed that the above classification is at best a very rough approximation to physical reality. Many phenomena overlap between two of the classes indicated, and there is also dynamic interaction between the phenomena in the different scales.

Observational requirements

43. Theoretically the observing programme should provide data which describe the state of and temporal and spatial changes in the atmosphere. In practice, however, it has not been possible to specify the optimum observational requirements for any of the scales (a) to (d), though to do so for scales (c) and (d) is in fact one of the objectives of GARP. However, minimum data requirements can be specified based upon extensive preparatory studies for FGGE. These are stated in the Manual on the GOS. Practical requirements stated in the WMO Technical Regulations and elsewhere reflect the influence of two factors: (1) the capability of users to apply the data either manually or through numerical models, and (2) the capability of observing systems. Both the methods of application and the observing systems are changing and, therefore, the practical observational requirements may also be expected to change.

44. Consideration of scales of motion (c) and (d) (large scale and planetary scale) by themselves generally results in different data requirements than that of scale (b) - meso-scale. However, there exists interaction between various scales of motion, which makes such separation often difficult. Large-scale and small-scale requirements are based on the needs for both numerical and manual methods. Requirements for uniform networks have long been important in manual processing of data. Employment of numerical methods in models which cover the globe or significant portions thereof have served to emphasize existing requirements for uniform data networks. Four-dimensional data assimilation techniques used to integrate asynoptic data into the forecast models are being tested. If these results prove useful, the evolving large-scale models will be able to use asynoptic data as well as data collected at standard synoptic hours. With this development, the asynoptic data will have an increasing importance in the future.

45. For the meso-scale there is much more variation geographically in the time and space requirements than for large-scale data. In this respect the use of asynoptic data as well as of synoptic data should be taken into account.

46. There are other sources of observations which provide information at positions and at times which are not necessarily fixed, e.g. satellites, aircraft and mobile ships. At this time it is not possible to specify fully on scientific considerations the optimum requirements for the spacing and accuracy of such observations.

Major users' requirements for the period 1980-1983

Systems for global requirements

47. The global requirements given in the Manual on the GOS derive primarily from the need to provide input to numerical models dealing with atmospheric motions on large and planetary scales. These requirements emphasize averages over large volumes of the atmosphere and the distribution of the mass and moisture fields. At mid-and high latitudes, an increasing part of these requirements will be met during the period by a system of satellites. The surface-based system will continue

to play its important role by providing the main information required to meet global requirements. The two systems, one based on surface and the other on space, will complement each other. Surface observations, radiosonde and aircraft reports will provide geopotential reference and calibration input to the space system. The space system augments the data points provided by the surface-based system to complete the global coverage.

48. In the tropics much more emphasis is placed on the mesoscale convection contribution to the larger scale dynamics and the large-scale wind field. While satellites will increasingly contribute to meeting these requirements, considerable input will be required from the surface-based sub-system, particularly upperwind data from land, fixed and mobile ship stations and aircraft.

Systems for regional and national requirements

49. It is firmly believed that during the period 1980-1983 the surface-based system will continue to be the main source of information required to meet the regional and national requirements. At the outset, heavy reliance will be placed on the regional networks of synoptic surface and upper-air stations, fixed and mobile ships and aircraft. Information from the space-based sub-system will complement that obtained by the surface-based sub-system to an increasingly significant degree. Decisions regarding additional observations required internationally for specialized purposes should be taken under the relevant WMO programme, in co-operation with other international organizations as appropriate.

Surface-based sub-system

Composition of the sub-system

The main elements of the sub-system are:

Regional basic synoptic networks (manned and automatic stations) and other synoptic networks of observing stations

50. The regional basic synoptic networks of both surface and upper-air observing stations constitute the Basic Synoptic Network. They will continue to be the main part of the surface-based sub-system. They comprise manned stations as well as fully automatic stations or partly automatic stations complementing certain manned stations. The detailed lists of stations to be established to meet the observational requirements laid down in paragraphs 43 to 49 have been drawn up by decisions of the various regional associations relating to their regional basic synoptic networks. They are contained in WMO Publication No. 217 - Basic synoptic networks of observing stations. Regional associations should continue to examine and revise their regional basic synoptic networks as necessary, taking into account any international requirements for additional mesoscale observations.

51. Considering that these networks constitute the minimum requirements to permit Members to fulfil their responsibilities within the WWW in particular and in the application of meteorology in general, Members should endeavour to complete the implementation of all the surface and upper-air observing stations of the regional

basic synoptic networks of which the lists are contained in WMO Publication No. 217. Special importance is attached to the establishment of stations in areas where the horizontal spacings specified in the WMO Technical Regulations are far from being attained. Urgent action should also be taken to complete the observing programme at stations which are already in operation but which do not at present carry out the full programme of observations recommended by the various regional associations by using automatic stations.

52. Automatic weather stations capable of meeting some of the requirements for surface observations are available and have proved to be reliable and economic in certain locations on land and on small islands and reefs up to several hundred kilometres from the mainland. Such equipment could therefore be used to provide a portion of the surface observations called for in the regional basic synoptic networks, where it would be economical and feasible, particularly at locations where it is not practicable to have a manned station or at manned stations where shortage of trained staff would otherwise preclude round-the-clock operations.

53. Stations on the coast and on islands provide meteorological and oceanographic information from important geographical locations. Members are encouraged to equip these stations suitably to take not only meteorological observations (synoptic or otherwise) but also other observations, such as sea level, waves, ice, and water temperature.

Fixed sea stations (weather ship stations, stationary ships, fixed anchor platforms and various superstructures in coastal areas)

54. Stationary ships and fixed or anchored platforms are required to meet WWW data requirements. Such fixed sea stations provide essential and detailed meteorological and oceanographic data from critical locations or ocean areas where more eonomical means are not available. In this role they are primarily part of regional and national scale networks. Fixed sea stations also provide data for the calibration and verification of soundings by remote-sensing from satellites. Ocean weather stations also constitute a large source of sub-surface information (BATHY/TESAC reports) required for WWW and IGOSS.

55. The existing number of ocean weather stations in the North Atlantic and Pacific should be retained until such time as completely satisfactory and proven alternative observing systems, which could maintain the necessary regular reliable observations, become available.

Mobile ships

56. Mobile ships will continue to be one of the main sources of surface observations over the oceans. As there are still vast ocean areas from which very few or no surface meteorological observations are available, Members should endeavour to recruit all suitable ships which may traverse the data-sparse areas. Furthermore, Members should install automatic observing and transmission equipment on mobile ships whenever possible. Such action should aid the prompt and accurate transmission of ship reports to meteorological centres. Efforts should also be made to recruit mobile ships to take sub-surface observations required for WWW and IGOSS.

Research and special purpose vessels

57. Members having research and special purpose vessels should do their utmost to ensure that all such vessels make surface and upper-air meteorological observations, as well as sub-surface (temperature) observations down to the thermocline, and transmit this information for further dissemination in accordance with the appropriate WMO procedures. These ships should be encouraged to make such observations in data-sparse areas and in particular to make upper-wind observations in the tropics.

Automatic marine stations

58. Fixed or drifting automatic marine stations (buoys) have been extensively used to obtain meteorological and oceanographic information from critical locations and data-sparse areas. A variety of types of buoys have been developed; some of them for measuring only very few parameters, but others for measuring a complete range of meteorological and oceanographic parameters. However, efforts should be made to increase the reliability of operation of these buoys and to decrease the cost of operation.

Aircraft

59. Commercial aircraft constitute a valuable source of upper-air data especially over the oceans and sparsely-inhabited areas, as has been demonstrated by current practices of meteorological analysis. The interest shown for this kind of meteorological information is even reinforced nowadays by the introduction of the Aircraft to Satellite Data Relay (ASDAR) system on board wide-bodied commercial aircraft. These data will continue to be of great importance in the mixed observation system which gradually takes shape.

Weather radars

60. Weather radars constitute one of the best means for observing and studying small and mesoscale cloud-precipitation systems. Weather radar observations provide quantitative and qualitative information which can fruitfully be used in synoptic, aeronautical meteorology and hydrology for early warnings of dangerous weather phenomena and improved quantitative forecasts of specific elements. Members are invited to continue the operation of existing radars or radar networks, to exchange their observations if practicable and to establish or continue the implementation of programmes in this field. The definition of such networks should be considered by regional associations, where this is justified by recognized regional needs.

Atmospherics detection systems

61. Distant thunderstorms can be located by means of automated atmospherics detection systems using very long baselines. Taking into account the obvious advantage of the long-range identification of the location of thunderstorm activity, efforts in this field should be continued on a national basis.

Tide gauge stations

62. The establishment of a well-distributed network of tide gauge stations along the coast subject to storm surges is essential for the efficient operation of a storm surge warning system. As the continuous monitoring of the variation of the sea level is required, tide gauge observations should be telemetered to the warning centre by radio or land-line. In certain areas of the world tide gauge stations for storm surges are combined with those for tsunami (seismic sea waves).

Meteorological rockets

63. Several Members have undertaken to implement programmes for launching meteorological rockets. These rockets will continue to constitute an effective means to measure in situ the meteorological parameters above the 10 mb level. Such measurements are indispensable for a better knowledge of the atmosphere at very high levels, as well as for the calibration and interpretation of data obtained from satellites. Efforts in this field should be continued with due regard to the need for adequate co-ordination with aeronautical authorities.

Background Air Pollution Monitoring Network (BAPMoN)

64. In view of the need to continue and further increase efforts to provide information on environmental pollution, the WMO Background Air Pollution Monitoring Network (BAPMoN) of stations should be maintained and expanded. The station coverage of BAPMoN is not yet sufficient in certain areas and should be improved during the period 1980-1983. During this period, Members should also give special attention to implementing, to the maximum extent possible, the agreed monitoring programme.

Radiation stations

65. In view of the importance of solar radiation in atmospheric processes in influencing the origins of atmospheric motions, Members should establish and operate radiation stations as recommended in the WMO Technical Regulations.

Ozone stations

66. The quantitative information on total ozone and its vertical distribution is of great value in studies of the atmospheric ozone balance as well as studies of the general circulation and other related meteorological phenomena. Members should maintain and expand as necessary the existing network of total ozone measuring stations and ozone sounding stations, particularly those with already long records, in accordance with the scientific requirements. These stations would serve as the basis for the determination of the long-term trends in the global ozone content, and for other relevant research studies. Continuous ozone measurements by rocket- and satellite-borne sensors of proven capability should also be maintained and expanded to fulfil the complete scope of the scientific requirements.

Climatological stations

67. Climatological stations provide information for use in connexion with studies of climate and climatic change and their operation should be continued and extended as required.

Agricultural meteorological stations

68. Agricultural meteorological stations provide information in real- and non-real-time in connexion with food production and their operation should be continued and extended as required.

Stations for measurements in the planetary boundary layer

69. In view of the importance of enhancing the knowledge on the physics of boundary layer processes and of applying it to a large number of problems relevant to air pollution dispersion and prediction, numerical weather prediction modelling, aeronautical meteorology, agrometeorology and climate studies, Members should establish stations (surface including tower installation and lower level aerological soundings) for observing boundary layer parameters in accordance with the scientific requirements.

Systems specifications

70. The specifications for each of the above elements, network configurations, observing programmes and frequency of observations are specified by decisions of Congress, Executive Committee, the Technical Commisions and Regional Associations concerned. They are published in the WMO Technical Regulations and its annexes (i.e. Manual on the GOS, Manual on Codes) and in other relevant WMO Publications such as the Guide on the GOS. Material contained in the Guide to Meteorological Instruments and Methods of Observation sets forth the technical and meteorological aspects in detail.

Quality control of observational data

71. The GOS objectives of quality control of observational data are:

(i) To ensure that data provided for use in the GDPS are as error-free and complete as possible;

(ii) To remedy data deficiencies and their causes (i.e. by correction feedback);

(iii) To maintain records of effectiveness of quality control actions which will lead to improvements in quality-control systems.

72. The basic responsibility for implementing minimum standards for quality control of observational data remains with Members, who are free to choose the methods of quality control they wish to use as long as these methods conform to the standards prescribed in the WMO Technical Regulations and its annexes.

Implementation aspects

73. In implementing the GOS surface-based sub-system, Members should ensure that the observing system meets the requirements placed on the sub-system. In implementing the surface-based sub-system, Members should strive to meet the provisions set forth in paragraph 70 above as closely as possible.

Space-based sub-system

74. There are meteorological satellite systems* which have reached advanced stages of development and have become operational, or nearing this stage. Therefore, observational information (quantitative data and pictorial data) will be routinely available to all Members, as part of the GOS, in accordance with the general principles of the WWW. The operational status of satellite systems will be announced by the satellite operators, and any change will be made known to all Members. In addition to operational satellite systems, experimental satellites will be tested. Information obtained from these systems will be made available to Members, but will not form a part of the GOS. In accordance with the WWW concept, the space-based sub-system is designed to meet the needs for satellite data on three levels, namely global, regional and national.

Composition of the sub-system

75. Each operational system is composed of:

(i) Space segment composed of operational satellites, either in operational or standby mode, which provide the following missions:

(a) Imagery;

(b) Sounding;

(c) Data collection;

(d) Data dissemination;

(ii) Ground segment composed of:

(a) Receiving and processing stations for satellite signals and data from DCPs;

(b) Data collection platforms (DCPs).

Each specific satellite system is operated and controlled by a Member directly or by an international organization established by several Members.

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* WMO Publication No. 411

Space segment

76. The operational satellites will be composed of:

(i) Polar-orbiting satellites (800-1 000 km near-polar orbit); they will consist of METEOR/MODEL 2 system (U.S.S.R.) and NOAA series TIROS-N MODEL (U.S.A.). Each of the above systems is expected to have two operational satellites in orbit at any time during the period 1980-1983;

(ii) Geostationary operational satellites (in geosynchronous orbit at 36 000 km); they will consist of six satellites at the following locations over the equator:

140°E	-	operated by Japan
74°E	-	operated by India
70°E	-	operated by the U.S.S.R.
0°E	-	operated by the European Space Agency
75°W	-	operated by the U.S.A.
135°W	-	operated by the U.S.A.

Some of these systems are fully operational, and arrangements for ensuring continuity of operation have been made by the satellite operators in the case of failures of satellites or through degradation of satellite performance. This will be achieved by an appropriate launching schedule of replacement satellites and standby satellites in orbit. Details of each of the satellite systems are given in WMO Publication No. 411. A description of the types of information derived from operational satellites is given in the Guide on the Global Observing System.

77. In addition to the above operational satellite systems, plans are known of a number of experimental satellites (e.g. METEOR experimental series, LANDSAT). Some of the above experimental satellite programmes may become operational during the period and may be added to the list of satellites given above.

Ground segment

78. Receiving and processing stations will provide for the reception of signals and DCP data from operational satellites and the processing, formatting and display of meteorological meaningful information, with a view to further distributing it in a convenient form to local users, or over the GTS, as required.

79. Data collection platforms (DCPs) will play an increasingly important role in transmitting their observations to satellites.

Satellite data for meeting global requirements

80. Global satellite data required for analysis and forecasting of large- and planetary-scale processes will be available for distribution on the GTS by WMCs or satellite operators. This may include:

(a) Vertical profiles of temperature and humidity;

(b) Temperature of sea, land and cloud top surfaces;

(c) Wind field derived from cloud displacements;

(d) Cloud amount, type and height of cloud tops;

(e) Snow and ice cover;

(f) Radiation balance data.

81. The quantitative data should, as far as possible, meet specifications suitable for input to numerical models dealing with atmospheric motions on a large or planetary scale, initially taken from the observational data requirements set forth for the FGGE*. The data sets should be issued twice daily, optimized as close as possible to 0000 and 1200 GMT synoptic hours. Additional wind data should be provided for 0600 and 1800 GMT, if possible.

82. Satellite operators should arrange for receiving and processing data collection signals for the area covered or collected by the satellite, for distribution on the GTS, as required to meet WWW requirements. The data collection system will mainly be used for platforms (DCPs) incorporated in the Global Observing System.

83. Appendix I shows the location of the satellite sub-points of geostationary satellites, as well as the geographical coverage for each of the main missions.

Satellite data for meeting regional requirements

84. For meeting specific regional requirements, regional facilities, established in consultation with the satellite operator(s) concerned, should be capable of receiving full resolution images from appropriate geostationary satellite(s), as well as high-resolution images and sounding data by direct broadcast from the satellites in polar orbit. It may also receive and process data collection signals from DCPs which were relayed by geostationary and polar-orbiting satellites in a designated area.

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*These observational data requirements will be adjusted in the light of results of observing systems studies carried out with the FGGE data sets.

85. Whenever possible and necessary, regional satellite facilities should derive regional wind data from sequences of high-resolution images received from geostationary satellites by direct broadcast and high-resolution sounding data received from polar-orbiting satellites. These wind and sounding data should be available regionally on the GTS. They should supplement global satellite data and conventional data, in order to provide the higher resolution in space and time required for meso- to synoptic-scale analysis and forecasting.

86. The regional satellite products, together with satellite data received from other centres should, in general, meet the data requirements of RMCs, which primarily issue the analysis and forecasts of large-, meso- and, to some extent, small-scale processes. On the basis of regional satellite information, consideration should be given to the distribution on the GTS and other telecommunication channels, as a minimum, of alphanumeric messages giving location and intensity of storms, as well as warnings concerning their occurrence and development. Regional satellite facilities to be most effective should, in general, be located at or be associated with an RMC or with a very well-developed NMC. Regional associations should examine in detail the role of the existing and planned satellite facilities in their respective Regions, with a view of determining their precise regional functions.

Satellite data for meeting national requirements

87. The future development of the WWW and of space techniques will require a strengthening of the role of the NMCs. It is desirable that each NMC receives with high frequency, high- and low-resolution satellite information, in order to maintain a continuous weather watch and support meso- and small-scale analysis or prediction. As a minimum, provision should be made for APT and WEFAX reception at the national level.

88. NMCs may also be equipped to receive relayed signals from DCPs in their territories via the direct broadcast capabilities of polar and geostationary satellites.

Satellite data from experimental and other environmental satellites

89. The primary purpose of experimental satellites is the development and testing of new instrumentation and improvement of existing ones. Satellite programmes established for various environmental applications and experimental satellites may provide information which may be available for operational use. It could be expected that these satellites will provide information on:

(a) Improved temperature/humidity profile;

(b) Soil moisture distribution;

(c) Ice definition;

(d) Sea state;

(e) Cloud composition;

(f) Distribution of particulate matter and certain minor constituents, e.g., ozone contained in the atmosphere;

(g) Marine pollution.

90. However, in contrast to the operational meteorological satellite system which provides real-time data on a continuous and permanent basis, no such feature could be expected from experimental and other environmental satellites. The results of these programmes will also be important in determining the desired future evolution of operational systems.

Work required for further evolution of the space-based sub-system

91. The implementation and operation of the plan set forth above requires the continuation of activities in the following areas:

- Detailed technical co-ordination of polar-satellite systems, such as common direct broadcast image formats, standard APT transmission characteristics, advance distribution of related plans and changes thereto;

- Co-ordination of geostationary satellite systems and their operation to ensure global coverage by at least five operational satellites;

- Establishment of routine schedules for geostationary satellite operations on a regional basis, within the constraints dictated by the needs of the respective satellite operators (such as frequency of imaging, schedules for WEFAX, priority between imaging and WEFAX where both can operate simultaneously);

- Archiving of satellite data and information which is fully co-ordinated with the GDPS archival system of the WWW (see WWW plan - GDPS).

92. There is a need for further research and development work during the period 1980-1983, such as:

(i) Evaluation of the results in the field of interpretation and utilization of satellite data;

(ii) Evaluation of new and improved sensors flown on experimental spacecraft during the period, especially those for ocean observations;

(iii) Evaluation of the output quality and characteristics of quantitative satellite data for operational and research use;

(iv) Improvement in design of operational satellite systems, including engineering and operation of space and ground segments;

(v) Development of sensors and products required for meeting special needs of the World Climate Programme through the operational satellite systems.

93. The studies listed above in (i), (ii) and (iii) should be carried out by technical commissions within their respective terms of reference, and those in (iv) and (v) by satellite operators. Activities of the technical commissions in these fields should be co-ordinated and supervised by the Executive Committee, which may call on ad hoc groups, composed of representatives of satellite operators and data users for special tasks.

94. In addition, the Executive Committee should oversee the evaluation of desirable improvements in satellite systems engineering and operation, as they relate to WWW, which may become possible as a result of new developments.

95. For planning of the ground segments, it will be necessary to prepare and keep up to date the "Guide on Direct Broadcasting", containing detailed technical and operational information required for planning, setting up and operating these facilities. This task should be carried out by the Secretary-General, in consultation with satellite operators and technical commissions concerned, as appropriate.

Implementation aspects

96. It is expected that, by 1980, the space-based sub-system originally envisioned for the World Weather Watch will be fully operational. In addition, new capabilities, such as data collection by satellite and WEFAX, will be playing increasingly important roles in the WWW. Thus, in the time period 1980-1983, the WWW will, in many respects, be dependent on the space-based sub-system. Therefore, WMO should request those Members and organizations responsible for the various components of the space-based sub-system, to ensure its reliable operation in order to meet WWW purposes. Since increasing reliance during the 1980-1983 period will be placed on the space-based sub-system as an important source of data for the three WWW levels, the satellite operators should give high priority to the continuity of the operational meteorological space programme.

GLOBAL DATA-PROCESSING SYSTEM

Purpose and principles

97. The purpose of the GDPS is to make available to all Members processed information, which they require for both real-time and non-real-time applications, with a minimum of duplication using the most modern computer methods. The GDPS is organized as a three-level system of World Meteorological Centres (WMCs) and Regional Meteorological Centres (RMCs) at the global and regional levels, respectively, and National Meteorological Centres (NMCs) which carry out GDPS functions at the national

level. In general, the real-time functions of the system involve pre-processing of data, analysis and prognosis, including derivation of appropriate meteorological parameters. The non-real-time functions include collection, quality control, storage and retrieval as well as cataloguing of data for use in research and special applications.

Organization and functions of GDPS centres*

98. The WMCs, located in Melbourne, Moscow and Washington, should provide products which can be used for general short-, medium- and long-range forecasting of planetary or large-scale meteorological systems. Melbourne will provide products for the southern hemisphere.

99. The RMCs are: Algiers/Oran, Bracknell, Brasilia, Buenos Aires, Cairo, Dakar, Darwin, Khabarovsk, Lagos, Melbourne, Miami, Montreal, Moscow, Nairobi, New Delhi, Norrköping, Novosibirsk, Offenbach, Peking, Rome, Tananarive, Tashkent, Tokyo, Tunis/Casablanca, Wellington. These centres should provide regional products which can be used for short- and medium-range forecasting of small-, meso- and large-scale meteorological systems by NMCs. Products of RMCs should be presented in such a way that they can be used by Members at the national level as input to data-processing procedures which must be performed to provide adequate assistance to users.

100. The system of WMCs and RMCs should be kept under review by CBS and, as appropriate, by regional associations. Steps should be taken by them to fill any gaps in the system and to avoid any undesirable redundancy, and to make appropriate recommendations for this purpose to the Executive Committee.

101. Members should take all measures, if not yet done, to adequately man and equip their NMCs to enable them to play their full part in the WWW and also to ensure that the full benefits of the information obtained from WWW are reaped on a national level. In particular, NMCs should be equipped to receive WMC and RMC products for further processing, especially in respect of small-scale meteorological systems.

PRINCIPLES OF OPERATION OF THE GDPS IN THE PERIOD 1980-1983

Real-time service**

Observational data requirements of the GDPS

102. During the period 1980-1983 the GDPS will continue to require complete and timely observational data from both the surface-based and space-based systems of the GOS to meet operational forecasting requirements at the national, regional

*Further specifications and details of the functions and organization of GDPS centres are given in Volume I of the Manual on the GDPS (Annex IV to the Technical Regulations, WMO-No. 485).

**Details of methods used in real-time operations of GDPS centres are found in the Guide on the GDPS (WMO-No. 305).

and global levels. Therefore, the need continues to overcome the present problems in data collection (especially from the tropics and southern hemisphere) and the deficiencies in the current observing systems (see also paragraph 108).

103. During the period, emphasis should be placed on data requirements for the short-range (one-to three-day) and medium-range (four-to ten-day) weather forecasting. Studies are needed to determine the most appropriate spatial scale of networks as well as the overall coverage of reports in support of forecasting in these time ranges.

(a) The short-range forecast and warning services will require the well-organized use of data from both manned and automatic stations on land and at sea, as well as from radars and polar-orbiting and geostationary satellites. Methods should be developed for rapid communication of these data to the forecast office and for their automatic display and assimilation in short-range forecasting. Special emphasis should be placed on the general distribution of visual and infra-red satellite pictures from both geostationary and polar-orbiting satellites;

(b) Global data will be needed for forecasting in the medium time range. During the period 1980-1983 these data will be made up of a combination of observations from surface-based and space-based stations/platforms which provide a continuous mix of synoptic and asynoptic data throughout each day.

104. To assist in determining future data requirements, studies must also be pursued on the best mix of observing systems and on the most economic instrument systems for observing the weather over the globe. During the period 1980-1983, further experiments will be needed to develop methods for producing improved temperature sounding data from satellite radiances, bearing in mind the potential importance of these data, particularly in the southern hemisphere.

Processing requirements of the GDPS

105. To exploit both the present and emerging surface and space-based observing systems, multi-variate four-dimensional analysis schemes will need to be tested and further refined for general use in operational forecasting.

106. Testing of fine-mesh global/hemispheric numerical models which will properly assimilate the data from new satellite observation systems is of great importance during the period.

107. To improve warning and forecasting services in Member countries, it is desirable to implement new methods such as statistical techniques, limited-area, fine-mesh numerical models. Also desirable is the improvement of techniques for using boundary values provided from large-scale numerical forecasts to stabilize the integration of these fine-mesh models. These limited-area NWP models can be used at RMCs and NMCs to provide input parameters for statistical-dynamical techniques for forecasting specific weather elements (e.g. temperature, precipitation, wind, ceiling, visibility, etc.). Use of radar echoes digitized by computer processing should also be encouraged for short-range forecasting of rainfall amounts.

Production and distribution of GDPS products

108. The standard and recommended procedures, given in Volume I of the Manual on the GDPS, include those concerned with the production and distribution of products at WMCs, RMCs and NMCs. These procedures include information on times of receipt of observational and processed data and exchange of products between centres. Also included are procedures and minimum standards for real-time quality control of data within the GDPS. It is important that these procedures be followed by all Members to the maximum extent possible.

Non-real-time service*

109. The non-real-time functions and operations of WMCs, RMCs and NMCs are given in Volume I of the Manual on the GDPS. These include:

(a) Collection and storage in the GDPS of all direct observations and a selection of derived data, analyses and forecasts;

(b) Quality control of data to be stored, including minimum standards for non-real-time quality control;

(c) Use of media and formats recommended for international exchange of data;

(d) Publication of catalogues of stored data.

Inter-relationship with other WWW components

Global Observing System

110. The development and use of analysis and forecasting methods within the GDPS should provide the basis for stating requirements concerning the types and amounts of data to be provided by both the surface and space-based sub-systems of the GOS.

111. The GDPS should provide central satellite receiving and processing stations with the processed data necessary for the derivation of all types of satellite products. Satellite stations of all types should make available to GDPS centres those data required in forecasting and storm-warning services.

112. The GDPS should provide the necessary storage and retrieval systems and media for exchange of data derived from the space-based sub-system of the GOS.

Global Telecommunication System

113. The scheduling of transmissions on the GTS should be made on the basis of the requirements for exchange of observational and processed data stated by the GDPS.

114. The GDPS and GTS must co-ordinate their activities to assure the distribution of processed products to all Members requiring them.

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* Details of methods used in non-real-time operations of GDPS centres are found in the Guide on the GDPS (WMO-No. 305).

General objectives of the GDPS during 1980-1983

115. Taking into account the requirements for data and forecasting services (paragraphs 102 through 107), the general objectives of the GDPS during the period 1980-1983 should be:

(a) To facilitate the functioning of short-range weather forecasting and storm warning services, especially at the regional and national levels by providing technical advice and information on automatic data-processing methods and equipment, and on local applications of equipment and techniques in forecasting;

(b) To improve operational weather forecasts in all time ranges by development and incorporation into operational use of new methods for forecasting, such as models based on stochastic/dynamic techniques, other new modelling techniques and ways of parameterizing atmospheric processes;

(c) To develop and improve methods for presenting and, as necessary, modifying machine-made products for the user, so as to make these products more valuable and more easily applied to operational problems;

(d) To develop and improve methods for processing, storage and retrieval of data for basic meteorological, climatological and other purposes, as appropriate, to meet the needs of other WMO programmes in accordance with the requirements stated by the appropriate WMO technical commission(s).

Objectives of WWW centres

116. During the period 1980-1983 WMCs should:

(a) Update and expand as necessary their programmes for the preparation and dissemination of output products and list them in WMO Publication No. 9, Volume B, taking into account the requirements of Members and the capability of the GTS;

(b) Develop for use in operational forecasting four-dimensional data assimilation schemes using suitable analysis schemes (e.g. multi-variate optimum interpolation or spectral);

(c) Introduce for use in operational forecasting fine-mesh numerical models which will fully exploit the mix of data from the surface-based and space-based observing systems;

(d) Apply in daily operations quality-control procedures according to the minimum and advanced standards given in Volume I of the Manual on the GDPS;

(e) Carry out the GDPS responsibilities of monitoring the operation of the WWW as given in the CBS Plan for Monitoring the Operation of the WWW, in the Manual on the GDPS (WMO-No. 485);

(f) Complete as necessary arrangements for the collection, processing, storage and retrieval of data needed for basic meteorological, climatological and other purposes to meet global data requirements as specified by CBS and other technical commissions.

117. During the period 1980-1983 RMCs should:

(a) Update and expand as necessary their programmes for the preparation and dissemination of output products and list them in WMO Publication No. 9, Volume B, taking into account the requirements of Members, including those of specialized services, and the capabilities of the GTS;

(b) Implement for use in operational forecasting limited-area fine-mesh numerical models using (where necessary) boundary values from larger-scale numerical forecasts provided by WMCs or other RMCs;

(c) Develop and implement, where required, procedures to convert processed data received via the GTS, in GRID or GRAF code form, into pictorial form. (This should, where appropriate, be shared with RTHs co-located with RMCs);

(d) Introduce into operational data processing the use of quality-control procedures, in conformity with the minimum standards given in Volume I of the Manual on the GDPS (WMO-No. 485);

(e) Complete as necessary the arrangements for processing, storage and retrieval of data needed for basic meteorological, climatological and other purposes to meet regional data requirements as specified by regional associations, CBS and other technical commissions;

(f) Carry out the responsibilities of monitoring the operation of the GDPS as given in the CBS Plan for Monitoring the Operation of the WWW in the Manual on the GDPS (WMO-No. 485).

118. During the period 1980-1983 NMCs should:

(a) Introduce, where appropriate, numerical techniques (e.g. fine-mesh models and statistical-dynamical forecasting methods) to improve the short-range forecasting and warning services at the national level;

(b) Develop and implement procedures to convert processed data received via the GTS in GRID or GRAF code form, into pictorial form;

(c) Introduce in operational data processing the use of quality-control procedures in conformity with the minimum standards given in Volume I of the Manual on the GDPS (WMO-No. 485);

(d) Complete, as necessary, the implementation of arrangements for the collection, processing, archival and retrieval of all data from their national observing networks which are needed for basic meteorological, climatological and other purposes;

(e) Carry out the responsibilities of monitoring the operation of the GDPS as given in the CBS Plan for Monitoring the Operation of the WWW in the Manual on the GDPS (WMO-No. 485).

Further efforts and studies required in the GDPS

119. The implementation of the objectives of the GDPS, given above, will provide for the improvement of both real-time and non-real-time data-processing within the system. New analysis and forecasting methods, developed during the FGGE and other research projects must be kept under review by CBS and as appropriate, by regional associations, so that the results of these projects may be applied in operational forecasting.

120. CBS and the regional associations, where appropriate, should continue their efforts to improve the operation of the GDPS, by eliminating deficiencies in timeliness and availability of observational processed data and to make appropriate recommendations to the Executive Committee.

121. Research must continue in the development and testing of numerical forecast systems (i.e. analysis and forecasting methods) which fully exploit the data base and computer systems available in the 1980s. This must include observing system experiments to develop an optimum mix of observing systems, as well as further development of four-dimensional data assimilation methods. Fine-mesh numerical models and parameterization of physical effects, both on a global and limited-area scale, must be further developed and tested to provide a basis for improvement of operational forecasting and warning services. Development and testing of numerical models which link the atmosphere with ocean and sea-ice models should continue with a view to forecasting the evolution of atmospheric long waves on the time-scale of one month. Furthermore, efforts should continue to ensure better interpretation of numerical weather-prediction products in operational forecasting. Verification of forecasts should be continued at the national and international levels.

122. Further improvement and automation of storage and retrieval services at all levels of the GDPS to promote the international exchange of stored data for research in forecasting. In this connexion, the international tape exchange formats for observational and processed data should be completed by CBS.

GLOBAL TELECOMMUNICATION SYSTEM

Purpose and principles

123. The purpose of the GTS is primarily to provide the telecommunications facilities and arrangements for the rapid and reliable collection, exchange and distribution of the required observational data, in particular from the GOS, and also of processed information available from the WMCs and RMCs operating within the GDPS of the WWW, to meet the needs of Members for operational purposes and those research purposes which

necessarily involve the exchange of information in real time. The GTS will also give telecommunication support for the implementation of all other environmental programmes as decided by the WMO Congress or the Executive Committee in so far as its principal objective allows.

124. The facilities provided in the GTS and the techniques to be employed on these circuits should be adequate to accommodate the necessary volume of meteorological information and its transmission within the required time limits to meet the needs of Members for operational and research purposes within the WWW, and all other programmes as agreed by Congress or the Executive Committee.

125. The collection, exchange and transmission schedules and procedures should, for all types of data, be co-ordinated by CBS and regional associations as required.

General organization and functions of the GTS

126. The GTS is organized on a three-level basis, namely:

(a) The Main Trunk Circuit and its branches;

(b) The regional meteorological telecommunication networks; and

(c) The national meteorological telecommunication networks.

127. The GTS is internationally supported by the telecommunication functions of the following centres:

(a) World Meteorological Centres;

(b) Regional Telecommunication Hubs (RTHs);

(c) Regional Meteorological Centres, as necessary, in accordance with regional agreement; and

(d) National Meteorological Centres.

128. The centres with receiving and transmitting capabilities on the Main Trunk Circuit and its branches have been specified by Congress. These are:

(a) World Meteorological Centres: Melbourne, Moscow, Washington;

(b) Regional Telecommunication Hubs: Algiers, Bracknell, Brasilia, Buenos Aires, Cairo, Nairobi, New Delhi, Offenbach, Paris, Peking, Prague, Tokyo.

A diagram indicating the routeing of the Main Trunk Circuit and its branches is given in Part A of Appendix II. Regional associations have included in their regional telecommunication plans other RTHs in addition to those listed above. These are given in Part B of Appendix II.

129. In addition to the above elements, the meteorological and environmental satellites will play an increasing role within the GTS. Data collection platforms (DCP) constitute an integral part of the GTS for the collection of in situ observations from fixed and mobile platforms. Furthermore, the low resolution analogue direct broadcast channel of geostationary satellites, known as WEFAX, is an important part of the GTS for the distribution of pictorial information directly to users (see WWW plan - GOS). Therefore, both the data collection and distribution capabilities of meteorological satellites should be fully integrated into the GTS.

130. The details of the organization and functions of the networks and centres mentioned above are given in the Manual on the GTS.

Operational procedures, technical characteristics and specifications for the GTS

131. The standard operational procedures and the technical characteristics, specifications of meteorological transmissions and the engineering of WMCs and RTHs on the Main Trunk Circuit and its branches have been developed in detail and are contained in the Manual on the GTS (Volume I, Global Aspects). CBS is responsible for reviewing, modifying and updating the information contained in Volume I of the Manual on the GTS, in the light of technological developments and other requirements.

132. Regional meteorological telecommunication networks are developed by regional associations so that they are compatible with the system characteristics (engineering, circuit, transmission) of the Main Trunk Circuit and its branches. Compatibility is essential, particularly to ensure efficient flow of traffic over the GTS. The details of the regional meteorological telecommunication networks are contained in the Manual on the GTS (Volume II, Regional Aspects).

133. National telecommunication networks should be developed so as to ensure efficient flow of traffic over the GTS within the specified time limits.

134. The satellite operators and WMO have developed and promulgated the standardized technical characteristics of the international and regional data collection platforms, as well as their certification and admission procedures. The details are contained in the Manual on the GTS, Volume I.

135. The detailed technical characteristics of WEFAX transmissions are contained in the publication entitled "Guide on Direct Broadcasting".

Further development and main study projects relating to the GTS during the period 1980-1983

136. Every effort should be made by Members concerned, regional associations and CBS for further development and improvement of the GTS during the period 1980-1983, with a view to extending, as far as possible during the period 1980-1983, the full

benefits of the WWW and other environmental programmes to every part of the world. To this end the following developments are considered to be of primary importance:

(i) The development and organization of existing and new telecommunication centres, including automatization;

(ii) The development and improvement of the techniques used for and transmission capacities of the Main Trunk Circuit and its branches;

(iii) The development of WMO technical, procedural and operational standards for improved data transmission, including speeds higher than 2400 bit/s, as well as for digital facsmile transmissions;

(iv) The development and, whenever required, upgrading of national and regional meteorological telecommunication networks;

(v) Prompt elimination of shortcomings, in those areas where they still exist, in the collection and exchange of observational data and processed information in order to meet the requirements of Members;

(vi) Complete integration of the telecommunication capabilities of meteorological satellites (both geostationary and polar-orbiting) in the GTS;

(vii) The development of procedures for making major changes in the WWW/GTS plan in cases where the establishment of centres and/or circuits has not been completed over a long period of time.

137. In connexion with the above, the following main study projects should be carried out during the period 1980-1983:

(a) The possibilities of applying the automatic collection of observational data in some areas;

(b) Expansion of the capabilities of telecommunication centres, in particular those on the MTC and its branches, to include storage of observational data and their automatic retrieval by request messages received on the GTS from other WWW centres;

(c) Development of procedures for automation of re-routeing of traffic in case of outages;

(d) Improved transmission of processed information, in both pictorial and digital form, to users;

(e) Rationalization of the format of messages and of different existing methods of identification (GDPS, GTS and Codes) used in meteorological messages.

MONITORING THE OPERATION OF THE WORLD WEATHER WATCH

Objectives

138. The objectives of the monitoring effort are to improve the performance of the World Weather Watch (WWW), in particular to increase 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) are so inter-related, the monitoring of each element cannot be done independently. Therefore, for efficient monitoring of the operation of the WWW as an integrated system, close co-ordination between 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.

Components

139. The main components for monitoring the operation of the WWW are:

(a) Real-time monitoring;

(b) Non-real-time monitoring;

(c) Follow-up action for co-ordination and assistance.

The details of these components, as well as the aspects of their implementation, are included in the "Plan for Monitoring the Operation of the WWW" developed by the CBS and approved by the Executive Committee, which is published in the appropriate WWW Manuals.

Responsibilities

140. The basic responsibilities for monitoring the operation of the WWW rest with Members.

141. Members should implement the plan for monitoring the operation of the WWW at the earliest possible date, in particular the real-time monitoring.

142. The WMO Secretariat plays an important role in the monitoring of the operation of the WWW on a non-real-time basis as prescribed in the plan for monitoring the operation of the WWW. The Secretariat will carry out the necessary analyses of the non-real-time monitoring reports from the WWW centres to identify the level - global, regional or national - on which deficiencies occur. The Secretary-General will co-ordinate and advise on assistance necessary to rectify the deficiencies revealed from the results of the monitoring.

IMPLEMENTATION OF THE WWW PLAN

General

143. The WWW should be implemented according to the following basic principles:

(a) All activities connected with the implementation of the WWW on the territories of individual countries should be the responsibility of the countries themselves and should, as far as possible, be met from national resources;

(b) Implementation of the WWW on the territory of developing countries should be based on the principle of the utilization of national resources but, where necessary and so requested, assistance may be in part provided by:

(i) The United Nations Development Programme (UNDP) (which should be used to the maximum possible extent);

(ii) Bilateral or multilateral arrangements;

(iii) Contributions in financial form or in the form of equipment or services by Members of WMO; such contributions will constitute the WMO Voluntary Assistance Programme (VAP);

(c) Implementation of the WWW in regions outside the territories of individual countries (i.e. outer space, oceans, Antarctica) should be based on the principle of voluntary participation of countries which desire and are able to do so, by providing facilities and services, either individually or jointly from their national resources or possibly by having recourse to collective financing. The possibility of granting assistance from the WMO VAP should, however, not be excluded;

(d) In the implementation of the WWW plan, maximum use should be made of existing facilities and arrangements in the different fields of activity involved. The implementation programme includes the establishment during the period 1980-1983 of the new and improved facilities required by the plan and any necessary further work concerning details relating to these facilities. The main actions required in implementing the WWW during the period 1980-1983 are given in the paragraphs below;

(e) No existing component or facility of the WWW should be removed before the corresponding new component or facility can meet the requirements at least to the same extent as the old;

(f) The further development of the three essential elements, GOS, GDPS, GTS, and the monitoring of the operation of the WWW are an important feature of the WWW plan. The setting up and operation of the new and improved facilities and services which are projected require a considerable amount of scientific research, development engineering, co-ordination of procedures, standardization of methods and implementation co-ordination.

144. The main actions required during the period 1980-1983 are:

(a) Completing the implementation of the GOS, GDPS and GTS, so as to bring the plan into full operation in all respects;

(b) Extending and improving the operation of the GOS, GDPS and GTS with a view to achieving high systems effectiveness and reliability;

(c) Adapting to opportunities provided by technological advances especially in telecommunications, space observational systems and data-processing systems;

(d) Providing increased support needed by other WMO programmes and international programmes established jointly by WMO and other international organizations.

GUIDANCE FOR IMPLEMENTATION ACTION

145. Guidance for implementation action for the period 1980-1983 is given below.

GOS: Surface-based sub-system

(a) Improve the regularity of making and reporting of observations from surface and upper-air stations included in the regional basic synoptic networks;

(b) Implementation, particularly in Regions I, II (southern part), III, IV (southern part) and V (including oceanic areas), of the regional basic synoptic networks of surface and upper-air stations which are necessary as a minimum requirement.

This would entail at least:

Surface observations

(i) Establishment of 240 new surface synoptic stations;

(ii) Expansion of the observing programmes at 350 existing stations, in particular during night hours, preference being given to the full implementation of the observations at the main standard times.

Upper-air observations

(i) Establishment of 30 new radiosonde/radiowind stations and 20 radiowind stations, mainly in the tropical and subtropical belt and southern hemisphere;

(ii) Expansion of the observing programmes at existing stations in the tropical belt to one full radiosonde/radiowind ascent and one radiowind ascent daily. This would involve approximately 70 stations.

(c) Surface observations over the oceans by mobile ships

(i) Recruitment of an additional 150 ships (as selected ships) mainly plying in subtropical, tropical and southern oceans;

(ii) Equipping 200 ships with satellite data-collection facilities (DCP), in particular those on routes traversing the tropical belt and the southern hemisphere.

(d) Marine buoys

Establishment of buoy networks, anchored and drifting, as required for marine and IGOSS activities.

(e) Upper-air observations from mobile ships

Recruitment of an additional 15 ships (merchant, special or research ships) for making upper-wind observations in tropical waters.

(f) Tide gauges

Establishment of tide gauges, particularly in coastal and island areas subjected to storm surges, unusually high tides and tsunamis.

(g) ASDAR

Establishment of up to 200 ASDAR units on wide-bodied aircraft, especially those which operate in data-sparse areas, assuming the success of the ASDAR trials now being carried out.

GOS: Space-based sub-system

(a) Space segments

(i) Continuation of the operation of at least two operational polar-orbiting satellite systems, each of them consisting of two satellites;

(ii) Continuation of operation and expansion of the geostationary satellite systems composed of at least five geostationary satellites.

(b) Read-out stations

(i) Establishment of special regional facilities co-located or linked with RMCs;

(ii) Establishment of local or national read-out facilities. Each national Meteorological Centre should be equipped with an APT/WEFAX station.

GDPS

(a) WMCs should introduce new operational forecast systems which exploit the available surface and space-based observing systems for global and hemispheric forecasting, especially over the tropical belt;

(b) RMCs should be equipped with appropriate computing facilities, as required for the preparation of objective analyses and prognoses, and also to accept WMC/RMC output products in GRID code;

(c) Two newly designated RMCs should be established in Region I and one newly designated RMC in Region II;

(d) NMCs should introduce modern data-processing techniques to improve their short-range forecasting and severe weather warning services and should be equipped with appropriate facilities enabling them to accept WMC/RMC products in GRID code, as required;

(e) RMCs/NMCs should introduce data quality control procedures and up-to-date data archiving and retrieval methods. (Establishment of national data banks.)

GTS

(a) MTC and its branches

(i) Two remaining RTHs on branches of the MTC should be automated;

(ii) Segments of the MTC should be upgraded to 2400/4800 b/s operation as required and digital facsimile transmission should be introduced;

(iii) All branches of the MTC should be upgraded to at least 200 b/s and a facsimile channel installed, where feasible and required.

(b) Regional Meteorological Telecommunication Networks

(i) Implementation of two RTHs;

(ii) Setting up of about 50 remaining main regional, inter-regional and regional circuits and replacement of HF circuits by terrestrial, satellite or cable circuits wherever such an opportunity exists;

(iii) Automation of RTHs/NMCs included in the regional plan as required and financially possible;

(iv) Improvement of the operation of the regional telecommunication networks to ensure timely and complete collection and distribution of observational data in:

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

(v) Introduction of digital facsimile transmission for regional distribution of processed information, as appropriate.

(c) National Meteorological Telecommunication Networks

(i) Improvement of the national collection system in Africa, southern parts of Regions II and IV, South America and the Antarctic. This would entail setting up or improvement of 1,000 links between observing stations and NMCs;

(ii) Establishment of 300 DCPs for centralized collection of surface and upper-air reports for stations in Regions I, IV (southern part), III, II (southern part) and V, in addition to national collection schemes (see also GOS paragraph (b)(ii) above));

(iii) Establishment at each NMC of reception capabilities for pictorial information (facsimile receiving equipment);

(iv) Designation of 20 new adequately equipped coastal radio stations, in particular in Africa and South America, for collection of ships' weather reports.

146. In addition to the specific action listed in paragraph 145 above, the implementation of the plan will call for an increased number of trained meteorological personnel, as well as experts in automatic data-processing, meteorological telecommunications, electronic engineers and technicians.

147. To ensure a general improvement of the operation of the GOS, GDPS and GTS, a constant real-time monitoring of the system needs to be maintained by Members at all levels. The non-real-time monitoring function carried out by the Secretary-General will need to be expanded in order to achieve a more effective operation of the WWW at the global and regional levels.

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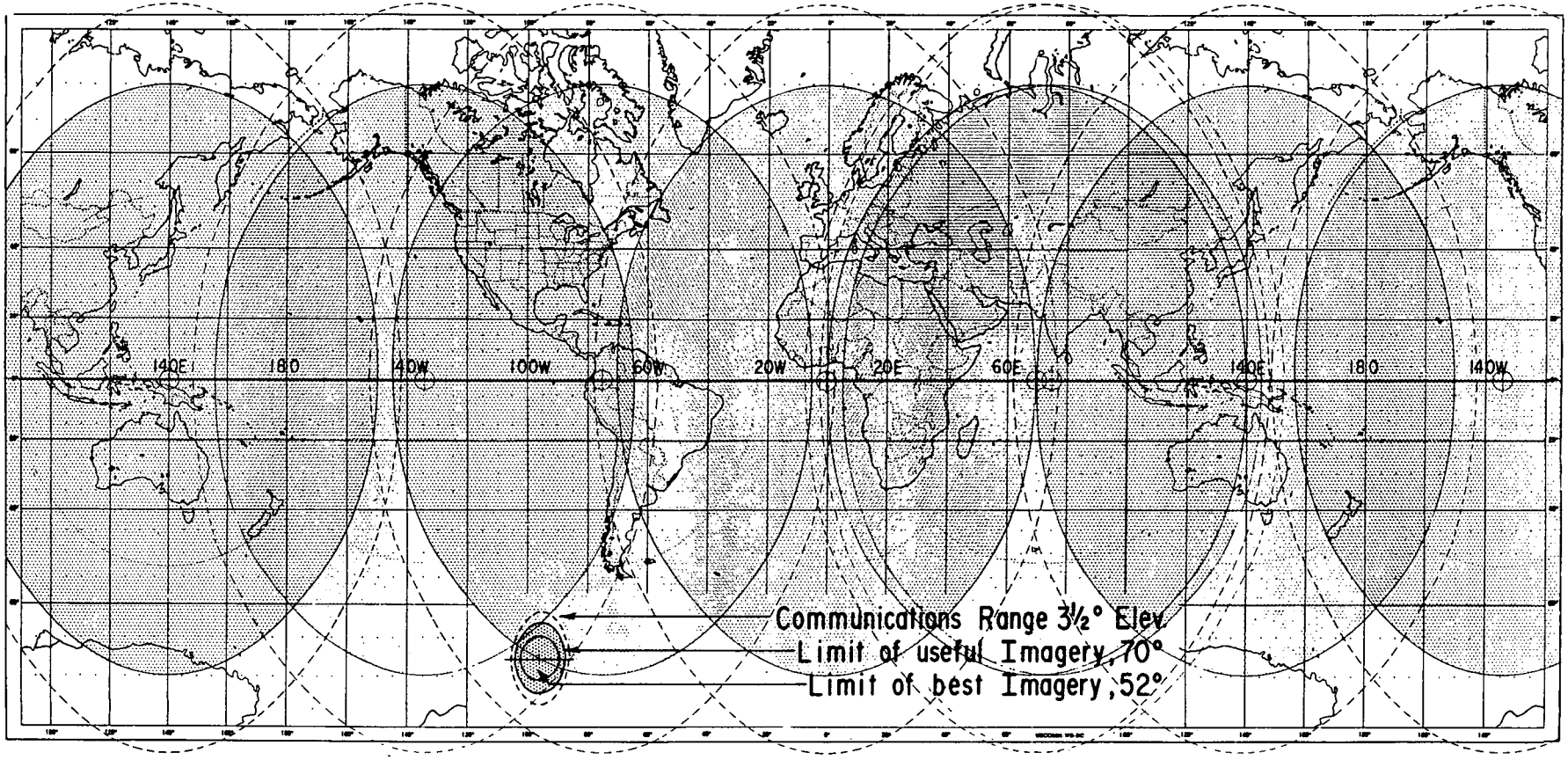
APPENDIX I

Planned Geostationary Meteorological Satellites

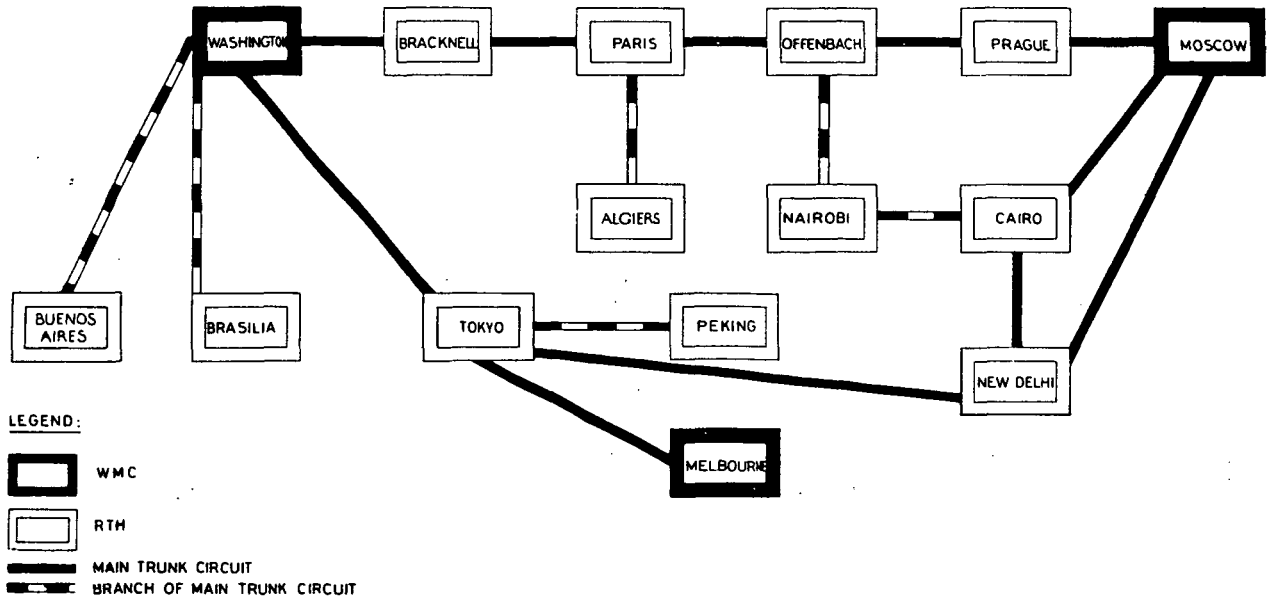
(Reference paragraph 83 of the Plan)



APPENDIX II

(Ref. paragraph 128 of the Plan)

PART A: Routeing of the Main Trunk Circuit and its branches



PART B: Regional Telecommunication Hubs other than those on the Main Trunk Circuit and its branches, as included by the regional associations in their regional telecommunication plans:

Bangkok, Brazzaville, Casablanca, Dakar, Jeddah, Kano, Khabarovsk, Lusaka, Maracay, Norrköping, Novosibirsk, Rome, Sofia, Tashkent, Tehran, Vienna, Wellington.

A N N E X III

Annex to paragraph 7.2.1.1 of the general summary

PROPOSALS FOR UPDATING THE GUIDE ON THE GDPS

Part A

Proposals for updating Chapter 3 of Volume I of the Guide on the GDPS

Paragraph 3.1.1 - General questions

- Some minor amendments are suggested:

  3.1.1.4 (b) Should be titled "Pre-analysis function".

  (e) Add at the end "or by use of spectral representation".

  (g) (ii) Replace to read "Formatting of computer-generated graphical information for presentation on graphical output devices or for facsimile transmission".

  3.1.1.5 (e) Last sentence should be changed to read "For example: line printer, electromechanical or electrostatic plotters, electronic displays, etc."

- A general discussion and diagram (including a more general treatment of the material in Figure 1) should be included in this paragraph to show the functions and equipment necessary to operate an automated prediction centre. When developing this discussion, account should be taken of the functions and equipment discussed in the annexes to Chapter 2 of the Guide on the Roles of RMCs and NMCs.

Paragraph 3.1.3 - Pre-analysis processing

3.1.3.4 Sorting and formatting of asynoptic data should also be discussed in terms of the method and scale of analysis used. The type of data and average number of reports after certain cut-off times should be updated with recent experience and broadened to include information on southern hemisphere data receipt (see p. III.8).

3.1.3.5 This section should be rewritten in a more general form since it contains too specific a description of one procedure for preliminary data processing.

Paragraph 3.1.4 - Methods of numerical weather analysis

(a) All references to publications at the end of this paragraph should be carefully checked and updated.

(b) The following general comments:

- This paragraph should be updated and re-arranged so that the method of optimum interpolation is expanded to include the more general two- and three-dimensional multi-variate schemes now being used or planned for use in several countries (e.g. Canada, Germany, Federal Republic of, U.S.A.). The correction method can be treated as a special case of the multi-variate scheme where weights are not calculated but are given as a function of distance only.

- A section titled "Functional representation" should be written to include polynomial and spectral analysis as well as the method of orthogonal polynomials used at the RMC Bracknell.

- Advantages and disadvantages of each analysis method or scheme should be pointed out in the discussions. The discussions should also include information on analysis of other parameters besides heights.

- A suggested source for updating this paragraph is the following:

  "Weather Forecasting and Weather Forecasts: Models, Systems and Users - Volume I" - NCAR Summer School on Weather Forecasting, 1976.

  Lectures by Dr. L. Bengtsson:

  pp. 311-355 - General principles of objective analysis-optimum interpolation.

(c) The problem of four-dimensional data assimilation should be discussed in more detail. In Volume I of the NCAR Summer School lectures, this problem is discussed on pages 366 to 376 by Dr. Bengtsson.

(d) Section 3.1.4.7 - Numerical analysis in the tropics

This method is no longer used operationally at WMC Washington. Since the more general multi-variate schemes are used for analysis in all parts of the globe, the discussion of a special analysis scheme for the tropics may need to be updated.

Paragraph 3.1.5 - Numerical weather-prediction methods

- The problem of initialization of models should be discussed in some detail. Again, a good reference for material on this subject is Dr. Bengtsson's lecture on pp. 355 to 365 of Volume I of the NCAR Summer School lectures.

- This paragraph needs to be updated and expanded to include discussion of new and more economical numerical schemes such as semi-implicit and split-explicit methods, which run 3 to 8 times faster on computers without degrading the resulting forecast. These methods are in operational use in several weather services (e.g. China, People's Republic of, and United Kingdom).

- Spectral models which are now in operational use (e.g. Australia and Canada) should be discussed in this paragraph.

Paragraph 3.1.6 - Methods of deriving and presenting output products

This paragraph should be updated and expanded to include:

(a) A brief description of different forms of alphanumeric and pictorial output (e.g. teletype bulletins, GRID code data, facsimile charts) and equipment (e.g. line printers, display terminals, etc.);

(b) A brief description of the GRID code and any simplified version, including procedures for coding and decoding GRID data (e.g. typical methods and equipment needed to transform GRID data into pictorial charts);

(c) A description of automated graphical output methods:

- Data volumes, transmission time and data-compression methods in raster and vector modes;

- Methods for generation of isopleths from GRID data in both raster and vector modes;

- Methods for plotting of observations in both raster and vector modes;

- Generation of facsimile charts.

Paragraph 3.1.7 - Utilization of numerical products

- Expand and update the discussion of statistical and dynamical techniques used to make forecasts of specific meteorological parameters. Specific information on these techniques can also be found in the NCAR Summer School lectures:

  Volume I, pp. 401-407, by L. Bengtsson, and
  Volume II, pp. 449-519, by H. Glahn.

- Discussion of errors in numerical forecast systems could also be updated with material from the NCAR Summer School lectures:

  Volume I, pp. 133-135, Robert's Error Budgets;
  Volume II, pp. 691-695, Metapredictability, by R. J. Somerville.

Paragraph 3.2.1 and 3.2.2 - Methods of manual analysis and prognosis in extra-tropical latitudes

These paragraphs should be reviewed and updated, particularly in the area of use of radar and satellite data.

Paragraph 3.2.3 - Methods of analysis and forecasting in the tropics

This paragraph was reviewed and updated at the request of CBS-VI in 1974 and 1975. However, this paragraph should be further reviewed and updated by a WWW centre concerned with forecasting in the tropics.

Part B

Various amendments to Volume I of the Guide on the GDPS

1. Concerning the revision and updating of material in Chapter 5 of Volume I of the Guide:

(a) The list of atmospheric scales in paragraph 5.1 should be expanded to include other classifications. A suggested reference for this review is:

Orlanski, L.: "A rational subdivision of scales for atmospheric processes", pp. 527-530, Bulletin American Meteorological Society 1975.

(b) The table labelled "Types of observation" in paragraph 5.1 should be eliminated, since it is now included in the Manual on the GDPS.

2. As far as possible, symbols and characters used in Volume I should be standardized. A glossary of basic symbols frequently used should also be included for reference at an appropriate location in Volume I.

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ANNEX III

Part C

Requirements and technical aspects of conversion of information in alphanumeric (GRID code) form into pictorial form

Introduction

1. At the present time, certain branches of the Main Trunk Circuit of the GTS are already heavily loaded because of the excessive distribution of meteorological products in analogue form. In view of the anticipated significant increase in the alphanumeric traffic, caused by FGGE, the increasing exchange of numerical analyses and forecasts in GRID code form and the foreseen changes in the telecommunication tariffs in the direction of volume-based cost make it obvious that measures will have to be taken in the near future to decrease the transmission of data in analogue form. This is also supported by the fact that most of the products distributed in pictorial form could be transmitted without difficulties in digital form. Furthermore, it should be kept in mind that some 50-100 GRID code messages can be transmitted in the time required for transmission of one map in pictorial form.

2. The transfer from analogue to alphanumeric distribution of NWP products implies, however, that a conversion must take place either at the RMC level when forwarding the products to national centres without conversion equipment or at the NMC level if the required equipment is available. As the conversion process is highly dependent on the specific requirements of the users and is related to the map projection and scale, area, representation, parameters to be superimposed, it seems logical to perform the conversion at the NMCs whenever possible.

3. At present only very few national centres have the capability to convert meteorological data from alphanumeric to pictorial form. In the following, a short general description of the hardware and software needed for the conversion is therefore presented. In view of the fact that a large number of WMO Members States are likely to acquire conversion equipment in the next few years, it is furthermore recommended that an expert be seconded by WMO to work out a detailed description of the hardware and software required for the conversion and to develop, in co-operation with centres experienced in this field, guidelines for a software package containing computer-independent sub-routines (e.g. in standard FORTRAN) performing the various general tasks included in the conversion process and described in some detail in the section on software (see paragraphs 14 and 15).

Hardware

4. It should initially be noted that GRID code exchange in principle should be performed over error-controlled (medium-speed) circuits because of the relatively large amount of data to be transmitted and the software problems caused by erroneous messages. Therefore, a (national) centre planning to initiate conversion of alphanumeric data into pictorial form must be equipped with a telecommunication computer system connected to a centre by an error-controlled circuit.

5. As regards the equipment required for the conversion process, two logically different hardware solutions can be identified:

(a) When no computer system suitable for the conversion is available, the best solution would normally be to acquire a minicomputer system and to connect this system on-line to the telecommunication system. (An off-line system with data transfer by using magnetic tapes is also a possible solution, although it is less flexible and requires significantly more operator intervention);

(b) When a major system is already available at the centre in question or is being acquired, the computations related to the conversion could be handled by the same computer.

It should be noted that although the above-mentioned two hardware solutions can be seen as basic alternatives, many other solutions are possible.

6. A special and quite attractive case of the first alternative occurs when the telecommunication system is expanded to handle both telecommunications and conversion. (In a duplicated system the conversion could normally be handled by the back-up computer.)

7. For a modern minicomputer, the conversion process for typical meteorological maps will require 5-15 minutes of CPU time and some 16K words of primary memory, not including space required for the operating system and related system software. In addition, secondary memory (normally on disk) of the order of 5M bytes is required for storage of messages received and maps produced during the last 12-24 hours and for intermediate storage during the computational process.

8. The price of the hardware for such a minicomputer equipped with the necessary peripheral equipment is of the order of 100 000 US dollars. In the case of a major computer system to be used for the conversion, such a system normally fulfils all the hardware requirements without any enhancements.

9. Regarding the graphical equipment required for the production of the meteorological maps, two types of plotter can be distinguished:

(a) Pen plotters which draw continuous lines with one or several pens of different colours on pre-printed maps;

(b) Electrostatic plotters which produce maps by printing small black dots, as controlled by the software, with a resolution of 100 dots/inch or more on specially prepared paper.

10. In both cases, on-line (direct connexion to the computer) or off-line (data transfer via magnetic tape) connexions are possible. However, in the case of a minicomputer an on-line connexion is clearly preferable. An off-line connexion is quite acceptable in the case of a major computer installation, in particular for a pen plotter which in any case requires a significant amount of operator intervention.

11. When deciding if a pen plotter or an electrostatic plotter is to be acquired, the following aspects should be taken into account:

(a) The price of an electrostatic plotter is normally lower (25 000–35 000 US dollars; the lower price refers to a low-cost on-line alternative, which might not always be available) than the price of a comparable pen plotter system (45 000–70 000 US dollars);

(b) The electrostatic system produces maps significantly faster than a pen plotter; on the other hand, the determination of the data controlling the plotter is considerably more time-consuming for the electrostatic plotter, in particular if the resolution of the plotter is very high (more than 100 dots/inch);

(c) The reliability of the best electrostatic plotters is very high (of the order of 3 000 hours of Mean Time Between Failures) as compared with pen plotters, and a duplication of the electrostatic equipment is therefore perhaps not necessary, whilst a pen plotter normally must have a back-up solution;

(d) The use of pre-printed backgrounds and ballpoint or ink pens normally makes the pen plotter more attractive if the maps are to be processed further by meteorologists; this is particularly true if other than isoline maps (surface and upper-air plotting, vertical TEMPs, etc.) are to be produced by the system.

12. If the aim is to have a conversion system with a minimum amount of operator intervention, the recommendable solution is a minicomputer-controlled electrostatic plotter with the computer being connected on-line to the telecommunication system (and the plotter on-line to the minicomputer). It should also be noted that such a system could easily be expanded to distribute automatically maps on facsimile circuits because of the logical similarity between the two systems.

13. In many cases a computer-controlled system for the conversion of GRID-code data into pictorial form and the subsequent automatic distribution of this information on facsimile circuit could be the preferred solution. This requires fairly small hardware enhancements as compared with a system producing meteorological maps locally using an electrostatic plotter. Because of the logical similarity between the two types of the map output, virtually no software modifications are required.

Software

14. The software required for the conversion of data in alphanumeric form into maps is naturally dependent on the hardware configuration of the centre in question (and in particular the plotting equipment available) and also related to the special requirements of the users of the products. However, certain central parts of the software are more or less identical for all installations of this type and are tabulated below:

(a) A general-purpose plotting package with features such as lines of different thicknesses, scaling of arrays, data lines and axes, character and number plotting, etc. (This is a package used by many of the other sub-routines and also quite practical in general plotting applications not directly related to meteorological maps);

(b) Identification (possibly performed at the telecommunications level) and decoding of WMO GRID-code messages produced by various centres. (This will either be a fairly general package for decoding of virtually any kind of WMO GRID-code messages or, more probably, if a relatively small computer is to be used, special versions of the decoding package for each producing centre. Also, if the proposed simplified GRID code will be adopted, a similar decoding package for this code will be required;

(c) Interpolation, including conversion from one map projection to another. (This will typically include conversion from latitude-longitude grids to polar-stereographic grids, depending on what is used by the originating and receiving centres);

(d) Grid-to-isoline computations. (In the case of a pen plotter, this will be the production of vectors from grid-point data. In the case of an electrostatic plotter, this will be the determination of black and white dots either by direct interpolation from grid-point values or from vectors determined as an intermediate result);

(e) Background generation. (This is normally of interest only in the case of an electrostatic plotter, where a fairly general background package is needed, but could also in some cases be used for a pen plotter system).

15. For other meteorological applications, packages producing SYNOP plottings from the corresponding messages, upper-air plottings or vertical upper-air drawings from the TEMPs and PILOTs, etc., might also be of interest. At a higher level of sophistication, output of graphical products on visual graphical displays and manipulation of these products on the display before distribution or hardcopy output can be visualized.

ANNEX IV

Annex to paragraph 7.2.2 of the general summary

REVIEW OF THE MATERIAL IN VOLUME II OF THE GUIDE ON THE GDPS

CHAPTER 1 - PREPARATION OF METEOROLOGICAL CHARTS AND DIAGRAMS

1.2 - Plotting of meteorological observations

1.2.3 - Plotting of upper-air observations
After revision should be included in Attachment II-4 to the Manual on the GDPS.

1.3 - Plotting of meteorological elements in the vertical above a point
A short sentence on this matter should be included in the Manual and detailed description of its purpose should be included in the Guide along with the updating of material in Chapter 2, paragraph 2.1.4 of Volume II.

1.4 - Vertical cross-sections
Should be included in the Guide combined with Chapter 2, paragraph 2.2.6 but the plotting should be eliminated from this section.

1.5 - Plotting of atmospherics
Should be maintained in the Guide.

1.6 - Plotting of aircraft meteorological observations
After reviewing and updating should be included in the Manual.

1.7 - Plotting of charts of wave conditions

See Chapter 2, paragraph 2.2.7.

1.8 - Miscellaneous charts

Should be included in the Manual but standardized symbols should be considered for specific types of observations (e.g. SATEM, SATOB, etc.).

CHAPTER 2 - REPRESENTATION OF ANALYSES

2.1 - General

2.1.4 Representation of air masses

This material should be revised and should be combined with Chapter 6, section 6.3 - Air-mass charts - and should be included in the Guide.

2.2 - Representation of the analysis on specific charts

2.2.4 Tropopause chart

A short sentence should be included in this matter in Attachment II-4 to the Manual with a mention of maximum wind chart and more detailed explanation on the methods for the analysis of these charts should be included in the Guide.

2.2.5 - Pressure-change charts

Should be included in the Guide considering its use in objective methods.

2.2.6 - Vertical cross-sections

More details on objective methods for the analysis should be included in the Guide.

2.2.7 - Charts of wave conditions

After revision should be combined with Chapter 1, section 1.7 and be included in the Guide.

2.2.8 - Miscellaneous charts

Should be eliminated from the Guide.

CHAPTER 5 - CODED ANALYSES

A short explanation on this matter should be given in the Guide, taking into account the GRID codes.

CHAPTER 6 - SPECIAL CHARTS

6.2 - Frontal contour charts

Should be eliminated from the Guide.

6.3 - Air-mass charts

See Chapter 2, paragraph 2.1.4.

ANNEX V

Annex to Recommendation 2 (CBS-VII)

DRAFT LAYOUT
FOR THE MANUAL ON THE GLOBAL DATA-PROCESSING SYSTEM,
VOLUME II - REGIONAL ASPECTS

1. Introduction

The introduction will contain a brief description of the purpose and composition of the manual, indicating that Volume II contains practices and procedures adopted by the regional associations and by Members. The material in Volume II does not form part of the WMO Technical Regulations and is applicable only to Members of regional associations concerned. The words "shall" and "should" used in this volume have their usual dictionary meanings.

2. Regional Data Processing - Procedures and Practices in Region I, Africa

3. Regional Data Processing - Procedures and Practices in Region II, Asia

4. Regional Data Processing - Procedures and Practices in Region III, South America

5. Regional Data Processing - Procedures and Practices in Region IV, North and Central America

6. Regional Data Processing - Procedures and Practices in Region V, South-West Pacific

7. Regional Data Processing - Procedures and Practices in Region VI, Europe

Each regional section will contain the following parts:

Part I - Real-time data processing, regional and national aspects

1. Minimum standards for quality control
   (To contain regional standards and agreements between Members and additional national deviations from the minimum standards given in Volume I.)

2. Observational data requirements and times of receipt of observational data for regional exchange
   (To contain lists of types of observational data, with required times of receipt, for exchange within the Region.)

3. Pictorial representation of information, regional and national aspects
   (To contain more specific regional practices within the global frame concerning scales, projections and symbols for plotting and analysis and national deviations from global practices given in Attachment II-4 of Volume I.)

4. Exchange of processed products between centres, regional practices
   (To contain requirements for products from outside and inside the Region, regional distribution of products, transmission priorities on the regional network, products to be exchanged from WMCs/RMCs to centres in the Region in GRID-code form, products which must be exchanged in pictorial form within the Region. These requirements can be published as lists in this section.)

Part II - Non-real-time data processing, regional and national aspects

1. Data to be stored at centres (RMCs and NMCs) within the Region
   (To contain specific responsibilities of centres within the Region for storage of observational and processed data.)

2. Minimum standards for quality control
   (To contain regional standards or agreements between Members and additional national deviations from the minimum standards given in Volume I.)

3. Classification and cataloguing of stored data
(To contain descriptions of specific cataloguing practices within the Region.)

4. Media and formats for exchange of stored data
(To contain regional procedures used and additional national deviations from exchange procedures given in Volume I (media and formats).)

Part III - GDPS monitoring, regional and national aspects

(To contain more detailed regional GDPS monitoring procedures, to be applied within the Region, in support of or in addition to those given in the CBS Plan for Monitoring the Operation of the WWW. Also, it will contain any national deviation from this plan as given in Volume I of the Manual on the GDPS.)

A N N E X VI

Annex to Recommendation 3 (CBS-VII)

DRAFT ATTACHMENT TO THE MANUAL ON THE GDPS
MINIMUM STANDARDS FOR QUALITY CONTROL OF DATA FOR USE IN THE GDPS

Introduction

1. According to the WWW Plan 1976-1979 (see WMO Publication No. 418, paragraph 118), the Commission for Basic Systems is required to develop minimum standards for quality control of data in the GDPS. The Plan for Monitoring the Operation of the WWW, developed by the CBS (as presently published in the Manual on the GTS, WMO-No. 386, Attachment I-5, paragraph 14), also includes reference to the fact that minimum standards should be defined in the Manual on the GDPS.

Objectives

2. The objectives of the GDPS quality control are:

- To ensure the best possible quality of the data which are used in the real-time operations of the GDPS;

- In non-real time, to protect and improve the quality and integrity of data destined for storage and retrieval within the GDPS;

- To provide the basis for feed-back of information on errors and questionable data to the source of the data.

Basic components

3. The minimum standards for quality control of data apply to all WWW centres: NMCs, RMCs, WMCs. They include quality control at various stages of processing. They apply both to real-time and non-real-time processing and should lead to various records of quality-control actions.

Aspects of implementation

4. Quality-control standards may be introduced progressively at a GDPS centre using a modular approach. The general priorities for implementation of the minimum standards under the modular concept concern quality control of data. according to:

(a) Sources (e.g. stations);

(b) Type (e.g. SYNOP, TEMP);

(c) Time (e.g. OO GMT, 12 GMT);

(d) Parameters and characteristics (e.g. pressure, wind, temperature, amount of precipitation).

5. WMCs having multiple responsibilities as an RMC and/or an NMC, and RMCs also having a responsibility as an NMC, should assume the minimum standards pertinent to all levels at which the centre operates.

6. Table 1 of this Attachment lists the minimum standards for real-time and non-real-time quality control at NMCs, RMCs and WMCs. Where applicable, regional associations and national Meteorological Services will set up similar quality-control standards for data exchanged only at regional or national levels.

Responsibilities

7. General principles for the application and administration of GDPS minimum standards for quality control of data are given in the following paragraphs.

8. The basic responsibilities for implementing minimum standards for quality control of the GDPS rest with Members.

9. An essential part of the quality-control plan includes an exchange of information about data deficiencies between adjacent centres and between NMCs and observation points in order to resolve those deficiencies and minimize their recurrence.

10. The frequencies with which information is exchanged in order to improve the quality of data and products should correspond to the frequency with which monitoring reports are exchanged. These are given in the Plan for Monitoring the Operation of the WWW (as presently published in Manual on the GTS, WMO-No. 386, Attachment I-5).

11. The minimum standards specify which data are to be quality-controlled and how often. The detailed methods for performing the quality control are left to the Members to develop, but should conform to the minimum standards.* The geographic area (zone) of responsibility for application of the minimum standards will correspond to that undertaken by each WWW centre for data processing (Manual on the GDPS, Volume I, WMO-No. 485, Attachment III-2).

12. Real-time quality control of data is considered to be the control applied prior to initial application of the data in analysis and forecasting. Non-real-time quality control is considered to be the control applied prior to permanent storage of observational and processed data.

Advanced standards

13. The primary purpose of quality control is to detect data deficiencies and to attempt to correct them in real time. Thus, the WWW centres should perform quality-control operations as these are developed and as their technical capabilities allow. Centres which have high-speed computers can apply standards for quality control which are far beyond the minimum standards. These advanced standards should involve more real-time quality control, including correcting or flagging of more reports, parameters and levels than listed in Table 1. The Guide on GDPS gives information on methods for more advanced quality control.*

*Methods for real-time and non-real-time quality control are given in Volume I of the Guide on the GDPS, WMO-No. 305 (see paragraphs 3.1.3.3 and 4.4.2).

14. It is also the responsibility of automated centres to perform nearly continuous inspection and quality control of processing programmes that enable computers to identify, decode, process and array data properly.

Minimum standards for processed data

15. Minimum standards for quality control of processed data should include:

(a) Standards for presentation of processed data as they are given in Attachment II.4 to the Manual;

(b) Spatial and temporal coherence in the meteorological structure of the product (that is, no impossible or contradictory atmospheric states).

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TABLE 1

GDPS MINIMUM STANDARDS FOR QUALITY CONTROL OF INCOMING DATA (RECEIVED VIA THE GTS OR OTHER MEANS)

(1)	STATION LIST (2)	TYPES OF REPORT (3)	TIMES OF OBSERVATIONS* (4)	PARAMETERS TO BE QUALITY CONTROLLED (5)	PROCEDURES FOR QUALITY CONTROL (6)	RECORDS TO BE MAINTAINED (7)	MINIMUM FREQUENCY FOR PERFORMING QUALITY CONTROL (8)
REAL-TIME	WMCs GLOBAL EXCHANGE LIST IN WMO No. 386 GUIDE ON THE GTS RMCs & NMCs REGIONAL BASIC SYNOPTIC NETWORK GIVEN IN WMO No. 217	SYNOP	00, 06, 12, 18	-FM-11; All mandatory groups -FM-14; All telecommunicated data ***	Checking: -Detection of missing data at centres -Adherence to prescribed coding formats -Internal consistency -Time consistency -Space consistency -Physical and climatological limits Remedial Action -Before further processing, correct or flag erroneous or suspect data Notification: -Discrepancies and missing data should be made known to the appropriate centre or station Note: It is recognized that notification of not all errors or doubtful data can be done in real time by processing centre	-Information to identify source of data such as station, aircraft, ship -Type of deficiency (non-receipt, incomplete or incorrect reports, etc.) -Identification of deficient element (whole report, specific group, specific parameter, etc.) -Frequency of occurrence of data deficiencies (according to station type and element)	Preferably with each operational cycle; otherwise, with sufficient frequency to establish representative records.
		SHIP AND SHRED	00, 06, 12, 18	FM-21, FM-22, FM-23 All mandatory groups			
		PILOT PART A & B	00, 06, 12, 18	FM-32; Secs. 1, 2, 3, 4			
		PILOT SHIP PART A & B	00, 06, 12, 18	FM-33; Secs. 1, 2, 3, 4			
		TEMP PART A & B	00, 12	FM-35; Secs. 1, 2, 3, 4, 5, 6			
		TEMP SHIP PART A & B	00, 12	FM-36; Secs. 1, 2, 3, 4, 5, 6			
		SATEM SATOB	Asynoptic	-FM-86; mean temperatures -FM-88; cloud-motion winds			
		AIRCRAFT METEOROLOGICAL OBSERVATIONS	Asynoptic	-time and position -wind -temperature -flight level			
		CLIMAT**	Monthly	FM-71; Sec. 1			
		CLIMAT SHIP**	Monthly	FM-72 Sec. 1			
		CLIMAT TEMP**	Monthly	FM-75			
		CLIMAT TEMP SHIP**	Monthly	FM-76			
NON-REAL-TIME	WMCs GLOBAL EXCHANGE LIST IN WMO No. 386 GUIDE ON THE GTS RMCs & NMCs REGIONAL BASIC SYNOPTIC NETWORK GIVEN IN WMO No.217 AND FOR CLIMATE STATIONS, AS DETERMINED BY REGIONAL ASSOCIATIONS	SAME AS ABOVE PLUS:	Same as above plus:	Same as above plus:	Checking: Same as in real time and in addition: -Review of recorded data in comparison with observations taken before and after; -Inter-comparison of parameters and calculations -Check of supplemental data -Check of extreme values Remedial Action: -Correct errors and flag data as appropriate Notification: Refer discrepancies to observing stations or WWW centre as follows: -once per month from NMCs -once every three months from RMCs -once every six months from WMCs	Summarize records developed in real time to include: Same as above with all data deficiencies found in real-time combined with additional ones found in non-real time	With sufficient frequency to establish representative records
		PILOT PART C & D	00, 06, 12, 18	FM-32; Secs. 1, 2, 3, 4			
		PILOT SHIP PART C & D	00, 06, 12, 18	FM-33; Secs. 1, 2, 3, 4			
		TEMP PART C & D	00, 12	FM-35; Secs. 1, 2, 3, 4, 5, 6			
		TEMP SHIP PART C & D	00, 12	FM-36; Secs. 1, 2, 3, 4, 5, 6			
		ROCOB	Asynoptic	FM-39; Secs. 1, 2			

* Use observation time nearest to main synoptic hours when observation not taken at main synoptic hours.
** Monthly on receipt and prior to initial distribution or use.
*** When used in place of FM-11 for combined manned-automated stations.

A N N E X VII

Annex to Recommendation 4 (CBS-VII)

AMENDMENTS TO FM 87-VI Ext. SARAD

(1) Amend the symbolic code form FM 87-VI Ext. SARAD and the accompanying notes as follows:

FM 87-VI Ext. SARAD - Report of satellite clear radiance observations

CODE FORM:

SECTION 1	$M_iM_iM_jM_j$	YYGG/	$I_1I_2I_2I_3I_4$			
SECTION 2	222	$QL_aL_aL_oL_o$	$(N_cN_cP_cP_cP_c)$	$//A_2A_2A_2$		
SECTION 3	$6c_1c_1c_nc_n$	$1uR_1R_1R_1$	$2uR_2R_2R_2$	....	....	$nuR_nR_nR_n$
or						
SECTION 4	$7c_1c_1c_nc_n$	$1qT_1T_1T_{a1}$	$2qT_2T_2T_{a2}$	....	....	$nqT_nT_nT_{an}$

N O T E S:

(1) SARAD is the name of the code for reporting satellite clear radiance.

(2) A SARAD report is identified by M_iM_i = WW.

(3) The code form is divided into a number of sections as follows:

Section number	Indicator figure or symbolic figure group	Contents
1	---	Identification, date and time
2	222	Position, optional cloud information and zenith angle
3	6	Clear radiance data, directly expressed in energy units
4	7	Clear radiance data, indirectly expressed in equivalent black-body temperature units.

(4) Radiance is a function of equivalent black-body temperature at a given channel wave number and may be calculated using Planck's Law:

$$R = \frac{c_1 \nu^3}{e^{\frac{c_2 \nu}{T}} - 1}$$

where

R = radiance in $mW/(S.cm^2.sr.cm^{-1})$

T = equivalent black-body temperature in K

ν = wave number in cm^{-1}

c_1 = 1.191066×10^{-5} $mW/(S.cm^2.sr.cm^{-4})$

c_2 = 1.438833 $K/(cm^{-1})$

(2) Amend Regulation 87.1 as follows:

REGULATIONS:

87.1

General

87.1.1

The code name SARAD shall not be included in the report.

87.1.2

Whenever it is not possible to report radiance data, directly expressed in energy units, with sufficient precision to achieve the temperature sounding accuracies needed (for example, to the nearest degree C), Section 3 shall be omitted and Section 4 shall be used to report clear radiance data indirectly expressed in equivalent black-body temperature units.

87.1.3

Except for the case where Regulation 87.1.2 applies, Section 3 shall be used, and Section 4 shall not be included in the report.

(3) Add a new Regulation 87.5 as follows:

Section 4

87.5.1
Section 4 shall contain clear radiance data corresponding to the sounding identified by means of Section 1 for filter channel numbers arranged in the order of decreasing spectral wave length.

87.5.2
When clear radiance values are not available for filter channel numbers smaller than a given filter channel number, the clear radiance values relative to the filter channels for which no data are available shall not be included in the report. The lowest filter channel number for which data are included shall in all cases be indicated by means of c_1c_1 in group $7c_1c_1c_nc_n$.

87.5.3
When clear radiance values are not available for filter channel numbers greater than a given filter channel number, the clear radiance values relative to the filter channels for which no data are available shall not be included in the report. The highest filter channel number for which data are included shall in all cases be indicated by means of c_nc_n in group $7c_1c_1c_nc_n$.

87.5.4
When use is made of Regulations 87.5.2 and 87.5.3 to report abbreviated soundings, data for all filter channel numbers between c_1c_1 and c_nc_n shall be included in the report.

87.5.5
Regulation 87.4.5 shall apply.

(4) Insert new specifications for the following symbolic letters (in the appropriate pages of the Manual on Codes, Volume I):

q Relative confidence figure in tens of per cent as an overall quality measure of

(a) thickness values.
(FM 86-VI Ext.)

(b) equivalent black-body temperature values.
(FM 87-VI Ext.)

(1) High figures mean high relative confidence.

(2) A value of 0 means the relative confidence is not specified.

T_{ao}
T_{a1}
...
T_{an}

Approximate tenths value and sign (plus or minus) of

(a) the air temperature at specified levels starting with station level. (Code table 3931)
(FM 35-V, FM 36-V)

(b) equivalent black-body temperature. (Code Table 3931)
(FM 87-VI Ext.)

T_oT_o
T_1T_1
...
T_nT_n

Tens and unit digits of

(a) air temperature not rounded off, in degrees Celsius, at specified levels starting with station level.
(FM 35-V, FM 36-V)

(b) equivalent black-body temperature, not rounded off, in degrees Celsius.
(FM 87-VI Ext.)

(1) The tenths of the temperature which is measured in degrees and tenths, shall be indicated by means of T_{ao}, T_{a1} ... T_{an}.

A N N E X VIII

Annex to Recommendation 5 (CBS-VII)

ABBREVIATED CODES FOR THE TRANSMISSION OF PROCESSED DATA IN THE FORM OF GRID-POINT VALUES

FM 49-VII GRAF - Processed data in the form of grid-point values (Abbreviated code form)

CODE FORM:

SECTION 0	GRAF	F_1F_2NNN	$1nnn_tn_t$					
SECTION 1	111	$1a_1a_100$	$(2p_1p_1p_2p_2)$	$(3H_1H_1H_1H_1)$		$(5b_1b_100)$	6JJMM	
		$7YYG_cG_c$	(81ttt)					
SECTION 3	333	$1n_an_a12$	$2n_10q_1q_2$	$3us_nrr$	rrrrr			
		$k_1k_1(n_gn_g)$	$(i_ai_ai_aj_aj_aj_a)$	II...I	II...I	....	....	II...I
		....	....	....	....	....	....	....
		$k_1k_1(n_gn_g)$	$(i_ai_ai_aj_aj_aj_a)$	II...I	II...I	....	....	II...I
		....	....	....	....	....	....	....
SECTION 5	555	F_1F_2NNN	$1nnn_tn_t$	$\begin{cases}666\\777\end{cases}$				

N O T E S:

1. GRAF is the name of the abbreviated code for the transmission of processed data (analyses and prognoses of meteorological and other geophysical parameters) in the form of numerical values given for a set of regularly spaced points on a chart. The code is suitable for computer use and also for decoding by manual handling.

2. The GRAF code form is derived from the GRID code form (FM 47-V) by means of a series of simplifying assumptions, i.e.:

(a) To include data for one parameter only;

(b) To relate these data to one pressure surface, or to one height level or to one special level or to a layer between two pressure levels;

(c) Each data group refers to one grid point only;

(d) To include grids that are published in WMO Publication No. 9, Volume B, Data Processing;

(e) The terms data line and grid line are used interchangeably in the code.

3. A GRAF coded analysis or prognosis is identified by the word GRAF.

4. The code form is divided into four sections:

Section number	Symbolic figure group	Contents
0	-	Identification of the coded analysis or prognosis
1	111	Identification of the processed data included in the coded analysis or prognosis
3	333	Data format specification and data content
5	555	Redundant identification of the coded analysis or prognosis and indicator figures 666 or 777 (see Regulation 49.1.4)

5. Definitions - See Note (4) under FM 47-V GRID.

6. Section 0 is used for the identification of the coded analysis or prognosis. In addition to the identifier word GRAF, it contains an indication of the data-processing centre (F_1F_2) originating the product, of the number of parts in which the complete analysis or prognosis has been split up for transmission purposes (n_tn_t), as well as of the serial number of that part which is included in the coded analysis or prognosis (nn).

The section provides, furthermore, a reference to the grid system used (NNN). The grid identifier NNN will normally refer to WMO Publication No. 9, Volume B - Data processing, in which full details of the grid system used will be given.

7. Section 1 contains information relating to the processed data transmitted in the coded analysis or prognosis. This consists of:

- One meteorological or other geophysical parameter (a_1a_1);
- The level or layer to which the parameter refers (p_1p_1, p_2p_2, $H_1H_1H_1H_1$, b_1b_1);
- Time identifiers relating to the product (JJ, MM, YY, G_cG_c);
- The time of validity of prognoses that is (ttt) hours after G_cG_c.

8. Section 3 includes the actual data content of the coded analysis or prognosis, symbolized by the data groups II...I. There is normally a space between these data groups for the convenience of manual decoding; but the space between these groups may be omitted. The characteristics of the form of the data groups and the way they are arranged in the coded analysis or prognosis are indicated by the first two groups of this section. It should be noted that while the length of the data groups may vary in different coded analyses or prognoses, it remains the same within any given coded analysis or prognosis.

9. The data lines are numbered (by the symbol k_1k_1) and the data groups II...I are arranged in the sequence for normal scanning.

10. In the case of a non-rectangular grid, the position of the first grid-point of a data line is given by its co-ordinates ($i_ai_ai_aj_aj_aj_a$) with respect to a point of reference. The point of reference in a cartesian grid is fixed. In the case of the GRAF code, the point of reference in a geographical grid, as contained in the appropriate WMO publication, is assumed to remain fixed throughout the whole message.

11. The reporting of the parameter values is generally based on the use of conventional units as indicated in the a_1a_1 code table. A departure from these units can be realized, however, by using the scale factor (u) as follows: modified unit = conventional unit multiplied by the scale factor. For example, a scale factor of 0.1 can be applied to the conventional unit for geopotential height of an isobaric topography, changing it into the standard geopotential metre.

12. Section 5 gives a redundant identification of the coded analysis or prognosis.

REGULATIONS:

49.1

General

49.1.1

The groups GRAF F_1F_2NNN 1nnn$_t$n$_t$ shall be included as the first line of the text of the coded meteorological analysis or prognosis.

49.1.2

If the complete analysis or prognosis described by the grid has to be transmitted in a number of parts separately, the text of each coded analysis or prognosis shall contain Sections 0, 1, 3 and 5. The truncation shall be made in Section 3 at the end of a suitable data line.

49.1.3

If several complete analyses or prognoses are transmitted one after the other in one meteorological bulletin, each of them shall be characterized by Sections 0, 1, 3 and 5.

49.1.4

Each coded analysis or prognosis shall end with the group 666 if further parts are to follow and with the group 777 if all parts have been transmitted.

49.2

Section 1 - Identification of the processed data included in the coded analysis or prognosis

49.2.1

The groups with indicator figures 1, 6 and 7 shall always be included in the coded analysis or prognosis. One of the groups $2p_1p_1p_2p_2$, $3H_1H_1H_1H_1$ or $5b_1b_100$ shall always be included in the coded analysis or prognosis to indicate the level or the layer to which the parameter given in the data content refers. When parameters a_1a_1 = 80 to 89 are reported, the indication of the level is meaningless and therefore shall not be included.

49.2.2

If the parameter given in the data contents refers to a pressure level, the group $2p_1p_1p_2p_2$ shall be used and p_1p_1 shall indicate the level and p_2p_2 shall be coded 99.

49.2.3

If the parameter given in the data content refers to a layer between two pressure levels the group $2p_1p_1p_2p_2$ shall be used. The upper level shall be indicated by p_1p_1 and the lower level by p_2p_2.

49.2.4

If the parameter given in the data content refers to a special level the group $5b_1b_100$ shall be used and b_1b_1 shall indicate the special level.

49.2.5

The group 8lttt shall be included only in the case of a prognosis.

49.3

Section 3 - Data format specification and data content

49.3.1

If the complete analysis or prognosis described by the grid has to be transmitted in several parts by means of several coded meteorological analyses or prognoses of optimum length each, the four groups $1n_an_a12$, $2n_10q_1q_2$, $3us_nrr$ and rrrrr shall be included in each part.

49.3.2

Each data group shall refer to one grid point only. As a result the fourth figure of the group with indicator figure 1 shall always be 1.

49.3.3

The grid points shall always be scanned in the normal mode, and q_1 shall only take values 0 (spaces included between data groups) or 2 (no spaces included).

49.3.4

For a rectangular grid, each data line shall begin with k_1k_1 immediately followed, as the case may be, by one of the following:

(a) The data groups (q_2 shall be encoded by means of code figure 2); or

(b) The number of data groups per data line, and the data groups (q_2 shall be encoded by means of code figure 4); or

(c) The number of data groups per data line, the co-ordinates of the first grid point on the data line, and the data groups (q_2 shall be encoded by means of code figure 5).

49.3.5

When a_1a_1 represents a weather phenomenon (code figures 80-89 of code table 0291), the code figure for n_1 shall be 1, and the data content for each grid point and for each phenomenon reported shall contain one digit chosen out of (0, 1) or (0, 1 and 2) as specified in code table 0291, to indicate the occurrence and/or the intensity of the phenomenon.

49.3.6

The groups $3us_nrr\ rrrrr$ shall always be included. u indicates the scaled unit of the parameter indicated by a_1a_1 and $s_nrr\ rrrrr$ used for the reference value. All values in the data content shall always be positive. As a result the last figure of the group with indicator figure 1 shall always be 2. Negative values shall be eliminated by selecting an appropriate reference value. The reference value should be chosen in order to minimize the number of digits in the data content.

N O T E: To illustrate this regulation, consider a temperature field in which values vary between -27°C and +11°C. The reference value can be chosen between -27°C and -88°C inclusive. The choice of a lower temperature value would increase the number of digits to be reported (for example, -89°C, as a reference value, would convert 11°C into 100°C). For practical reasons, the choice of -30°C would be made in this case, and values to be reported would range between +3 and +41.

49.4

Section 5 - Redundant identification of the coded analysis or prognosis and indicator figures 666 or 777

Section 5 shall always be included in the coded analysis or prognosis or in parts thereof.

FM 47-V GRID

(1) Amend Regulation 47.4.1, by deleting subparagraph (c), to read as follows:

"47.4.1

If the complete analysis or forecast described by the grid has to be transmitted in several parts by means of several coded meteorological analyses or forecasts of optimum length each, the groups $1n_an_an_pi_s$ and $2n_1n_2q_1q_2$ and, if required, the groups with indicator figures 3 and 4 shall be included in each part.

(a) Groups $3us_nrr\ rrrrr$ shall be used to indicate the scaled unit and reference value of the parameter indicated by a_1a_1 and shall be included only if the scaled unit and/or reference value used are different from those specified in Code table a_1a_1/a_2a_2(0291);

(b) Groups 4us$_n$rr rrrrr shall be used to indicate the scaled unit and reference value of the parameter indicated by a_2a_2 and shall be included only if the scale d unit and/or reference value used are different from those specified in Code table a_1a_1/a_2a_2 (0291)."

(2) Delete the last sentence of Regulation 47.1.2 so that the text reads as follows:

"47.1.2

If the complete analysis or prognosis described by the grid has to be transmitted in a number of parts separately, the text of each coded analysis or forecast shall contain Sections 0, 1, 3, 4 and 5 (optional, see Regulations 47.2 and 47.5.1 below). The truncation shall be made in Section 3 after a suitable data line.

N O T E:

In the case of geographical grids, the data location groups $k_1k_1n_gn_g$ $i_ai_ai_aj_aj_aj_a$ can be preceded by the groups with indicator figures 5 and 6 when a change of reference point is needed and by the group $999I_oI_o$ as necessary."

(3) Amend Regulation 47.1.3 to read as follows:

"If several complete analyses or forecasts are transmitted one after the other in one meteorological bulletin, each of them shall be characterized by Sections 0, 1, 2, 3, 4 and 5."

ANNEX IX

Annex to Recommendation 6 (CBS-VII)

AMENDMENTS TO FM 39-VI ROCOB AND TO FM 40-VI ROCOB SHIP

1. In Section 1 of the code form, insert the group MMJJJ immediately after the group YYGGg.

2. Add a new regulation 39.2.3 as follows:

"39.2.3

The group MMJJJ shall be used to indicate, together with the group YYGGg, the year (JJJ), month (MM), date (YY) and time (GGg) of the firing of the rocket."

3. In Part C, include FM 39-VI and FM 40-VI within the brackets in the specifications of symbolic letters MM and JJJ.

ANNEX X

Annex to Recommendation 7 (CBS-VII)

AMENDMENTS TO THE DEFINITIONS OF SYMBOLIC FIGURE GROUPS IN FM 63-V BATHY AND FM 64-V TESAC

1. Replace the word "standard" by " selected" in the following places:

   (a) FM 63-V BATHY, Note (3), p. 1-A-107, and paragraph 63.4.2, p. 1-A-108.

   (b) FM 64-V TESAC, Note (3), p. 1-A-109, and paragraph 64.4.2, p. 1-A-110.

   (c) Specifications of $Z_oZ_o...Z_nZ_n$, p. 1-C-48.

   (d) Specifications of $Z_oZ_oZ_oZ_o...Z_nZ_nZ_nZ_n$, p. 1-C-49.

2. Replace the word "standard" by "selected" in indicator groups

   7777 and *77755*) in the list of symbolic figure groups on p. 1-B-6.
   77777)

3. Change the specifications for $Z_oZ_o...Z_nZ_n$ on p. 1-C-48:

   (a) Add the following text:

      (i) Surface shall be encoded as 00 (FM 63-V)

      (ii) i_zi_z = 77 shall indicate depths in tens of metres

      (iii) i_zi_z = 55 shall indicate depths in hundreds of metres.

   (b) Delete the reference to Code table 5184.

4. Delete Code table 5184 on p. 1-D-116.

5. Under the specifications of $i_z i_z$, on p. 1-C-22,

(a) Add the following note:

(1) See regulations concerning $Z_o Z_o \ldots Z_n Z_n$ on p. 1-C-48.

(b) Delete the reference to Code table 5184.

A N N E X XI

Annex to Recommendation 8 (CBS-VII)

AMENDMENTS TO AERONAUTICAL CODES METAR, SPECI, ARMET AND TAF*

FM 15-V METAR

(1) Put the time group GGgg in brackets.

(2) Amend Regulation 15.1.1 to read:

"15.1

General

The code name METAR shall be included at the beginning of an individual report; in case of a meteorological bulletin, which may consist of one or more than one report, the code name METAR shall be included at the beginning of the text of the bulletin, if so required by the authorities concerned."

(3) Delete Regulation 15.1.2.

(4) Amend Regulation 15.3 to read:

"15.3

Group (GGgg)

This group shall be included in the report:

(i) If the actual time of observation deviates by more than 10 minutes from the official time of observation indicated in the heading of the bulletin, or

(ii) In accordance with the requirements established by the authorities concerned."

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* 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 1978.

FM 16-V SPECI

(1) Amend Regulation 16.1.1 to read:

"16.1.1

The code name SPECI shall be included at the beginning of an individual report; in case of a meteorological bulletin, which may consist of more than one report, the code name SPECI shall be included at the beginning of the text of the bulletin, if so required by the authorities concerned."

(2) Replace the text of Regulation 16.2 by the following:

"16.2

Groups of SPECI

16.2.1

Group GGgg

This group shall indicate the time of occurrence of the change(s) which justified the issue of the report.

16.2.2

Other groups of SPECI

Regulation 15.2 and Regulations 15.4 to 15.9 inclusive shall apply."

FM 48-V ARMET

(1) Replace the time group $YYG_1G_1G_2G_2$ by $g_eg_eY_AY_AG_AG_A$

with the following meaning of the new symbolic letters to be included in Section C:

"g_eg_e Period of time in hours between the synoptic hour of the analysis on which the ARMET forecast is based and the hour at which the forecast is valid."

(2) Delete FM 48-V from inside the brackets in the specifications of symbolic letters YY, G_1G_1, G_2G_2 in Section C.

FM 51-V TAF

(1) Replace the text of Note (2) by the following:

"Owing to the variability of meteorological elements in space and time, to limitations of forecasting techniques and to limitations caused by the definitions of some of the elements, the specific value of any of the elements given in a forecast shall be understood by the recipient to be the most probable value which the element is likely to assume during the period of the forecast. Similarly, when the time of occurrence or change of any element is given in a forecast, this time shall be understood to be the most probable time."

(2) Replace the text of Regulation 51.1.1 by the following:

"The code name TAF shall be included at the beginning of an individual aerodrome forecast; in case of a meteorological bulletin which may consist of one or more than one aerodrome forecast, the code name TAF shall be included at the beginning of the text of the bulletin if so required by the authorities concerned."

(3) Delete Regulation 51.1.2 and renumber the rest of the regulations accordingly.

In Section C:

(4) Delete FM 51-V, FM 53-V and FM 54-V from inside the brackets in the specifications of symbolic letters H_w and P_w.

(5) Delete FM 51-V from inside the brackets in the specifications of F_t.

ANNEX XII

Annex to Recommendation 9 (CBS-VII)

CODE FOR REPORTING UPPER-LEVEL PRESSURE, TEMPERATURE, HUMIDITY AND WIND FROM A SONDE RELEASED BY CARRIER BALLOON OR AIRCRAFT (TEMP DROP)

Text to be included in Manual on Codes, Volume I

The code form TEMP DROP is based on the FM 35-V TEMP and FM 36-V TEMP SHIP codes and incorporates appropriate provisions for reporting upper-level pressure, temperature, humidity and wind from a sonde released by carrier balloon or aircraft as provided in the present FM 35-V TEMP and FM 36-V TEMP SHIP.

FM 35-V **TEMP — Upper-level pressure, temperature, humidity and wind report from a land station**

FM 36-V **TEMP SHIP — Upper-level pressure, temperature, humidity and wind report from a sea station**

FM 37-VII **TEMP DROP — Upper-level pressure, temperature, humidity and wind report from a sonde released by carrier balloons or aircraft**

CODE FORM:

Part A

SECTION 1	$M_iM_iM_jM_j$	$YYGGI_d$	IIiii * $99L_aL_aL_a$ $Q_cL_oL_oL_oL_o$ $MMMU_{La}U_{Lo}$ **
SECTION 2	$99P_oP_oP_o$ $P_1P_1h_1h_1h_1$ ..... $P_nP_nh_nh_nh_n$	$T_oT_oT_{ao}D_oD_o$ $T_1T_1T_{a1}D_1D_1$ ..... $T_nT_nT_{an}D_nD_n$	$d_od_of_of_of_o$ $d_1d_1f_1f_1f_1$ ..... $d_nd_nf_nf_nf_n$
SECTION 3	$88P_tP_tP_t$ or 88999	$T_tT_tT_{at}D_tD_t$	$d_td_tf_tf_tf_t$
SECTION 4	$77P_mP_mP_m$ or $66P_mP_mP_m$ or 77999	$d_md_mf_mf_mf_m$	$(4v_bv_bv_av_a)$

* Used in FM 35-V.
** Used in FM 36-V and FM 37-VII.

Part B

SECTION 1	$M_iM_iM_jM_j$	YYGG/	{ IIiii • / 99$L_aL_aL_a$ $Q_cL_oL_oL_oL_o$ MMM$U_{La}U_{Lo}$ ••
SECTION 5	$n_on_oP_oP_oP_o$ $n_1n_1P_1P_1P_1$ ..... $n_nn_nP_nP_nP_n$	$T_oT_oT_{ao}D_oD_o$ $T_1T_1T_{a1}D_1D_1$ ..... $T_nT_nT_{an}D_nD_n$	
SECTION 6	21212	$n_on_oP_oP_oP_o$ $n_1n_1P_1P_1P_1$ ..... $n_nn_nP_nP_nP_n$	$d_od_of_of_of_o$ $d_1d_1f_1f_1f_1$ ..... $d_nd_nf_nf_nf_n$
SECTION 8	41414	$N_hC_LhC_MC_H$	
SECTION 9	51515 52525 59595	Code groups to be developed regionally	
SECTION 10	61616 62626 69696	Code groups to be developed nationally	

Part C

SECTION 1	$M_iM_iM_jM_j$	YYGGI$_d$	{ IIiii • / 99$L_aL_aL_a$ $Q_cL_oL_oL_oL_o$ MMM$U_{La}U_{Lo}$ ••
SECTION 2	$P_1P_1h_1h_1h_1$ ..... $P_nP_nh_nh_nh_n$	$T_1T_1T_{a1}D_1D_1$ ..... $T_nT_nT_{an}D_nD_n$	$d_1d_1f_1f_1f_1$ ..... $d_nd_nf_nf_nf_n$
SECTION 3	88$P_tP_tP_t$ or 88999	$T_tT_tT_{at}D_tD_t$	$d_td_tf_tf_tf_t$
SECTION 4	77$P_mP_mP_m$ or 66$P_mP_mP_m$ or 77999	$d_md_mf_mf_mf_m$	($4v_bv_bv_av_a$)

Part D

SECTION 1	$M_iM_iM_jM_j$	YYGG/	{ IIiii • / 99$L_aL_aL_a$ $Q_cL_oL_oL_oL_o$ MMM$U_{La}U_{Lo}$ ••
SECTION 5	$n_1n_1P_1P_1P_1$ ..... $n_nn_nP_nP_nP_n$	$T_1T_1T_{a1}D_1D_1$ ..... $T_nT_nT_{an}D_nD_n$	
SECTION 6	21212	$n_1n_1P_1P_1P_1$ ..... $n_nn_nP_nP_nP_n$	$d_1d_1f_1f_1f_1$ ..... $d_nd_nf_nf_nf_n$
SECTION 9	51515 52525 59595	Code groups to be developed regionally	
SECTION 10	61616 62626 69696	Code groups to be developed nationally	

• Used in FM 35-V.
•• Used in FM 36-V and FM 37-VII.

NOTES:

(1) TEMP is the name of the code for an upper-level pressure, temperature, humidity and wind report from a land station. TEMP SHIP is the name of the code for an upper-level pressure, temperature, humidity and wind report from a sea station.

TEMP DROP is the name of the code for an upper-level pressure, temperature, humidity and wind report from a sonde released by a carrier balloon or aircraft equipped with dropsondes.

(2) A TEMP report from a land station is identified by M_iM_i = TT; a TEMP report from a sea station by M_iM_i = UU, and a TEMP report from an aircraft by M_iM_i = XX.

(3) The code form consists of four parts as follows:

Part	*Identifier letters* (M_jM_j)	*Isobaric surfaces*
A	AA	Up to and including the 100 mb surface
B	BB	
C	CC	Above the 100 mb surface
D	DD	

Each part can be transmitted separately.

(4) The code form is divided into a number of sections as follows:

Section number	*Indicator figures or symbolic figure groups*	*Contents*
1	—	Identification and position data
2	—	Data for standard isobaric surfaces
3	88	Data for tropopause level(s)
4	66 or 77	Data for maximum wind level(s) and data for vertical wind shear
5	—	Data for significant levels, with respect to temperature and/or relative humidity
6	21212	Data for significant levels, with respect to wind
7	31313	(Reserved)
8	41414	Cloud data
9	51515, 52525, ..., 59595	Code groups to be developed regionally
10	61616, 62626, ..., 69696	Code groups to be developed nationally

REGULATIONS:

35.1

General

35.1.1

The code name TEMP, TEMP SHIP or TEMP DROP shall not be included in the report.

35.1.2

Parts A and B shall contain data, in so far as available, *only* for levels up to and including the 100 mb level.

35.1.3

Parts C and D shall contain data, in so far as available, *only* for levels above the 100 mb level.

35.1.4

The instructions regarding Parts A and B of the report with respect to the inclusion of data up to and including 100 mb and regarding Parts C and D with respect to the inclusion of data above 100 mb shall not be contravened. For example, if data at or below 100 mb are not included in either Part A or B, as appropriate, they shall *not* be included in Part C or D. In this instance the non-included data shall be transmitted separately in the form of a correction report.

35.1.5

When during an ascent the pressure data can no longer be obtained but wind data can be obtained, the wind data so obtained shall *not* be reported in TEMP and TEMP SHIP reports.

NOTE: These wind data so obtained may be reported in PILOT or PILOT SHIP.

35.1.6

Only wind data obtained from the radiosonde ascent by either visual or electronic means shall be included in the TEMP and TEMP SHIP reports. Wind data obtained by means other than a radiosonde-type ascent shall not be included in TEMP and TEMP SHIP reports.

35.1.7

Only wind data obtained from the radiosonde descent by electronic means shall be included in the TEMP DROP report. Wind data obtained by means other than a radiosonde-type descent shall not be included in TEMP DROP reports.

35.2

Parts A and C

35.2.1

Section 1 — Identification and position

The observing station shall indicate its position by means of the group IIiii for a land station or the groups $99L_aL_aL_a$ $Q_cL_oL_oL_oL_o$ $MMMU_{La}U_{Lo}$ for a sea station, aircraft or carrier-balloon.

35.2.2

Section 2 — Standard isobaric surfaces

35.2.2.1

In Section 2, the data groups for the surface level and the standard isobaric surfaces of 1000, 850, 700, 500, 400, 300, 250, 200, 150 and 100 mb in Part A, and of 70, 50, 30, 20 and 10 mb in Part C shall appear in ascending order with respect to altitude.

35.2.2.2

When the geopotential of a standard isobaric surface is lower than the altitude of the reporting station, the air temperature-humidity group for that surface shall be included. Solidi (/////) shall be reported for these groups. The wind groups for these levels shall be included as specified by the value reported for symbol I_d.

35.2.2.3

When wind data are available for all levels, the wind group shall be included for each level as indicated in the symbolic code form. If wind data are not available for all levels, the procedures given below shall be followed:

(*a*) When wind data are missing for one or more standard isobaric surfaces but are available for other standard isobaric surfaces below and above the level of missing wind data, the wind group(s), i.e. $d_n d_n f_n f_n f_n$, shall be coded by means of solidi (/////);

(*b*) When wind data are missing for a standard isobaric surface and are also missing for all succeeding standard isobaric surfaces up to the termination of the ascent, the wind group shall be omitted for all these levels and the symbol I_d reported accordingly.

35.2.2.4

Whenever it is desired to extrapolate a sounding for the computation of the geopotential at a standard isobaric surface, the following rules shall apply:

(*a*) Extrapolation is permissible if, and only if, the pressure difference between the minimum pressure of the sounding and the isobaric surface for which the extrapolated value is being computed does not exceed one quarter of the pressure at which the extrapolated value is desired, provided the extrapolation does not extend through a pressure interval exceeding 25 mb;

(*b*) For the purpose of geopotential calculation, and for this purpose only, the sounding will be extrapolated, using two points only of the sounding curve on a T-log p diagram, namely that at the minimum pressure reached by the sounding and that at the pressure given by the sum of this minimum pressure and the pressure difference, mentioned in (*a*) above.

35.2.3

Section 3 — Tropopause level(s)

35.2.3.1

When more than one tropopause is observed, each shall be reported by repeating Section 3.

NOTE: For a definition of tropopause, see WMO Publication No. 100.TP.44, *Guide to Climatological Practices.*

35.2.3.2

When no tropopause data are observed, the group 88999 shall be reported for Section 3.

35.2.4

Section 4 — Maximum wind level(s) and vertical wind shear

35.2.4.1

When more than one maximum wind level is observed, each shall be reported by repeating Section 4.

NOTE: Criteria for determining maximum wind levels are given in Regulations 32.2.3.1 and 32.2.3.2.

35.2.4.2

When no maximum wind level is observed, the group 77999 shall be reported for Section 4.

35.2.4.3

Indicator figures 77 shall be used when data for maximum wind levels occurring within the sounding are reported. Indicator figures 66 shall be used when data for the top of the sounding, where the wind speed is the highest observed throughout the sounding, are reported.

35.2.4.4

Group ($4v_bv_bv_av_a$)

Group $4v_bv_bv_av_a$ shall be included only if data for vertical wind shear are computed and required.

35.3

Parts B and D

35.3.1

Section 5 — Significant levels with respect to temperature and/or relative humidity

35.3.1.1

If, in the determination of significant levels with respect to specified criteria for changes in air temperature and/or relative humidity, the criteria for either parameter are satisfied at a particular point in altitude, data for both parameters shall be reported for that level.

35.3.1.2

The reported significant data *alone* shall make it possible to reconstruct the air temperature and relative humidity curves within the limits of the criteria specified. Significant levels shall be selected as follows:

(*a*) Surface level and highest level of sounding or aircraft reference level and termination level for descent soundings;

(*b*) Bases and tops of inversions and isothermal layers which are at least 20 mb thick or are characterized by a substantial change in relative humidity provided that the base of the layer occurs below the 300 mb level or below the first tropopause, whichever is higher;

(*c*) Levels which are necessary to ensure that the temperature obtained by linear interpolation (on a T-log p or essentially similar diagram) between adjacent significant levels shall not depart from the observed temperature by more than 1°C below the 300 mb level or the first tropopause, whichever is reached first, and by more than 2°C above this level;

(*d*) Levels which are necessary to ensure that relative humidity obtained by linear interpolation between adjacent significant levels shall not depart by more than 15 per cent from the observed value. (The criterion of 15 per cent refers to an amount of relative humidity and NOT to a percentage of the observed value; e.g., if the observed value is 50 per cent, the interpolated value would lie between 35 per cent and 65 per cent.)

35.3.1.3

Significant levels determined in accordance with Regulations 35.3.1.2 shall, in so far as possible, be the actual levels at which the prominent changes in the lapse rates of air temperature or relative humidity occur.

35.3.1.4

When a significant level (with respect to air temperature and/or relative humidity) and a standard isobaric surface coincide, data for that level shall be reported in Parts A and B (or C and D, as appropriate).

35.3.1.5

In Part B, the successive significant levels shall be numbered 00 (station level), the first level 11, the second level 22, ... etc. ... 99, 11, 22, ... etc. In Part D, the first level above 100 mb shall be numbered 11, the second 22, ... etc. ... 99, 11, 22, ... etc. The code figure 00 for n_on_o in Part B shall never be used to indicate any other than station level.

35.3.1.6

In Parts B and D, a layer for which data are missing shall be indicated by reporting the boundary levels of the layer and a level of solidi (/////) to indicate the layer of missing data. The boundary levels are the levels closest to the bottom and top of the layer for which observed data are available. The boundary levels are not required to meet "significant level" criteria. The boundary levels and the missing data level groups will be identified by appropriate nn numbers. For example:

$33P_3P_3P_3$	$T_3T_3T_{a3}D_3D_3$
44///	/////
$55P_5P_5P_5$	$T_5T_5T_{a5}D_5D_5$

where the levels 33 and 55 are the boundary levels and 44 indicates the layer for which data are missing.

35.3.2

Section 6 — Significant levels with respect to wind

Significant levels shall be chosen so that the data from them alone shall make it possible to reconstruct the wind profile with sufficient accuracy for practical use.

NOTE: Criteria for determining significant levels with respect to changes in wind speed and direction are given in Regulation 32.3.1 and its notes.

35.3.3

Section 8 - Cloud data

35.3.3.1

This section shall not be included in TEMP DROP reports.

35.3.3.2

In TEMP and TEMP SHIP reports, this section shall be used to report cloud data as in FM 11-V SYNOP.

35.3.4

Section 9 — Regional groups

Inclusion of groups of Section 9 shall be determined by regional decision.

35.3.5

Section 10 — National groups

Inclusion of groups of Section 10 shall be determined by national decision.

Amend Volume I of WMO Publication No. 306 - Manual on Codes, as follows:

Page	Action required
I-A-2	Add "FM 37-VII TEMP DROP Upper-level pressure, temperature and wind report from a sonde released by an aircraft".
I-A-5	Add "FM 37-VII TEMP DROP" and resolution number.
I-B-5	Add FM 37-VII to list of codes following symbolic figure groups 51515 and 61616.
I-B-6	Add FM 37-VII to list of codes following symbolic figure groups 77999 and 88999.
I-C-7	Add FM 37-VII to list of codes following symbolic letters D_tD_t and $D_0D_0 \cdots D_nD_n$.
I-C-9	Add FM 37-VII to list of codes following symbolic letters d_md_m, d_td_t, and $d_0d_0 \cdots d_nd_n$.
I-C-13	Add FM 37-VII to list of codes following symbolic letters $f_mf_mf_m$, $f_tf_tf_t$, and $f_0f_0f_0 \cdots f_nf_nf_n$.
I-C-14	Add FM 37-VII to list of codes following symbolic letters GG.
I-C-20	Add FM 37-VII to list of codes following symbolic letters $h_1h_1h_1 \cdots h_nh_nh_n$.
I-C-21	Change specifications of symbolic letters I_d to read: "Indicator used to specify the hundreds of millibars figure (in Part A of TEMP, TEMP SHIP, and TEMP DROP reports) or tens of millibars figure (in Part C of TEMP, TEMP SHIP, and TEMP DROP reports)..."
	Add FM 37-VII to list of codes following symbolic letters I_d.
I-C-25	Add FM 37-VII to list of codes following symbolic letters $L_aL_aL_a$ and $L_oL_oL_o$.
I-C-26	Add FM 37-VII to list of codes following symbolic letters M_iM_i, M_jM_j, and MMM.
I-C-30	Add FM 37-VII to list of codes following symbolic letters $n_0n_0 \cdots n_nn_n$.
I-C-31	Add FM 37-VII to list of codes following symbolic letters $P_1P_1 \cdots P_nP_n$.
I-C-32	Add FM 37-VII to list of codes following symbolic letters $P_mP_mP_m$, $P_tP_tP_t$, and $P_0P_0P_0 \cdots P_nP_nP_n$.

Page	Action required
I-C-34	Add FM 37-VII to list of codes following symbolic letters Q_c.
I-C-38	Add FM 37-VII to list of codes following symbolic letters T_{at}.
I-C-39	Add FM 37-VII to list of codes following symbolic letters T_{a0} ... T_{an}.
I-C-40	Add FM 37-VII to list of codes following symbolic letters T_tT_t and T_0T_0 ... T_nT_n.
I-C-43	Add FM 37-VII to list of codes following symbolic letters U_{La} and U_{Lo}.
I-C-45	Add FM 37-VII to list of codes following symbolic letters v_av_a and v_bv_b.
I-C-48	Add FM 37-VII to list of codes in notes (a) and (1) following symbolic letters YY.
I-D-46b	Change explanation of symbolic letters I_d to read: "Indicator used to specify the hundreds of millibars figure (in Part A of TEMP, TEMP SHIP, and TEMP DROP reports) or tens of millibars figure (in Part C of TEMP, TEMP SHIP, and TEMP DROP reports) of the pressure relative to the last standard isobaric surface for which the wind is reported".
I-D-61	Change code table to include the following: 1. Under "Code form" add "FM 37-VII TEMP DROP"; 2. Under "M_iM_i ... Aircraft" add "XX" after "FM 37-VII TEMP DROP"; 3. Under "M_jM_j ... Part A" add "AA" after "FM 37-VII TEMP DROP"; 4. Under "M_jM_j ... Part B" add "BB" after "FM 37-VII TEMP DROP"; 5. Under "M_jM_j ... Part C" add "CC" after "FM 37-VII TEMP DROP"; 6. Under "M_jM_j ... Part D" add "DD" after "FM 37-VII TEMP DROP".

A N N E X XIII

Annex to Recommendation 10 (CBS-VII)

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 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.

*

* *

*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.

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 1-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 $N_hC_LhC_MC_H$

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 duststorm, 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 I-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 $h_s h_s$ and $P_L P_L$ 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 $n_t n_t$, and elsewhere), it is suggested to use one term only.

Page I-C-25

$n_o n_o$, ... $n_n n_n$ (and elsewhere)

Compare, under $P_w P_w$: "by coding 99 for $P_w P_w$", and under $n_o n_o$: "shall be coded $n_o n_o$ = 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)

A N N E X XIV

Annex to Recommendation 11 (CBS-VII)

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 $M_iM_iM_jM_j$ 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.

ANNEX XV

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) $T_dT_d$app (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 $T_dT_dj_aj_pj_p$.

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 (/$h_e h_e H_e H_e$)
....
n_nREEE (/$h_e h_e H_e H_e$)

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 $e_t W_e I_e a_e H_e$ 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) /$h_e h_e H_e H_e$ 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 $21212\ n_nn_nn_nP_PP_P\ \ d_nd_nf_nf_nf_n$), 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".

A N N E X XVI

Annex to Recommendation 13 (CBS-VII)

PUBLICATION OF THE INTERNATIONAL SEISMIC CODE IN VOLUME I OF THE WMO MANUAL ON CODES

The generalized code form for the routine reporting of basic seismic data from any number of stations, for any number of seismic occurrences is:

SEISMO␣MSGNO␣INIT(1,1)␣EVENT(1,1,1)␣...␣INIT(i,j)␣EVENT(i,j,k)␣STOP

where ␣ is a delimiter, k represents the kth occurrence of an EVENT group for a given combination of i and j, and the delimited groups are either symbolic words, or dummy words representing variable collections of sub-groups.

SPECIFICATION OF SYMBOLIC AND DUMMY WORDS AND LETTERS

SEISMO — Symbolic word prefixing this type of seismic message.

MSGNO — Includes the ordinal number from the first seismic message of the calendar year. Used to detect the non-receipt of a previous seismic message. Should not be confused with external message number. This optional group has the form:

Nyn

where:

- N — is a prefix;
- y — is the last digit of the year of transmission of the message (not necessarily the year of the data);
- n — is the 1- to 3-digit ordinal number itself, based on the number of these seismic messages originating with a particular network or agency or relayed from another and not corresponding to individual stations in a network.

INIT(i,j) The INIT(i,j) group, as shown in the generalized code form above, is a dummy group representing any legitimate combination of one or more of the following initializer groups which may occur in tandem with each other:

STA(i) represents the ith occurrence of a 3- to 5-character international station abbreviation. Required for INIT(1,1) and whenever a change in station occurs.

DATE(j) represents the jth occurrence of a DATE group. The date (UTC) is based on the arrival-time of the first phase in the following EVENT group. Required for INIT(1,1) and whenever a change in date occurs. DATE consists of the following:

mmmdd

where:

mmm is the 3-character month identifier;

dd is the 1- to 2-digit day of month.

Those contributors with more than one station should consider the following statement:

By allowing either j (i.e. the date) or i (i.e the station) to change more rapidly, one may order data either by space-time events (hypocentres) or by station.

SPMAG an optional field containing the standard magnification of a recording whose short-period trace amplitudes may be included in a following event. A prior knowledge of the relevant instrumentation must have been furnished to the recipient. SPMAG consists of the following:

sK

where:

s is the short-period vertical magnification in thousands. A decimal point may be necessary;

K is a suffix denoting this group.

LPMAG an optional field containing the standard magnification of a recording whose long-period trace amplitudes may be included in a following event. A prior knowledge of the relevant instrumentation must have been furnished to the recipient.

LPMAG consists of the following:

1M

where:

1	is the long-period vertical magnification;
M	is a suffix denoting this group.

The SPMAG and LPMAG groups are always optional when the recipient is known to have a record of the current operating magnification(s) of the default instruments. Inclusion of either of these groups is optional because they serve only as a check on the values stored in the recipient's computer data bank. If the operating magnification is changed, the sender should start a new message with the new magnification and include a plain-language comment in the first EVENT field confirming that a change has occurred, otherwise it will be considered an error. These groups are never included when the relevant amplitudes are ground amplitudes or by stations who never send amplitudes.

The standard magnification is that magnification, at that period, to which the instrument magnification factor is normalized to 1. The period to which magnifications are normalized varies with the instrument type, but is generally 1 second for short-period instruments and that period at which the instrument magnification peaks for long-period instruments.

EVENT(i,j,k) A station-event group, i.e. all of the data from a single seismic space-time source, as recorded and interpreted from any number of instruments at a single site, or as ascribed to a single station as in the case of slowness or phase velocity. The format of EVENT(i,j,k) is:

IFASE¥TAMP¥SFASE(i)¥...¥SFASE(n)¥SFC¥SLOW¥COMM

where i = 0 to n, and:

IFASE is the initial phase-time group in the form:

PHASEhhmms

where:

PHASE is a 1- to 5-character phase code which may include an onset prefix (accuracy indicator), and a first-motion suffix;

hh is the 2-digit hour;

mm is the 2-digit minute;

s is the seconds and decimal fraction thereof. This group should be quoted only to the precision actually obtained in scaling, but must contain at least 2 digits. A decimal point is required only if the time includes hundreths of a second.

TAMP is the period and amplitude of the first phase based on a short-period vertical recording. This optional group has the form:

Tt.t Aaa.aaa

where:

T is a symbol prefixing the period;

t.t — is the period in seconds. The decimal point is required unless the tenths are zero;

A — is a symbol prefixing the amplitude;

aa.aaa — is the amplitude (either double trace in millimetres or ground in nanometres). The decimal point is required to indicate a precision of less than one unit. Amplitudes should be quoted only to the precision actually obtained when scaling, generally 2 or 3 significant figures.

SFASE(i) is a secondary phase-time group. This optional group has the form:

PHASEhhmms

where:

PHASE — is the 1- to 5-character phase code which may include an onset prefix (accuracy indicator);

hh — is the optional 2-digit hour, required only when the hour is not the same as the hour of the preceding IFASE or SFASE within the EVENT group;

mm — is the 2-digit minute;

s — is the seconds and decimal fractions thereof (same format as in IFASE).

Up to 23 SFASE groups may be included in each EVENT group.

SFC is the undifferentiated surface-wave group. This optional group has the form:

LZ¥TttAaa.aa¥LN¥TttAaa.aa¥LE¥TttAaa.aa

where:

LZ	is a symbol for the vertical component group;
LN	is a symbol for the north-south component group;
LE	is a symbol for the east-west component group;
T	is a symbol prefixing the period;
tt	is the period, in whole seconds, of the surface-wave component;
aa.aa	is the amplitude (either double trace in millimetres or ground in micrometres). The decimal point is required to indicate a precision of less than one unit. Amplitudes may be reported to 3 decimal places, but should be quoted only to the precision obtained when scaling, generally 2 or 3 figures.
	The vertical component group may appear alone. Conversely, the 2 horizontal components may appear without the vertical; however, both horizontal components should appear together.

SLOW is reduced array data, consisting of either of the following optional groups:

SLOWbs.ssbAZbaaa

or

VELbvv.vbAZbaaa

where:

SLO	is a symbolic indicator of slowness data;
VEL	is a symbolic indicator of phase velocity data;
ss.s	is the slowness in sec deg^{-1};
vv.v	is the phase velocity in km sec^{-1};
aaa	is the station-to-epicentre azimuth.

COMM is additional information and comments. This optional group has the form:

((____))

where:

((	is a symbol indicating the onset of plain-language information which may or may not be related to the data to which it is appended;
____	symbolizes plain-language information;
))	is a symbol indicating the end of such information.

STOP Symbolic word ending the message.

ƀ Symbol for a delimiter. Delimiters in all of the above forms are shown only where they are required as group separators. A delimiter may consist of any number or combination of spaces, carriage-returns or line-feeds. Single spaces are permitted, but not required in other positions, which will be illustrated in following discussions and examples.

By using various or multiple characters for delimiters one may "columnarize" the data to improve visual legibility.

WARNING

While encoding a SEISMO message, one should keep in mind that it will be decoded by a computer program designed to cope with only a limited number of deviations from the prescribed format.

Appendix A

This appendix illustrates a SEISMO message, containing data from more than one station, in which the sender chose to group the data by station (i.e. the date varies more rapidly than the station). This is generally the most convenient grouping method when the data from the various stations span different time-frames, have been interpreted at different locations, or have been collected regionally and are then relayed.

This example is then followed by a detailed discussion of each group in the order in which they have been introduced in the example. A number of relaxations of the format are enumerated or illustrated which are acceptable but whose usage is deemed poor practice.

EXAMPLE OF TELEGRAM TEXT

SEISMO N812 TUC 2ØØK 3ØØØM APR3Ø IPCU17523Ø3 TØ.8 A3Ø.Ø
I5253Ø LZ T21A1ØØ LN T2ØA99 LE T2ØA1Ø1 SLO 6.84 AZ 357
DIFU2355110 PKPCU2358101 I58452 ISKPØØØ14Ø1 MAYØ1 (P)ØØ3742Ø
IPDØ2ØØ373 T2.9 A43.6 IAPØØ552 EXPØ1Ø42 IPNCRØ419226
IPB19252 ISN19558 ISB2ØØ25 ELG2ØØ6Ø ((DAMAGE VII YUMA,
ML5.8 D2.1)) IPCUØ6Ø615Ø ESØ9Ø6Ø IPCP1Ø521 IAPCP1128Ø
EXPCP1152Ø ESCP14Ø8Ø EPØ815160 LZ T21A4.2 ((NEW STATION
AT BLACK BUTTE 34 DEG 24 MIN 28.Ø SEC N, 1Ø6 DEG 44
MIN 44.3 SEC W, ELEV 1524 M DATA WILL SOON BE SENT BY
TEL))

ALQ 4ØØK 15ØØM APR26 IPGC1459Ø84 ((STRIP MINE EXPLOSION 31 DEG
14 MIN N, 111 DEG 2 MIN W)) APR27 EPR1752241 ES18Ø1446
LN T18A4.6 LE T19A1.3 IPDR1921367 ((LPZ,N,E OFF SCALE, LZ SCALED
FROM SPZ, DOUBLE TRACE AMPLITUDE EQUALS 72 MM AT 2Ø SEC)) EP2346170
((CORRECTION APR24 EP1943276 SHOULD READ EP1945276))

SRF APR23 (PN)Ø514220 IPG14324 ELG1517Ø IPGDØ7Ø3162 ISGØ3261
((ISMS Ø334)) IPN1213300 IAPN1343Ø IPB13512 ISN1443Ø STOP

Code	EXPLANATION OF TELEGRAM TEXT
SEISMO	Message type identifier. Always the first 6 characters of this type of message.
N812	Indicates that this message is the 12th such message sent during 1978 by this station or net. The first few messages of 1978 might have contained data recorded in 1977 UTC.
TUC	International station abbreviation for Tucson, Arizona. ALQ and SRF are abbreviations for other stations being sent. As shown above, we strongly recommend introducing a carriage-return and 2 line-feeds as a delimiter preceding the appearance of data from additional stations, when data are grouped by station. This greatly enhances visual scanning. Use only the international station abbreviation code and not the full name of the station. The 3- to 5-character abbreviations are assigned by the U.S.G.S. in co-operation with the I.S.C.
2ØØK	Short period vertical magnification in thousands. Worldwide Standardized Seismograph Stations (WWNSS), SEISMIC RESEARCH OBSERVATORY (SRO), and IRANIAN LONG-PERIOD ARRAY (ILPA) stations reporting peak-to-trough short-period body-wave trace amplitudes (i.e. double trace amplitudes), in millimetres, must report their short-period vertical magnification at 1 second in multiples of thousands (K). For example, 2ØØK for 2ØØØØØ, 12.5K for 125ØØ, 6.26K for 625Ø, and 3.125K for 3125. Stations reporting centre-to-peak ground amplitudes (in nanometres) must not quote magnification setting.
3ØØØM	Long-period magnification. WWNSS, SRO, and ILPA stations reporting peak-to-trough surface-wave trace amplitudes (i.e., double trace amplitudes), in millimetres, must report actual long-period magnification setting at the period at which their magnification is a maximum (i.e. 15, 25 and 25 seconds respectively). The letter M must follow the number. Both short-period and long-period magnification settings may be reported. Stations reporting centre-to-peak surface-wave ground amplitudes (in micrometres) must not quote long-period magnification setting.

APR3Ø Date group. Decoded as April 3Øth of current year.

This group is used to identify the date of the first EVENT group reported and each change of date thereafter. Thus this group need not be included with each event if there is more than one reported per day. Any of the following forms are acceptable: JANØ1, JAN1, JAN Ø1, JAN 1; SEPT22, SEP.22, etc. Months are identified only by the following: JAN, FEB, MAR or MARCH, APR or APRIL, MAY, JUN or JUNE, JUL or JULY, AUG, SEP or SEPT, OCT, NOV, and DEC.

IPCU Initial phase identification, onset prefix (accuracy indicator), and first motion suffix(es).

P Phase code

Initial first arrival phase identifications accepted by the computer are P, PDIF (or DIF), PKP, PN, PG, and PB. PN, PG, and PB are also accepted as secondary arrivals.

Frequently, in a preliminary interpretation of a seismogram, one may not know whether a particular phase is a P or a PKP, in which case a P should be reported. However, first arrivals identified only with an onset prefix such as ( ), E( ), E, I, etc. will be assumed to be P, and converted automatically to (P), E(P), EP, IP, etc. Secondary arrivals identified as E, I, etc. will be retained as E, I, etc.: they are treated as first arrivals only if there is no associated primary phase.

I Onset prefix (accuracy indicator)

To any phase code, one may prefix the onset codes E, I, ( ), and E( ), as long as this field will not exceed 5 characters. However, it is not necessary to include any such prefix.

Choice of E, I or ( )

For purposes of computing hypocentres, it is most useful to employ E and I to denote the accuracy of the timing of the phase for the first arrival, rather than the character of the recording (which may depend on the paper or film speed). For first arrivals with clear first motions and timing which should be accurate to within about $\pm$Ø.2 sec, I should be used. For first arrival times with accuracies between $\pm$(Ø.2 to 1.Ø) sec, E should be used. If the uncertainty in the onset of the first arrival is greater than 1 sec, E(P), (P), (PN), etc. should be used.

The above criteria, of course, apply to readings taken from seismograph systems having comparable chronometer accuracies and drum speeds and trace widths allowing comparable resolutions.

For secondary phases onsets will seldom, if ever, be legible to within ±Ø.2 second, and criteria for use of I and E should be liberalized.

Although an onset may exhibit "nodal character", no provision has been made for such information in the onset codes. Any onset codes received as EI will be processed as E.

CU First-motion identifications

C short-period compression
D short-period dilatation (rarefaction)
U long-period compression
R long-period dilatation (rarefaction)

The definition of long- and short-period first motions is left to the discretion of each observer; however, it should be based on the instrument from which the first motion was obtained and not the apparent period of the signal. First motions obtained from intermediate-period instruments should be reported as long-period.

One may report either or both short- and long-period first motions. Do not leave a blank (space) for the short when only the long is reported. The long and short need not agree with each other. If one has assigned an e(P) to a first arrival onset time scaled from a short-period instrument, one would ordinarily not report a short-period first motion.

Only clear first motions are desired; there is no provision for a first-motion quality indicator.

However, observers are encouraged to send first motions whenever possible.

The onset, phase, and first-motion field is restricted to five digits; consequently the onset portion may occasionally be omitted as it is the least important. Appendix C gives a complete list of acceptable combinations comprising this field.

17523Ø Initial phase arrival time. Decoded as 17hr 52mn 3Ø.3sec.

Initial phase arrival times must always include the hour.

A decimal point is not necessary to indicate tenths of a second; however, its use is allowed, and it is required if two decimal places are to be indicated. Likewise, arrival times may be given to the whole second. Do not fill in decimal fractions of seconds with zeros, if it will yield a false precision.

If only six digits are reported, the time is assumed to be to the nearest second, i.e. Ø1Ø2Ø3 is interpreted as Ø1 Ø2 Ø3, not as ØØ 1Ø 2Ø.3; Ø1 Ø2 Ø3.4 is interpreted correctly.

Spaces and decimal points in the arrival times are allowed. Example:

Correct	Incorrect
1752303	
17 52 3Ø3	175203.
17523Ø.3 or 17523Ø,3	175203,
17 52 3Ø.3	

Do not use 24 for an hour. Example:

SEP3Ø IPC2452123 incorrect

OCTØ1 IPCØØ52123 correct

Do not use a number larger than 59.99 for seconds unless a leap-second is involved.

Example:

OCTØ1 IPR1Ø2464.5 incorrect
OCTØ1 IPR1Ø25Ø4.5 correct
DEC31 IPD235960.3 correct for month ending in a leap second.

TØ.8 A3Ø.Ø Period and amplitude of short-period P body-wave

This group must immediately follow the first arrival time. The period and amplitude values must follow the letters T and A respectively. For example, correct forms are TØ.8 A3Ø.Ø and T1.Ø AØ.8. However, T.8A3Ø., T1.A.8, and T1A3Ø are also acceptable. Period and amplitude data should not be reported for phases known to be PKP. If uncertain as to whether a phase is PKP or P, report it as a P, and include period and amplitude if legible.

ASSOCIATED SECONDARY PHASES

FORMAT

I5253Ø
I58452
ISKPØØØ14Ø1
IAPØØ552
EXPØ1Ø42
IPB19252
IPG19272
etc.

Secondary phase codes, together with their onset codes, if any, must not consist of more than 5 characters. These arrival times need include the hour only when the hour differs from that of the preceding phase of the EVENT group, as in the case of the SKP time shown. Thus if they are reported to the nearest whole second, their arrival times will consist of either 4 or 6 figures. If reported to the nearest tenth of a second, without including the decimal point, they will consist of 5 or 7 figures.

Likewise, a secondary arrival time need include the minute only when the minute differs from that of the preceding phase of the EVENT group. However, such a degree of fragmentation of the data is not recommended, as experience has shown that such data are more difficult to correct if there is an error or garbling in transmission.

Arrival times may be reported to hundredths of a second, in which case a decimal point must be used.

Secondary arrivals must arrive within 66 min of the primary phase; otherwise, they will be considered to be new primary phases. One additional requirement is that PG, PB, and P*, when they are not primary phases, must not include the first-motion identifiers C, D, R, or U. For example, EPNØ1Ø2Ø3.4 IPGCØ1Ø2Ø9.5 would be considered to be two different events.

As many as 23 secondary phases may be included with each EVENT group.

Since an asterisk (*) generally cannot be sent by telegram, phases P* and S* should be sent as PB and SB.

No first-motion identification should be used for secondary phases.

RELATIVE IMPORTANCE

The most important secondary phases for hypocentre estimation are those which give an indication of the depth of focus. These include pP encoded as AP, sP encoded as XP, pPKP encoded as APKP, Pg encoded as PG, Lg encoded as LG. Also of great value are S phases for local and

regional shocks when their onset can be read accurately enough to yield a check on the computed origin time. They are especially valuable for local and regional shocks with deeper than normal foci. Any strong phase following teleseismic P by less than 2 min 3Ø sec, which might be a pP but for which the interpreter does not wish to definitely identify as pP, should be encoded as an E or I.

A pPcP and/or sPcP (encoded as APCP and XPCP respectively) together with PcP will yield depth information from stations which may be too close to the focus to record pP or sP. The same consideration applies to ScP, PcS, and ScS.

Phases which are generally prominent on short-period vertical instruments which are of some value in hypocentre estimation include PcP, ScP, PKKP and SKP. Identification of these phases by some stations may aid in the identification of these same phases from other stations which have reported them as P. Such phases as PP, PPP, SS, SSS, SP, PgPg, etc., are generally of lesser value in routine hypocentre work.

Phases closely following P which have much larger amplitudes than P and may indicate a multiple or complex event may be encoded as an E or I (these may also include breakout and stopping phases), or they may be encoded as separate shocks if the interpreter has such evidence, or desires to include their amplitudes.

LZ, LN, LE Surface-wave component identifiers

Identify data following as surface-wave period and amplitude group. Z, N, and E indicate the component. These data must relate to the same earthquake described by the preceding initial phase identification. Either the vertical component alone (Rayleigh Wave) and/or the two horizontal components may be reported. Average surface wave magnitudes are computed using only the vertical component, although individual station magnitudes computed from horizontal components are reported on the EDR.

T21A1ØØ Surface-wave period and amplitude

The surface-wave period and amplitude (see also 3ØØØM above) must follow the letters T and A respectively. Decimal points are necessary to report decimal fractions of the amplitudes. Amplitudes should generally be reported to at least 2 significant figures. Seldom will their precision be greater than 3 significant figures. Surface-wave period and amplitude group must follow the component they apply to (e.g. LZ, LN, or LE). If nearly zero, please assign an

allowable period with the zero amplitude. If a horizontal component is not scalable because it is missing, off scale, etc., do not report either horizontal component. If the horizontal periods differ, we assign them the value 2Ø sec arbitrarily.

SLO 6.84 AZ 357 Array data

Arrays now report slowness in sec deg^{-1} (SLO) or velocity in km sec^{-1} (VEL), and station to epicentre azimuth in deg (AZ). These should follow the associated primary phase, secondary phases, or period-amplitude group. The order is not important. The group above could also have been reported as VEL 16.3 AZ 357.

((----)) Additional information and comments

All additional information must be enclosed within double parentheses, and must come between the words SEISMC and STOP. Any messages in double parentheses after the word STOP will not be machine processed and will probably be lost. If it pertains to an event for which data are included in this message, the information, enclosed in double parentheses, must follow the data of that event. Usually this type of information includes macroseismic data, e.g. ((FELT IV AT RAB)), and magnitude information. If a magnitude is sent based on a distance and/or a depth which are not well known, the applied distance (in geocentric degrees) and/or depth (in km) should be included, together with the magnitude value and scale, e.g. ((ML 5.8 D 2.1)), ((MB 6.2 D 85 DEPTH 65Ø)). Other useful information includes rockburst, coal bump, and blast information; hypocentres supplied by your network; and any other comment relative to the hypocentre, magnitude, or depth determination, such as: ((probable double-shock, SPZ amplitude refers to second shock)).

If the additional information does not pertain to any particular data, it must be appended to the end of any convenient event. Such information may include: confirmation of a change in magnification ((SPZ changed from 1ØØK to 5ØK for winter, effective OCT16, 15ØØZ)); corrections; supplementary information for events reported on earlier messages; and information on new stations. Please do not include comments such as SEP28 ((NIL)) or SEP28 ((NO SIGNAL)). The correct method to send such information is...SEP29 IPØ522195 ((SEP28 NIL))... however it is not necessary to send such information at all if the MSGNO group is used.

STOP The stop instruction turns off automatic equipment. It must come before a signature or confirmation. No matter how long a telegram may be, confirmations should never come before the STOP. Usually, commas (,), dashes (-), and other symbols not shown in the sample message are ignored, except in comments which are enclosed in double parentheses. However, do not use a . or , at the end of a message, because this can be confused with the decimal point. Example:

EPØ1Ø2Ø3.4 STOP - Correct
EPØ1Ø2Ø34 STOP
EPØ1Ø2Ø3.4. STOP - Incorrect
EPØ1Ø2Ø34. STOP

Please stress to the people preparing these telegrams and those transmitting the telegrams that they must follow the format exactly. The letter O and the number zero (Ø) must be used correctly by the telegraphic operator, and not interchanged. The same applies to the letter I and the number 1, especially following the letter T, for period.

Symbols which do not appear on all teletype machines are transmitted by various upper case letters:

Symbol	Transmitted by	
(	figures (upper case)	K
)	" "	L
,	" "	N
?	" "	B
/	" "	X
.	" "	M
((	" "	KK
))	" "	LL

If your teletype key board does not contain the symbols contained in the left column above, please transmit the data in the right column.

Some stations or nets routinely send data telegraphically, and then send their preliminary interpretations by mail. They are requested to indicate on their preliminary bulletins or letters, which data have previously been supplied by telegraph, and which, if any, are revisions of such data or new data. When this is known, only the events which are new or revised need be processed.

Some stations are now sending telegrams with only first arrivals, or first arrivals and their period and amplitude, within a few days of recording, and are then sending by mail reinterpretations within a few weeks. They are urged to send their important secondary phases and comments with their initial telegrams, if these more complete preliminary interpretations can be sent with only a short additional delay.

All first motions with data received by airmail will be considered short-period first motions unless identified as long-period first motions on each message.

Appendix B

This appendix illustrates a SEISMO message which contains data from more than one station in which the sender chose to group the data by date (i.e. the station varies more rapidly than the date). This is frequently the most convenient grouping method when the signals are telemetered to one recording site from several seismometers.

In both versions frequent use of carriage-returns and line-feeds was made not simply to separate the data by seismic event, but, in so doing, to make the original copy more legible for the teletypist and others, in preparing the message for transmission.

As long as the format rules are adhered to rigidly, the computer(s) receiving the message do not "care" what it looks like to the naked eye. Each seismological agency should, in concert with those transmitting their messages, adopt a delimiter schema best suited to its individual situation.

Version I

```
SEISMO

MAR23
GIL IPC1919534 T1.4 A463.0  ANV IPC1918485  SIT EP1920528  KDC EP1920528
PMR EP1919478 T1.0 A65.0 LZ T20A90.0 LN T20A30.0 LE T20A95.0
NRA EP1919058  GMA EP1919063

ANV EP1927248

GIL EP1953558 T1.5 A107.0  ANV EP1952488  KDC EP1953356
NRA EP1953059

GIL EP2157109 T1.0 A25.0  ANV EPC2156570  KDC EP2156368  PMR EP2156557
T1.0 A75.0  NRA EP2156566  GMA EP2157029

GIL EP2226548 T0.9 A4.2


MAR24
GIL IPC0052368 T1.0 A65.0 I53255  NKI IPC0054070  GMA IPC0053149
NRA IPC0053162  KDC IPC0053018  ADK IPC0054325  PMR IPC0052459 T1.0 A102.5
E53305 I54582 LZ T18A14.0 LN T18A6.0 LE T18A12.0  ANV IPC0053275
SIT IPC0051589  MID IPC0052394  PMA IPC0053328

GIL EP0122119 T1.3 A25.0  NRA EP0122002  PMR EP0122070 T1.2 A16.3
ANV EP0121517
STOP
```

Version II

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SEISMO

MAR23
GIL IPC1919534 T1.4 A463.0
ANV IPC1918485
SIT EP1920528
KDC EP1920528
PMR EP1919478 T1.0 A65.0 LZ T20A90.0 LN T20A30.0 LE T20A95.0
NRA EP1919058
GMA EP1919063

ANV EP1927248

GIL EP1953558 T1.5 A107.0
ANV EP1952488
KDC EP1953356
NRA EP1953059
```

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GIL EP2157109 T1.0 A25.0
ANV EPC2156570
KDC EP2156368
PMR EP2156557 T1.0 A75.0
NRA EP2156566
GMA EP2157029

GIL EP2226548 T0.9 A4.2



MAR24
GIL IPC0052368 T1.0 A65.0 I53255
NKI IPC0054070
GMA IPC0053149
NRA IPC0053162
KDC IPC0053018
ADK IPC0054325
PMR IPC0052459 T1.0 A102.5 E53305 I54582 LZ T18A14.0 LN T18A6.0
    LE T18A12.0
ANV IPC0053275
SIT IPC0051589
MID IPC0052394
PMA IPC0053328

GIL EP0122119 T1.3 A25.0
NRA EP0122002
PMR EP0122070 T1.2 A16.3
ANV EP0121517
STOP
```

Appendix C

1. A. List of acceptable combinations of first-arrival codes, onset codes, and first-motion codes:

P	PDIF	PKP	PN	PG	PB
EP	EPDIF	EPKP	EPN	EPG	EPB
IP	IPDIF	IPKP	IPN	IPG	IPB
(P)	PDIFC	(PKP)	(PN)	(PG)	(PB)
PC	PDIFD	PKPC	PNC	PGC	PBC
PD	PDIFU	PKPD	PND	PGD	PBD
EPC	PDIFR	EPKPC	EPNC	EPGC	EPBC
IPC	DIF	IPKPC	IPNC	IPGC	IPBC
EPD	EDIF	EPKPD	EPND	EPGD	EPBD
IPD	IDIF	IPKPD	IPND	IPGD	IPBD
PU	(DIF)	PKPU	PNU	PGU	PBU
PR	DIFC	PKPR	PNR	PGR	PBR
EPU	DIFD	EPKPU	EPNU	EPGU	EPBU

IPU	EDIFC	IPKPU	IPNU	IPGU	IPBU
EPR	IDIFC	EPKPR	EPNR	EPGR	EPBR
IPR	EDIFD	IPKPR	IPNR	IPGR	IPBR
PCU	IDIFD	PKPCU	PNCU	PGCU	PBCU
EPCU	DIFU	PKPCR	EPNCU	EPGCU	EPBCU
IPCU	EDIFU	PKPDU	IPNCU	IPGCU	IPBCU
PCR	IDIFU	PKPDR	PNCR	PGCR	PBCR
EPCR	DIFR		EPNCR	EPGCR	EPBCR
IPCR	EDIFR		IPNCR	IPGCR	IPBCR
PDU	IDIFR		PNDU	PGDU	PBDU
EPDU	DIFCU		EPNDU	EPGDU	EPBDU
IPDU	DIFCR		IPNDU	IPGDU	IPBDU
PDR	DIFDU		PNDR	PGDR	PBDR
EPDR	DIFDR		EPNDR	EPGDR	EPBDR
IPDR			IPNDR	IPGDR	IPBDR

B. Since the onset codes E, I, and ( ) refer to the accuracy of the timing of the onset of the phase and not to the quality of the first motion, the following are also valid combinations:

(P)C	(PN)C	(PG)C	(PB)C
(P)D	(PN)D	(PG)D	(PB)D
(P)U	(PN)U	(PG)U	(PB)U
(P)R	(PN)R	(PG)R	(PB)R
(P)CU			
(P)CR			
(P)DU			
(P)DR			

These combinations could arise if one had poor chronometer accuracy, but a clear first motion; or a noisy short-period instrument from which times were scaled, and first motions taken from long-period instruments.

2. List of acceptable combinations of phase codes and onset codes that may be either first arrivals or secondary phases:

PN	EPN	IPN	(PN)
PB	EPB	IPB	(PB)
PG	EPG	IPG	(PG)

First motions can only be appended to these phases when they are a first arrival.

3. List of acceptable combinations of secondary phases and their onset codes:

APN	EAPN	IAPN	(APN)
XPN	EXPN	IXPN	(XPN)
SN	ESN	ISN	(SN)
SB	ESB	ISB	(SB)
SG	ESG	ISG	(SG)
PGPG	EPGPG	IPGPG	
SGSG	ESGSG	ISGSG	
LG	ELG	ILG	(LG)
AP	EAP	IAP	(AP)
XP	EXP	IXP	(XP)
S	ES	IS	(S)
XS	EXS	IXS	(XS)
PP	EPP	IPP	(PP)
APP	EAPP	IAPP	(APP)
XPP	EXPP	IXPP	(XPP)
SS	ESS	ISS	(SS)
PPP	EPPP	IPPP	(PPP)
APPP	EAPPP	IAPPP	
XPPP	EXPPP	IXPPP	
SSS	ESSS	ISSS	(SSS)
PS	EPS	IPS	(PS)
SP	ESP	ISP	(SP)
SPP	ESPP	ISPP	(SPP)
APS	EAPS	IAPS	(APS)
PPS	EPPS	IPPS	(PPS)
XSP	EXSP	IXSP	(XSP)
PCP	EPCP	IPCP	(PCP)
APCP	EAPCP	IAPCP	
XPCP	EXPCP	IXPCP	
PCS	EPCS	IPCS	(PCS)
SCP	ESCP	ISCP	(SCP)
ASCP	EASCP	IASCP	
XSCP	EXSCP	IXSCP	
SCS	ESCS	ISCS	(SCS)
RPCP	ERPCP	IRPCP	(RPCP signifies PcPPcP)
RSCS	ERSCS	IRSCS	(RSCS signifies ScSScS)
APKP	EAPKP	IAPKP	
XPKP	EXPKP	IXPKP	
SKS	ESKS	ISKS	(SKS)
PKS	EPKS	IPKS	(PKS)
APKS	EAPKS	IAPKS	
XPKS	EXPKS	IXPKS	
SKP	ESKP	ISKP	(SKP)
PKKP			

PKKP	EPKKP	IPKKP	
SKKS	ESKKS	ISKKS	
P3KP	EP3KP	IP3KP	
P4KP	EP4KP	IP4KP	
P5KP	EP5KP	IP5KP	
P6KP	EP6KP	IP6KP	
P7KP	EP7KP	IP7KP	
RPKP	ERPKP	IRPKP	(RPKP signifies PKPPKP)
RRPKP			(signifies PKPPKPPKP)
SKSP	ESKSP	ISKSP	
G	EG	IG	(G)
T	ET	IT	(T)
TT	ETT	ITT	(TT)

Phase codes without the onset prefix are accepted; however, use of the onset prefix as an accuracy indicator is encouraged, except where such use would lead to a field of more than 5 characters.

P′ and P* are alternate phase code designators for PKP and PB respectively. They are acceptable to computers processing seismic data, and may thus be exchanged by computer links or by air mail. However, "′" and "*" are generally not available to teletype cicuits, so PKP and PB are the preferred codes for teletype data even if the originator is capable of sending "′" or "*".

A N N E X XVII

Annex to Recommendation 14 (CBS-VII)

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 (IIiii *) (99$L_aL_aL_a$ $Q_cL_oL_oL_oL_o$ **)

SECTION 1 - i_Ri_xhVV Nddff $1s_nTTT$ $2s_nT_dT_dT_d$ $3P_oP_oP_oP_o$

$4PPPP$ $5appp$ $6RRRt_R$ $7wwW_1W_2$ $8N_hC_LC_MC_H$ 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 + {plain language / $c_iS_ib_iD_iz_i$})

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....) $(8N_sCh_sh_s)$

$(9S_PS_Pp_sp_p)$ (groups to be developed regionally)

SECTION 4 - 444 N'C'H'H'C_t

SECTION 5 - 555 groups to be developed nationally

SECTION 6 - 666 DDDD

SECTION 7 - 777 $A_1b_wn_bn_bn_b$

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* Used in FM 12-VII.

** Used in FM 13-VII.

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 $M_i M_i M_j M_j$ = AAXX.

(3) A SHIP report from a sea station is identified by the symbolic letters $M_i M_i M_j M_j$ = 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 $i_R i_x$hVV 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$_w$ 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 99$L_aL_aL_a$ $Q_cL_oL_oL_oL_o$.

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 $Os_n T_w T_w T_w$

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 + $\begin{bmatrix} \text{plain language} \\ \text{or} \\ c_i S_i b_i D_i z_i \end{bmatrix}$)

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

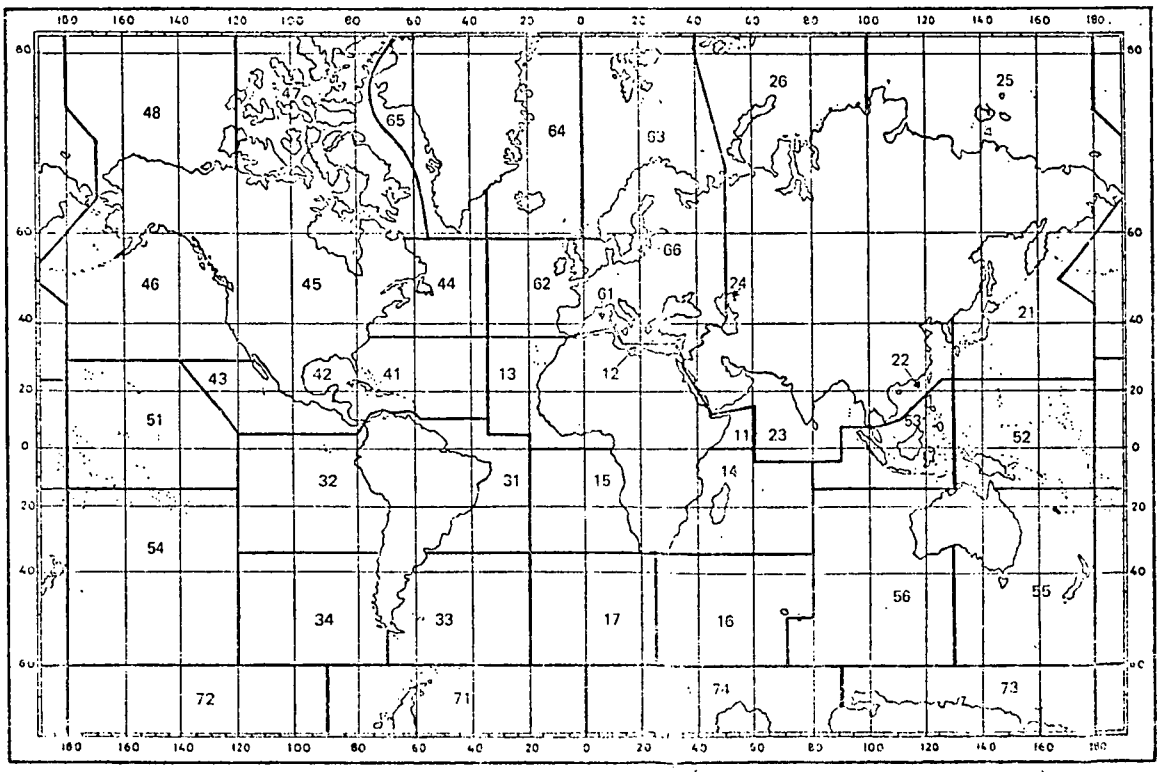
This section shall be used to report the identifier of an environmental data buoy.

SPECIFICATIONS OF NEW SYMBOLIC LETTERS

A_1	WMO Regional Association area 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	
FM 12-VII SYNOP	AA			unchanged
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.

A N N E X XVIII

Annex to Recommendation 15 (CBS-VII)

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

PART I - ORGANIZATION OF THE GLOBAL TELECOMMUNICATION SYSTEM

(1) In paragraph 2.6, delete the word "collecting".

(2) Attachment I-3: Replace the whole Attachment by the one contained in this annex.

*

* *

ATTACHMENT 1-3

RESPONSIBILITIES OF CENTRES ON THE MAIN TRUNK CIRCUIT AND ITS BRANCHES FOR THE TRANSMISSION OF OBSERVATIONAL DATA

I. The target and present responsibilities of centres performing telecommunication functions, and located on the Main Trunk Circuit and its branches, for the collection, exchange and distribution of observational data

The responsibilities are given in the following table and diagrams.

WMC/RTH	*Collection of observational data from the zones of responsibility of the following RTHs*	
	TARGET	*PRESENT*
Melbourne	Melbourne (51), Wellington (52)	Melbourne (51), Wellington (52)
Tokyo	Tokyo (25), Bangkok (26)	Tokyo (25), Bangkok (26)
Washington	Washington (41)	Washington (41)
Bracknell	Bracknell (61)	Bracknell (61)
Paris	Paris (63), Rome (66)	Paris (63), Rome (66), Algiers (16), Dakar (15), Brazzaville (17)
Offenbach	Offenbach (64), Norrköping (62), Vienna (68)	Offenbach (64), Norrköping (62), Vienna (68)
Prague	Prague (67)	Prague (67)
Moscow	Moscow (65), Norrköping (62), Sofia (69), Khabarovsk (24), Novosibirsk (23), Tashkent (22)	Moscow (65), Norrköping (62), Sofia (69), Khabarovsk (24), Novosibirsk (23), Tashkent (22)
Cairo	Cairo (11), Algiers (16), Dakar (15), Kano (14), Brazzaville (17)	Cairo (11), Algiers (16), Dakar (15), Brazzaville (17), Kano (14), Jeddah (29)
New Delhi	New Delhi (27), Jeddah (29), Tehran (21)	New Delhi (27), Jeddah (29), Tehran (21)
Brasilia	Brasilia (31), Buenos Aires (32), Maracay (33)	Brasilia (31), Buenos Aires (32), Maracay (33)
Nairobi	Nairobi (12), Lusaka (13)	Nairobi (12), Lusaka (13)
Peking	Peking (28)	Peking (28)

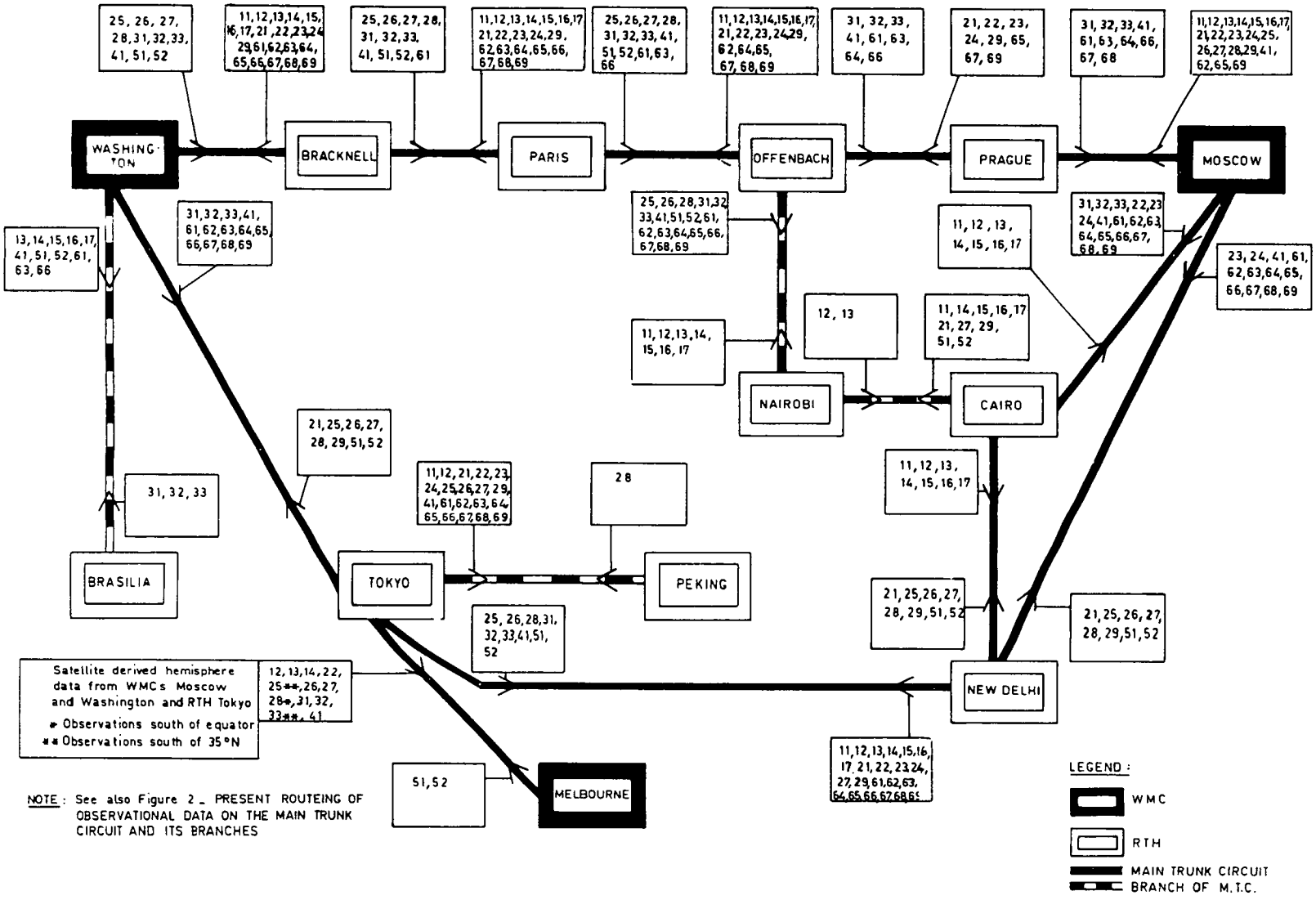


Figure 1 — Target routeing of observational data on the Main Trunk Circuit and its branches

Region I

11. Cairo
12. Nairobi
13. Lusaka
14. Kano
15. Dakar
16. Algiers
17. Brazzaville

Region II

21. Tehran
22. Tashkent
23. Novosibirsk
24. Khabarovsk
25. Tokyo + satellite data
26. Bangkok
27. New Delhi
28. Peking
29. Jeddah

Region III

31. Brasilia
32. Buenos Aires + Antarctic data
33. Maracay

Region IV

41. Washington + Antarctic data
    + satellite data

Region V

51. Melbourne
52. Wellington + Antarctic data

Region VI

61. Bracknell
62. Norrköping
63. Paris
64. Offenbach + satellite data
65. Moscow + Antarctic data
    + satellite data
66. Rome
67. Prague
68. Vienna
69. Sofia

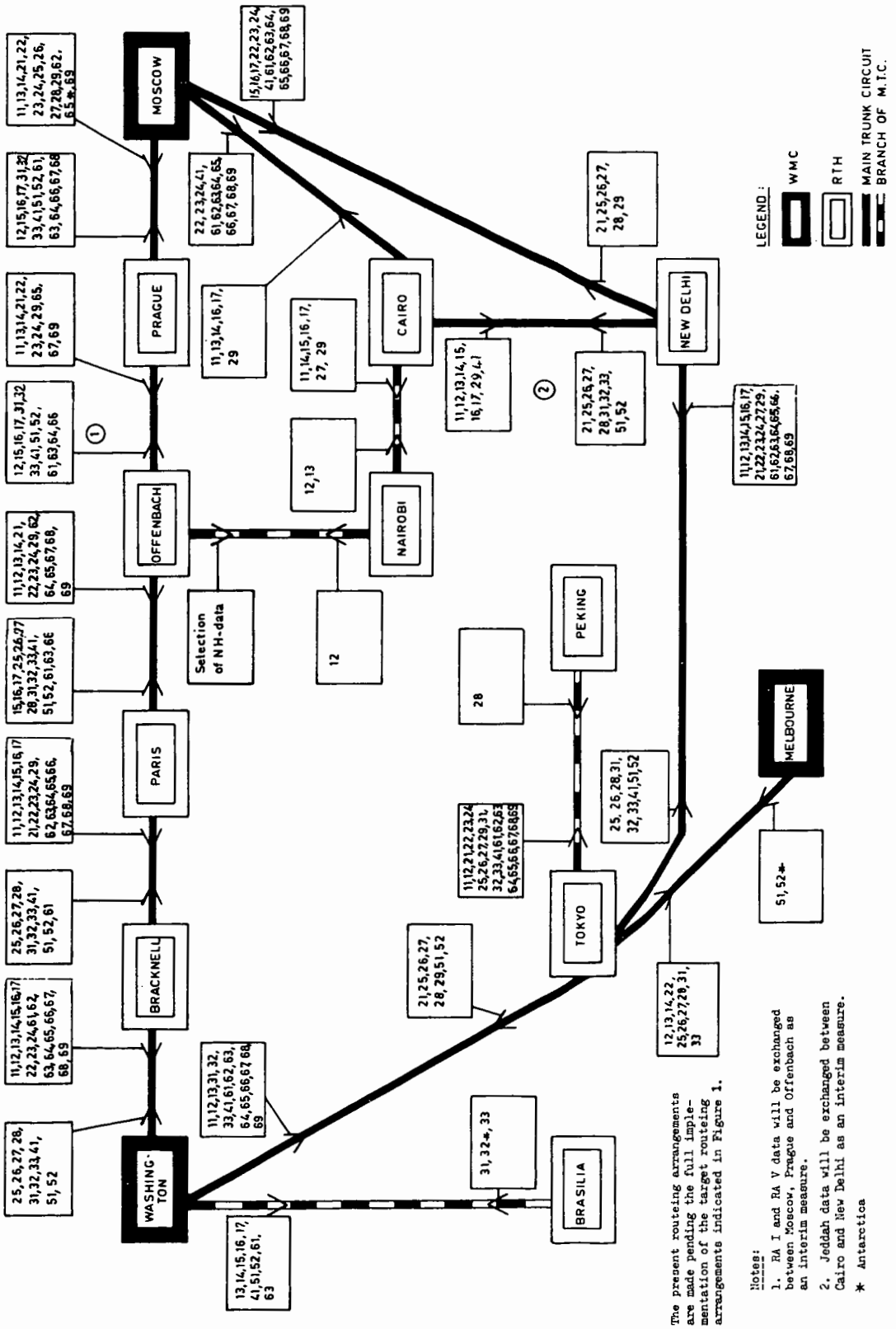


Figure 2 — Present routeing of observational data on the Main Trunk Circuit and its branches

Region I

11. Cairo
12. Nairobi
13. Lusaka
14. Kano
15. Dakar
16. Algiers
17. Brazzaville

Region II

21. Tehran
22. Tashkent
23. Novosibirsk
24. Khabarovsk
25. Tokyo + satellite data
26. Bangkok
27. New Delhi
28. Peking
29. Jeddah

Region III

31. Brasilia
32. Buenos Aires + Antarctic data
33. Maracay

Region IV

41. Washington + Antarctic data
    + satellite data

Region V

51. Melbourne
52. Wellington + Antarctic data

Region VI

61. Bracknell
62. Norrköping
63. Paris
64. Offenbach + satellite data
65. Moscow + Antarctic data
    + satellite data
66. Rome
67. Prague
68. Vienna
69. Sofia

A N N E X XIX

Annex to Recommendation 16 (CBS-VII)

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

(a) Following the sentence:

"The following sets of "ii" numbers shall be used for indicating the bulletins for global, inter-regional, regional and national distribution.", ADD:

"However, special more flexible provisions apply to the use of "ii" in respect of bulletins containing satellite data, processed information in grid-point format and pictorial information in digital form. (See details in respect of individual centres contained in WMO Publication No. 9, Volume C, Chapter I - Catalogue of Meteorological Bulletins.)

(b) Replace the entry against "CCCC" by the following text:

"CCCC - International four-letter location indicator of the station originating or compiling the bulletin, as agreed bi-laterally or multi-laterally, and published in WMO Publication No. 9, Volume C, Chapter I - Catalogue of Meteorological Bulletins. Once a bulletin has originated or been compiled, the CCCC must not be changed even if (because of inadequate reception or for any other reason) the bulletin in question has to be re-compiled at another centre."

2. Amend paragraph 2.3.2.3 to read:

"2.3.2.3 For the transmission of satellite data, processed information in grid-point format and pictorial information in digital form, the use of TTAAii may (if required) be modified so that:

$$TTAAii = T_1T_2A_1A_2i_1i_2$$

in which T_1 = T = satellite data

= G = information in grid-point format

= P = pictorial information in digital form

and the remaining five characters in the group may be used as required by originating and compiling centres.

One example of the use of this procedure is outlined in Attachment II-6, Table D. Details of the practice adopted by individual centres are contained in WMO Publication No. 9, Volume C, Chapter I - Catalogue of Meteorological Bulletins.

3. Amend the beginning of paragraph 2.3.3.7 to read as follows:

"2.3.3.7 NIL

(a) In the case of routine messages containing meteorological reports, NIL shall be inserted following the appropriate station index number (which should however retain its proper place in the coded message) when the report from that station is included in the published contents of the bulletin (in the Catalogue of Meteorological Bulletins and elsewhere) but is not available at the time of transmission. The same procedures also apply to other coded information (such as CLIMAT, CLIMAT TEMP)."

4. Attachment II-5, Paragraph 2(b)

At the end of this sub-paragraph, following the words "... appropriate numbers are allocated to all centres compiling bulletins.", ADD:

"These allocations are published in Volume C, Chapter I - Catalogue of Meteorological Bulletins. In the case of WMC/RMC/RTHs where the availability of catalogue numbers for allocation to satellite data, data in the form of grid values and pictorial information has become exhausted, the Centres concerned may make use of values of L_1L_2 which have been allocated for use by NMCs in their respective zones of responsibility by mutual arrangement with the NMCs concerned. Should any centre originating bulletins of these types be unable to obtain sufficient allocations of L_1L_2 for this purpose in the manner described above, suitable additional allocations will be made available by the Secretary-General of WMO in consultation with WMC/RTH/NMCs in other areas, where use is not being made of them."

5. Attachment II-5, Table of CL_3 specifications

Remove the vertical and horizontal lines separating C = 7, 8 and 9 and amend the text to read:

"Satellite data	7
or	or
grid-point value messages	8
or	or
pictorial information	9"

Remove the vertical and horizontal lines separating L_3 = 0 - 9 in the section where C = 7 or 8 or 9 and insert the text:

"To be used for the three types of data as may be required."

6. Amend Attachment II-6 as follows:

In the section for satellite data (T), combine all the entries for satellite data - T, GRID data - G and pictorial information - P as follows:

$\frac{TT}{T \text{ and } G \text{ or } P}$	$\frac{CL_3}{71 - 99}$

7. Attachment II-9, Table B - Data designators for information transmitted by analogue facsimile. Replace Table B by the following new table.

TABLE B

DATA DESIGNATORS FOR INFORMATION TRANSMITTED BY ANALOGUE FACSIMILE

Type of information	Data designators or chart identifications
Surface data	
Plotted surface data	SM
Radar summary	SD
METAR data	SA
Sea-ice information	ST
Surface or sub-surface sea temperature, salinity or current data	SO
Miscellaneous surface data	SX
Upper-air data	
Plotted upper-air data	US
TEMP chart	UX
Analyses	
Surface analyses	AS
Upper-air analyses	AU
Tropopause/jet-stream analyses	AU
Tropopause/maximum wind analyses	AU
Maximum wind analyses	AU
Upper-air thickness analyses	AH
Radar analyses	AR
Nephanalyses (satellite data)	AN
Sea-ice analyses	AI
Surface or sub-surface sea temperature, salinity or current analyses	AO
Sea wave analyses	AW
Vertical P-velocity analyses	AX
Vorticity analyses	AX
Temperature and dew-point depression analyses	AX
Freezing-level analyses	AX

Type of information	Data designators or chart identifications
Forecast	
Surface prognoses	FS
Surface numerical prognoses	FS
Upper-air prognoses	FU
Upper-air numerical prognoses	FU
Tropopause/jet-stream prognoses	FU
Tropopause/maximum wind prognoses	FU
Maximum wind analyses	FU
Upper-air thickness prognoses	FH
Sea-ice information (forecast)	FI
Surface or sub-surface temperature, salinity or current prognoses	FO
Wave prognoses	FW
Extended forecast charts	FE
Significant weather charts	FB
Vertical P-velocity prognoses	FX
Temperature and dew-point depression prognoses	FX
Vorticity prognoses	FX
Barotropic contour and vorticity prognoses	FX
Weather depiction prognoses	FX
Freezing-level prognoses	FX
Climatic data	
Monthly mean surface data	CS
Mean surface data	CS
Monthly mean upper-air data	CU
Mean upper-air data	CU
Monthly means (oceanic areas)	CO
Warnings	
Warnings in pictorial form	WP

ANNEX XX

Annex to Recommendation 17 (CBS-VII)

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

Amendments to paragraph 2 - Characteristics of transmissions over the Main Trunk Circuit and its branches

(1) Paragraph 2.2.1.2

Replace the existing text by the following text:

"2.2.1.2 A data-signalling rate of 1 200 bit/s or 2 400 bit/s shall be used for data transmission as agreed by the related centres. The use of a data-signalling rate of 4 800 bit/s or 9 600 bit/s is permitted, if agreed by the related centres."

(2) Paragraph 2.2.1.5

In the second line, replace "and/or" by "or".

(3) Paragraph 2.2.1.6

(a) Insert the following new paragraph:

"2.2.1.6 For data transmission at a signalling rate of 9 600 bit/s, the characteristics of the modem shall be those specified in CCITT Recommendation V-29."

(b) Renumber present paragraphs 2.2.1.6 to 2.2.1.10 as 2.2.1.7 to 2.2.1.11.

ANNEX XXI

Annex to Recommendation 19 (CBS-VII)

PROPOSED AMENDMENTS TO THE TECHNICAL REGULATIONS

Suggested additional definitions to be inserted under "Definitions" in Volume I of the Technical Regulations and in the Manual on the GOS

Automatic picture transmission (APT) service. The direct broadcast from a near-polar orbiting satellite, in the VHF band, of cloud images with a resolution of the order of 2-6 km.

Data-collection platform (DCP). A fixed or moving platform, on land or sea or in the air, which transmits data via satellite to a collection centre.

Direct read-out service. A service provided by meteorological satellites which allows the reception of satellite data in real time by ground stations within radio range of the satellite.

High-resolution Picture Transmission (HRPT) service. The direct broadcast from a near-polar orbiting satellite in the S-band (about 1 700 MHz), of cloud images of high resolution in the order of 1 km.

Space-based sub-system. A complementary part of the Global Observing System which is formed by near-polar orbiting meteorological satellites and geostationary satellites.

Surface-based sub-system. An essential part of the Global Observing System formed by the regional basic synoptic networks of surface and upper-air stations, as well as automatic weather stations, fixed ocean stations, automatic fixed and drifting sea stations, research and other mobile ships and aircraft, weather radars, meteorological rockets, background pollution stations, radiation stations, climatological and agricultural meteorological and other observing stations on land and at sea.

Near-polar orbiting satellite. A type of meteorological satellite with nearly circular, nearly polar orbit. The combination of satellite motion and the Earth's rotation beneath the orbit provides overlapping strips of satellite data covering a sufficiently wide swath (up to 3 000 km) from pole to pole. The satellite's altitude can be chosen within a wide range (between 600 and 1 500 km) in order to provide data over the entire globe twice a day.

Geostationary satellite. A type of meteorological satellite orbiting the Earth at an altitude of approximately 36 000 km with the angular velocity of the Earth and within the equatorial plane, thus providing nearly continuous information in an area within a range of about 50° from a fixed sub-satellite point at the Equator.

Satellite operator. Those entities (Members of WMO or international organizations) which manage and operate near-polar or geostationary meteorological satellites.

WEFAX. The broadcast via a geostationary satellite of environmental data in analogue format in the S-band (about 1 700 MHz).

Meteorological bulletin. A text comprising meteorological information preceded by an appropriate heading.

Prognosis. A representation of the future state of the atmosphere.

N O T E: This representation can be obtained either from the integration of a numerical prediction model, from the judgement of a forecaster, or from any other appropriate method or combination of several methods.

Prognostic chart. A forecast of (a) specified meteorological element(s) for a specified time or period and a specified surface or portion of air-space, depicted graphically on a chart.

Chapter A.2.1 - ORGANIZATION AND FUNCTIONS OF THE GLOBAL DATA-PROCESSING SYSTEM

Replace the entire text of the chapter by the following paragraph:

(A.2.1.) 2.1

Real-time and non-real-time functions of World Meteorological Centres, Regional Meteorological Centres and National Meteorological Centres should be as given in Annex IV (Manual on the Global Data-processing System, Publication No. 485, Volume I).

Chapter A.2.2 - SYNOPTIC ANALYSIS AND FORECASTING PRACTICES

(1) Replace the title of the chapter by the following:

ANALYSIS AND FORECASTING PRACTICES

(2) Replace (A.2.2.) 1 NUMERICAL COMPUTATION by the following:

(A.2.2.) 1 CONSTANTS, DEFINITIONS AND SPECIFICATIONS

(3) Replace Regulations (A.2.2.) 2.1.1 to (A.2.2.) 2.1.4 inclusive by the following:

(A.2.2.) 2.1.1

Appropriate projections and scales along the standard parallels used for weather charts should be as given in Annex IV (Manual on the Global Data-processing System, Publication No. 485, Volume I).

(A.2.2.) 2.1.2

The symbols used for the pictorial representation of observed data and for analysis and prognosis on weather charts should be those set out in Annex IV (Manual on the Global Data-processing System, Publication No. 485, Volume I, Attachment II-4).

(4) Replace Regulations (A.2.2.) 3.1.1 and (A.2.2.) 3.1.2 by the following:

(A.2.2.) 3.1.1

Diagrams used for representation and analysis of upper-air observations of pressure, temperature and humidity should be as given in Annex IV (Manual on the Global Data-processing System, Publication No. 485, Volume I).

(A.2.2.) 3.1.2

Diagrams used for the accurate computation of geopotential from upper-air observations of pressure, temperature and humidity should possess the features given in Annex IV (Manual on the Global Data-processing System, Publication No. 485, Volume I).

(5) Replace Regulations (A.2.2.) 4.1.1 to (A.2.2.) 4.1.4 inclusive by the following:

(A.2.2.) 4.1.1

Rules and procedures for representing and analysing the conditions in the free atmosphere, including standard isobaric surfaces to be used, are as given in Annex IV (Manual on the Global Data-processing System, Publication No. 485, Volume I).

(6) Replace Regulations (A.2.4.) 2.1.1 to (A.2.4.) 2.1.3 inclusive by the following:

(A.2.4.) 2.1.1

Collection, maintenance and transfer of climatological data and records should be carried out by Members as indicated in Annex IV (Manual on the Global Data-processing System, Publication No. 485, Volume I).

(7) Renumber Regulation /A.2.4./ 2.1.4 as /A.2.4./ 2.1.2.

RECOMMENDATIONS OF THE COMMISSION FOR BASIC SYSTEMS ADOPTED PRIOR TO ITS SEVENTH SESSION AND MAINTAINED IN FORCE

Rec. 6 (CBS-VI) - AIRCRAFT WEATHER REPORTS

THE COMMISSION FOR BASIC SYSTEMS,

NOTING Technical Regulations [12.1.] 2.3 and [12.2.] 2.3,

CONSIDERING the increased 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. 20 (CBS-VI) - REPORTING OF PARTS B AND D OF FM 36.E - TEMP SHIP BY VOLUNTARY OBSERVING SHIPS

THE COMMISSION FOR BASIC SYSTEMS,

NOTING Recommendation 12 (CSM-V) - Reporting of Parts B and D of FM 36.D - TEMP SHIP by voluntary observing ships,

CONSIDERING:

(1) That Parts A and C are most readily used by meteorological centres for processing,

(2) That information contained in Parts A and C allows a check of the data,

RECOMMENDS that the voluntary observing ships making upper-air observations may exclude Parts B and D of the code form FM 36.E from the transmission of upper-air messages to coastal radio stations when operational difficulties are encountered.

Rec. 20 (CBS-Ext.(76)) - EXCHANGE OF BATHY/TESAC DATA OVER THE GLOBAL TELECOMMUNICATION SYSTEM

THE COMMISSION FOR BASIC SYSTEMS,

NOTING:

(1) The report of the Preparatory Meeting of Governmental Experts on the BATHY/TESAC Operational Programme (Geneva, March 1976),

(2) The IGOSS General Plan and Implementation Programme 1977-1982 as approved by Resolution 5 (EC-XVIII),

(3) IOC/WMO Guide to Operational Procedures for the Collection and Exchange of Oceanographic Data (BATHY and TESAC),

(4) The principle prescribed in the Manual on the GTS that BATHY/TESAC data shall be exchanged on the MTC and its branches on a global basis,

CONSIDERING the need for the complete and rapid distribution of BATHY/TESAC data to centres requiring them,

RECOMMENDS that BATHY/TESAC data be disseminated expeditiously on the GTS in accordance with the requirements stated by WMO and IOC Member States;

INVITES regional associations to study, as necessary, the arrangements for the distribution of BATHY/TESAC data within the Regions;

REQUESTS the Secretary-General to develop in more detail the routeing arrangements for BATHY/TESAC data on the MTC, and the GTS in general, with a view to ensuring the availability of these data at centres requiring them, and for this purpose to carry out periodical monitoring of the flow of these reports.

LIST OF DOCUMENTS

I. "DOC" series

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1	Provisional agenda	2.2	
2	Explanatory memorandum relating to the provisional agenda	2.2	
3	Data-processing system (including the GDPS part of WWW and the report by the chairman of the Working Group on the GDPS) Report of the chairman of the Working Group on the GDPS ADD.1		Chairman of the working group
4	Global Data-processing System Report of the fourth session of CBS Working Group on the GDPS CORR.1	7	Chairman of the working group
5	Codes (including the report by the chairman of the Working Group on Codes) Amendment to FM 87-VI Ext. SARAD	8	Secretary-General
6	Codes (including the report by the chairman of the Working Group on Codes) Abbreviated code for the transmission of processed data in the form of grid-point values	8	Secretary-General
7	Data-processing system Report of the Rapporteur on the State of the Sky in the Tropics	7	Rapporteur

Doc. No.	Title	Agenda item	Submitted by
8	Codes (including the report by the chairman of the Working Group on Codes) Amendments to codes FM 39-VI ROCOB and FM 40-VI ROCOB SHIP	8	Secretary-General
9	Codes (including the report by the chairman of the Working Group on Codes) Amendments to aeronautical codes METAR, SPECI, ARMET and TAF	8	Secretary-General
10	Codes (including the report by the chairman of the Working Group on Codes) Matters concerned with revision of Volumes I and II of the Manual on Codes	8	Secretary-General
11	Report of the chairman of the CBS Working Group on the Global Telecommunication System	9	Chairman of the working group
12	Observing system Revision of Volume II of the International Cloud Atlas	6	Secretary-General
13	Codes (including the report by the chairman of the Working Group on Codes) Amendments to SYNOP and SHIP codes	8	Secretary-General
14	Review of previous resolutions and recommendations of the Commission and relevant Executive Committee resolutions	14	Secretary-General
15	Codes (including the report by the chairman of the Working Group on Codes) Report of the chairman of the Working Group on Codes	8	Secretary-General

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18	Observing system (including the GOS part of WWW and the report by the chairman of the Working Group on the GOS) Report of the chairman of the Working Group on the GOS	6	Chairman of the working group
19	Data-processing system (including the GDPS part of WWW and the report by the chairman of the Working Group on the GDPS)	7	Secretary-General
20	Telecommunication system (including the GTS part of WWW and the report by the chairman of the Working Group on the GTS) ADD.1, ADD.2, ADD.3, ADD.4, CORR.1	9	Secretary-General
21	Co-ordination of data needs for various uses	4	Secretary-General
22	Codes Common code for exchanging surface observations from different types of surface station	8	U.S.S.R.

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23	Telecommunication system (including the GTS part of WWW and the report by the chairman of the Working Group on the GTS) Review and action to be taken on the reports of the meetings of the Working Group on the GTS Study Groups on Data-transmission Techniques and on Coded Digital and Analogue Facsimile CORR.1	9	Secretary-General
24	Education and training in the field of CBS	11	Secretary-General
25	Draft WWW Plan for the period 1980-1983	5	Secretary-General
26	Report by the president of the Commission	3	President of CBS
27	Codes (including the report by the chairman of the Working Group on Codes) Continuation of the TEMP DROP code after the end of the first GARP Global Experiment (FGGE)	8	U.S.A.
28	Telecommunication procedure Modification of the meaning of the transmission sequence number group "nnn" in the starting line of meteorological message format	9	India
29	Review of Technical Regulations of interest to CBS	12	Secretary-General
30	Monitoring of the operation of the WWW	10	Secretary-General

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31	Requirements for observational data The need to increase the exchange of observational data and the content of these data	4.1	European Centre for Medium-range Weather Forecasts (ECMWF)
32	Codes (including the report by the chairman of the Working Group on Codes) Introduction of a common code for exchange of data from different surface stations	8	France
33	Monitoring of the operation of the WWW	10	Secretary-General
34	Codes (including the report by the chairman of the Working Group on Codes) Amendments to the definitions of symbolic figure groups in FM 63-V BATHY and FM 64-V TESAC	8	Secretary-General
35	Report by the president of the Commission Decision of EC-XXX on CBS membership and terms of reference in climatology	3	President of CBS
36	Codes (including the report by the chairman of the Working Group on Codes) Proposed SONDE Code forms FM 98-VII and FM 99-VII	8	Chairman of the working group
37	Telecommunication system Marine telecommunication arrangements for the collection of ships' weather reports and the exchange of BATHY/TESAC reports over the GTS	9	Secretary-General

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39	Global Data-processing System - Codes - Telecommunication System	7, 8 and 9	Secretary-General
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43	GTS - Proposal regarding the Buenos Aires-Washington inter-regional circuit	9	Argentina
44	Codes - Publication of the International Seismic Code in Volume I of the WMO Manual on Codes	8	U.S.A.
45	Co-ordination of data needs for various uses. Exchange of data below 850 mb	4	Canada
46	Codes - Amendments to SYNOP and SHIP codes	8	Canada
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6	Codes (including the report by the chairman of the Working Group on Codes)	8	Chairman, Committee A
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Doc. No.	Title	Agenda item	Submitted by
11	Scientific lectures and discussions	15	Vice-president of the Commisssion
12	Report by the president of the Commission	3	President of the Commission
13	Education and training in the field of CBS	11	Chairmen, Committees A and B
14	Telecommunication system (including the GTS part of WWW and the report by the chairman of the Working Group on the GTS)	9	Chairman, Committee B
15	Draft WWW Plan for the period 1980 to 1983	5	Chairman, Committee B
16	Review of previous resolutions and recommendations of the Commission and relevant Executive Committee resolutions	14	Chairman, Committee B
17	Observing system (including the GOS part of WWW and the report by the chairman of the Working Group on the GOS)	6	Chairman, Committee B
18	Codes (including the report by the chairman of the Working Group on Codes)	8	Chairman, Committee A
19	Observing system (including the GOS part of WWW and the report by the chairman of the Working Group on the GOS)	6	Chairman, Committee B
20	Review of Technical Regulations of interest to CBS	12	Chairman, Committee A
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WORLD METEOROLOGICAL ORGANIZATION

Supplement to WMO Publication No. 521

Abridged Final Report of the Seventh Session of the Commission for Basic Systems

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Decisions of the Executive Committee on the Abridged Final Report of the Seventh 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 Seventh session of the Commission for Basic Systems.

2.4 Report of the seventh session of CBS (Agenda item 2.4)

2.4.1 The Executive Committee noted with appreciation the report of the seventh session of CBS and recorded its decisions on the recommendations developed at the session in Resolution 4 (EC-XXXI).

2.4.2 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 which were established by the seventh session of CBS. This enabled the early distribution of this information to all concerned. These recommendations dealt with urgent matters related to meteorological codes and the Global Telecommunication System. Two recommendations, concerning the implementation of the WWW and proposed amendments to the Technical Regulations, were submitted to Eighth Congress.

2.4.3 The Executive Committee noted that Eighth Congress had taken certain decisions concerning the WWW and related matters, in particular the WWW plan for the period 1980-1983, which would necessitate some adjustments to the text of the Manual on the Global Observing System in order to eliminate any discrepancy between the plan and the Manual. Therefore, the Executive Committee authorized the president of CBS to approve those adjustments prior to the publication of the Manual. It also invited the president of CBS to arrange for WMO Publication No. 49 - Technical Regulations relating to the GOS - to be revised after the publication of the Manual on the GOS, so that both these publications are compatible.

2.4.4 The Executive Committee recalled that, according to a decision taken by EC-XXII, some seismic data were presently being transmitted on the Global Telecommunication System. The Executive Committee noted that an international seismic code would be included in an attachment to Volume I of the Manual on Codes for the information of Members.

2.4.5 The Executive Committee noted that the CBS had developed a common code for reporting surface observations from different types

of surface stations, which would be more suitable for both manual and automated operations. It felt that this code would better meet the data needs of WMO programmes and Members and, therefore, despite certain problems associated with its introduction, it invited the presidents of regional associations to take urgent steps to develop and to adopt the regional coding procedures, taking into account the regional sections in FM 12-VII SYNOP and FM 13-VII SHIP. In this respect, views were expressed that the date of 1 January 1981 proposed by CBS for the introduction of the common code for international use made very little allowance for unexpected difficulties or for the dissemination of information. Therefore, the Executive Committee agreed that the date for the introduction of this code would be 1 January 1982. However, the Committee urged regional associations and Members to spare no efforts to complete the regional and national coding procedures by 1 July 1980, thus allowing a period of eighteen months for Members to prepare their national instructions. The Committee also requested CBS and regional associations to complete the associated telecommunication arrangements for the collection and distribution of the surface synop reports on the Global Telecommunication System by 1 December 1980. The Committee stressed, in particular, the need for the early distribution of the new codes to ships participating in the WMO Voluntary Observing Scheme. Furthermore, the Committee urged Members to carry out operational transmission and processing tests with the new codes as early as possible and to complete them not later than September 1981. Resolution 5 (EC-XXXI) was adopted.

2.4.6 The Executive Committee noted with approval that CBS-VII decided to carry out an integrated system study comprising all elements of the WWW system. In this study the WWW will have to be considered as a fully integrated system and the study should take into consideration new technology, as well as the difficulties that might arise for some Member countries to implement new facilities, services and procedures.

2.4.7 The Executive Committee noted that there were now convincing reasons why WMO should assume increasing responsibility in the development of an improved marine environmental monitoring system. Such a system is essential for providing nations with weather and other marine information for the safe and efficient operation of their marine activities; it is also necessary for research purposes, in particular for the implementation of the World Climate Programme (see also paragraph 3.2.8).

2.4.8 The Executive Committee noted with approval the detailed work programme of CBS for the period 1979-1982, as drawn up at CBS-VII. It also noted that the appropriate financial provisions for the implementation of this work programme during the eighth financial period of WMO were considered by Eighth Congress. The relevant budgetary provisions for 1980 were made under agenda item 11.

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4 (EC-XXXI) - REPORT OF THE SEVENTH SESSION OF THE COMMISSION FOR BASIC SYSTEMS

THE EXECUTIVE COMMITTEE,

HAVING CONSIDERED the abridged final report of the seventh session of the Commission for Basic Systems,

DECIDES:

(1) To note the report;

(2) To note Resolutions 1 to 6 (CBS-VII);

(3) To take action on the recommendations as follows:

Recommendation 1 (CBS-VII) - Publication of the Manual on the Global Observing System

(a) Approves this recommendation with the understanding

that the decisions of Eighth Congress on WWW and related matters be incorporated in the Manual prior to its publication;

(b) Authorizes the president of CBS to approve the adjustments to the Manual referred to in (a) above;

(c) Invites the president of CBS to arrange that WMO Publication No. 49 - Technical Regulations relating to the GOS - be revised after the publication of the Manual on the GOS, so that both these publications are compatible;

(d) Requests the Secretary-General to publish the Manual on the Global Observing System in English, French, Russian and Spanish as soon as possible.

Recommendation 2 (CBS-VII) - Draft layout of Volume II of the Manual on the GDPS

(a) Approves this recommendation;

(b) Invites the WMO regional associations and Members to provide appropriate material for Volume II of the Manual on the GDPS;

(c) Requests the Secretary-General to publish Volume II of the Manual on the GDPS in an appropriate form, as soon as possible, but not later than 15 July 1980;

Recommendation 3 (CBS-VII) - Draft minimum standards for quality control

(a) Approves this recommendation;

(b) Requests the Secretary-General to arrange for the necessary amendments to be included in Volume I of the Manual on the GDPS;

(c) Decides that the above standards be implemented as soon as possible;

Recommendation 4 (CBS-VII) - Amendments to FM 87-VI EXT. SARAD

Recommendation 6 (CBS-VII) - Amendments to codes FM 39-VI ROCOB and FM 40-VI ROCOB SHIP

Recommendation 8 (CBS-VII) - Amendments to aeronautical codes METAR, SPECI, ARMET and TAF

Recommendation 9 (CBS-VII) - Code for reporting upper-level pressure, temperature, humidity and wind from a sonde released by carrier balloon or aircraft (TEMP DROP)

Recommendation 15 (CBS-VII) - Proposed amendments to the Manual on the Global Telecommunication System, Volume I (Global aspects), Part I - Organization of the Global Telecommunication System

Recommendation 16 (CBS-VII) - 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 17 (CBS-VII) - 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

Recommendation 18 (CBS-VII) - Implementation of the World Weather Watch

Recommendation 19 (CBS-VII) - Proposed amendments to the Technical Regulations

(a) Endorses the President's approval of these recommendations in accordance with Regulation 9 (5) of the WMO General Regulations;

(b) Confirms that the amendments in Recommendations 4 and 6 be introduced from 1 July 1980 and those in Recommendation 8 as soon as possible, and that the code form in Recommendation 9 be implemented from 1 December 1979;

(c) Confirms that the above amendments to the Manual on the Global Telecommunication System be implemented as soon as possible, but not later than 1 July 1979;

(d) Requests the Secretary-General:

(i) To include the amendments and the code form in Recommendations 4, 6, 8 and 9 in Volume I of the Manual on Codes;

(ii) To include the amendments in Recommendations 15, 16 and 17 (CBS-VII) in Volume I of the Manual on the Global Telecommunication System;

Recommendation 5 (CBS-VII) - Abbreviated code for the transmission of processed data in the form of grid-point values, FM 49-VII GRAF

(a) Approves this recommendation;

(b) Decides that the code FM 49-VII GRAF and the amendments to the code FM 47-V GRID be introduced for international use, as from 1 July 1980;

(c) Invites the president of CBS in consultation with the president of CAeM to arrange for a study of a code form suitable for computer-to-computer exchange to meet aeronautical requirements;

(d) Requests the Secretary-General to arrange that the necessary amendments be included in the Manual on Codes, Volume I.

Recommendation 7 (CBS-VII) - Amendments to the definitions of symbolic figure groups in FM 63-V BATHY AND FM 64-V TESAC

(a) Approves this recommendation;

(b) Decides that the above amendments be introduced from 1 July 1980, or as soon as possible after that date;

(c) Requests the Secretary-General to arrange for the necessary amendments to be included in Volume I of the Manual on Codes;

Recommendation 10 (CBS-VII) - Amendments to the Manual on Codes, Volume I

(a) Approves this recommendation;

(b) Decides that the above amendments be introduced as soon as possible, but not later than 1 January 1980, after consultation with CAeM;

(c) Requests the Secretary-General to ensure that part B of the annex to this recommendation be taken into account when preparing the revised edition of the Manual;

Recommendation 11 (CBS-VII) - Editorial revision of the structure of the Manual on Codes, Volume I

(a) Approves this recommendation;

(b) Requests the Secretary-General, in consultation with the president of CBS, to arrange for the preparation of the revision of the text of the Manual on Codes, Volume I, 1974 edition;

(c) Invites the president of CBS to arrange for the formal adoption of the revised text;

Recommendation 12 (CBS-VII) - Standardization of Volume II of the Manual on Codes

(a) Approves this recommendation;

(b) 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;

(c) Requests the Secretary-General to ensure that the draft revised text of Chapter VI of the Manual be used as a layout for the revision of Volume II of the Manual on Codes by regional associations;

Recommendation 13 (CBS-VII) - Publication of the international seismic code in Volume I of the WMO Manual on Codes

(a) Approves this recommendation;

(b) Requests the Secretary-General to arrange for the inclusion, for information purposes, of the international seismic code as an attachment to Volume I of the Manual on Codes and for the elimination of the seismic code from the appendix to Volume II of the Manual on Codes;

Recommendation 14 (CBS-VII) - Common code for reporting surface observations from different types of surface station

The decision on this recommendation is contained in Resolution 5 (EC-XXXI).

Recommendation 20 (CBS-VII) - Conversion of products in alphanumeric (GRID/GRAF code) form into pictorial form

Approves this recommendation.

Recommendation 21 (CBS-VII) - Review of the resolutions of the Executive Committee, based on previous recommendations of the Commission for Basic Systems

(Action on this recommendation will be 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.

5 (EC-XXXI) - COMMON CODE FOR REPORTING SURFACE OBSERVATIONS FROM DIFFERENT TYPES OF SURFACE STATION

THE EXECUTIVE COMMITTEE,

NOTING Recommendation 14 (CBS-VII) - Common code for reporting surface observations from different types of surface station,

CONSIDERING that sufficient time should be given to Members to make the necessary arrangements for the introduction of the new common code,

DECIDES:

(1) That codes FM 12-VII SYNOP and FM 13-VII SHIP for reporting surface observations from different types of surface station be introduced for international use as from 1 January 1982.

(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 1982;

URGES Members to spare no efforts to complete all the necessary arrangements for the introduction of the new codes, including operational transmission and processing tests, well in advance with a view to ensuring the world-wide introduction of codes FM 12-VII SYNOP and FM 13-VII SHIP as from 1 January 1982;

INVITES the presidents of regional associations, in consultation with the Secretary-General, to take urgent steps before 1 July 1980 to develop and 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.