

WORLD METEOROLOGICAL ORGANIZATION

INSTRUMENTS AND OBSERVING METHODS

REPORT No. 11

UPPER-AIR DATA COMPATIBILITY

WMO CATALOGUE  
OF  
RADIOSONDES IN USE BY MEMBERS

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Secretariat of the World Meteorological Organization - Geneva, Switzerland

March 1982



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## 1. INTRODUCTION

The seventh session of the Commission for Instruments and Methods of Observations realized that, through the efforts of its various working groups on upper-air data, powerful tools had been developed for the routine adjustment of radiosonde data to improve upper-air data compatibility. In order to apply these tools, it had charged its Working Group on Upper-air Data Compatibility with making the necessary information available to Members of WMO so that the meteorological analysis centres could apply such adjustments effectively (Resolution 6 (CIMO-VII)).

The necessary information falls into three categories, namely:

- (a) Annual radiosonde data compatibility reports based on the methods reported initially in WMO Technical Note No. 163 (WMO-No.512);
- (b) the provision of up-to-date information on the use of radiosondes by Members, so that the resulting meteorological data could be adjusted based on known characteristics of the sondes;
- (c) the provision of more general information on the compatibility of upper-air data from various sources.

The reports (a) have been prepared annually by the UK by the UK Meteorological Office; the Secretariat has circulated a summary and made the full report available on request. The general information (c) was incorporated in the report of the session of the CIMO Working Group on Upper-air Data Compatibility in Geneva in January 1981. The provision of information (b) is, of course, the subject of this catalogue.

Since the adjustment of upper-air data is necessary to compensate for the effects of instrument errors, it had been thought that a special code should be developed to enable the pertinent information to be transmitted regularly over the Global Telecommunications System (GTS). However, since this information is not operational meteorological data, the seventh session (Washington, 1978) of the Commission for Basic Systems felt that it would not be necessary to exchange such data regularly on the GTS and that the Presidents of CIMO and CBS should consult on other appropriate means of exchange. Therefore, it was suggested that a catalogue be published which provides the required information (the type and manufacturer of sondes used at each station, whether solar corrections are applied to the data, release times and ascent rates) and that a code be developed for use with the METNO telegraphic message system to provide a rapid update of the catalogue information, as required.

It was recognized that such an approach would be effective, so a questionnaire was distributed to Members in order to gather information. Some 83 Members replied, and their responses formed the basis for the first edition of this catalogue (see Instruments and Observing Methods Report No. 5 (1981)). This second edition of the

catalogue, which replaces the first edition, has incorporated further information including corrections of erroneous material and the removal of ambiguity from the METNO telegraphic message, part G.

The eighth session of CIMO (Mexico City, October 1981) endorsed the need for this catalogue to be updated regularly.

## 2. USE OF THE CATALOGUE

The information contained in this catalogue can be used, along with the reports listed in the references, to calculate and apply temperature and geopotential height adjustments to radiosonde observations. Thus, it is evident that the utility of the catalogue depends on a continual update of information on the use of radiosonde equipment. Therefore, Members are urged to report promptly to the WMO Secretariat all changes in the use of their radiosonde equipment.

Members are free to develop their own uses for this catalogue, as they see fit. However, certain suggested applications of the information in this catalogue are:

- (a) Radiosonde instrument types and release times could be plotted on a map so as to evaluate differences or discontinuities in adjacent mid- and lower tropospheric height observations which appear on an upper-air synoptic chart;
- (b) Systematic differences in mid- and lower tropospheric height observations could then be correlated with instrument types and release times, and correcting adjustments could be determined to aid in analysis of the data;
- (c) At stratospheric levels (e.g. 100 hPa, etc.), information on the application (or not) of solar corrections and on ascent rates can be used in a similar fashion, and complementary to (a) and (b) above, to correct and smooth out the analysis at standard pressure levels.

Further information on the application of information on radiosonde instruments can be found in References (2) and (3).

The catalogue, which appears in Table 4, contains coded information on the instrument type and manufacturer, and on the typical ascent rates and release times for the balloon-borne instrument package. The keys to the codes used are provided in Tables 1, 2 and 3. The catalogue also contains plain language information on whether the sonde has been modified, where it is used, whether solar corrections are applied and for each Member, an estimate of the total number of radiosonde stations being operated. The information in the catalogue is valid for 31 January 1982, as far as is known. Those Members for which the information is incorrect, incomplete or missing should ensure that the Secretariat has the correct information as soon as possible, so that the catalogue can be updated using the METNC telegraphic message, part G.

### 3. UPDATING THE CATALOGUE

Should a Member wish to update their entry in the catalogue for any reason, they should cable the information to the WMO Secretariat, attention: Instrument and Methods of Observation programme, either in plain language, or, if appropriate, by using the METNO telegraphic message, part G, given in Table 5. The basic purpose of the METNO telegraphic message, part G, is to allow the Secretariat to rapidly disseminate such information to all Members; the information will be included later in the regular supplements to the catalogue; these will be issued approximately every other year by the WMO Secretariat.

### 4. THE CATALOGUE

The catalogue is presented in Table 4. It lists Members known to operate observation programmes and lists the appropriate information, which has been provided to the Secretariat.

### 5. REFERENCES

- (1) CIMO Meeting Report No. 81-2, Working Group on Upper-Air Data Compatibility, Geneva, 26-30 January 1981.
  - (2) The Compatibility of Upper-air Data, WMO Technical Note No. 163 (WMO-No. 512).
  - (3) Upper-air Sounding Studies, WMO Technical Note No. 140 (WMO-No. 394).
  - (4) Performance Requirements of Aerological Instruments. An assessment based on atmospheric variability, WMO Technical Note No. 112 (WMO-No. 267).
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TABLE 1

## SYMBOLS USED TO REPRESENT RADIOSONDE TYPES IN USE

INSTRUMENT MANUFACTURER			INSTRUMENT TYPES AND (FREQUENCY in MHz)									
SYMECL	Manufacturer Name	Country of Origin										
B	Elin	Austria		- 2404 (403)								
C	Graw (also Sprenger for types 1, 1a)	Federal Republic of Germany	1	M6C (403)	1a	M6C (28)	2	H6C (153)				
D	India Meteorological Service	India	1	A-sonde MK.III (401) or (1680)								
E	Jinyang (VIZ license)	Korea, Republic of	1	(1680)								
F	Meteolabor	Switzerland	1	Basora (403)								
G	Meisei or Oki	Japan	1	RS-2-80 (1680)								
H	Mesural	France	1	FMO 1950A (403)	2	FMO 1945A (403)	3	MH 73A 403				
I	Phillips	Australia	1	Astor RS-4 (403)								
J	Meteorite	U.S.S.R.	1	RKZ-2 (1782)	2	RKZ-5 (1782)	3	A 22IV (216)	3a	A-22IV (400)		
K	Sangamo	Canada	1	(1680)								
L	Vaisala	Finland	1	RS-18 (25)	2	RS21-12C (403)	3	RS21-13C 1680	4	WS-18 (25)	5	RS-8C (403)
M	Vinohradý	Used in Czechoslovakia	1	ZAP MARS 4WF Berlin (1680)								
N	VIZ	United States	1	1392 (1680)	2	1206 (403)	3	1495 (403)	3a	1475 (403)	3b	1395 (403)
			3c	1394 (403)	4	AMT-4B (1680)	5	LORAN-C (403)				
			5a	LORAN-C (25)	6	Omega (403)	7	JCO8 solid state (1680)	8	1397 (72)	9	Microsonde (403)
O	U. K. Meteorological Office	United Kingdom	1	U.K. RS (28)								

TABLE 2

SYMBOLS USED TO REPRESENT RADIOSONDE RELEASE TIMES

SYMBOL	Typical Release Time	
	00 GMT	12 GMT
-2	2100 to 2159	0900 to 0959
-1	2200 to 2259	1000 to 1059
0	2300 to 0000	1100 to 1200
+1	0001 to 0100	1201 to 1300
*	No release	No release
[SYMBOL]	During local summer, release one hour earlier.	

TABLE 3

SYMBOLS USED TO REPRESENT RADIOSONDE ASCENT RATES

ASCENT RATE RANGE	TYPICAL ELAPSED TIME (minutes) from release to reach indicated level (hPa).				
	300	100	50	30	10
1	<19	<40	<50	<60	<70
2	19-29	40-49	50-59	60-69	70-79
3	30-40	50-60	60-70	70-80	80-90
4	>40	>60	>70	>80	>90
*	No data for this level.				

WMO CATALOGUE OF RADIOSONDES IN USE BY MEMBERS (31 January 1962)

TABLE 4

Member Country (Total of stations operated by Members)	Radiosondes in Use				Stations Using the Sonde Type	Solar correction applied to data?	Average release time GMT		Typical Ascent Rates expressed in terms of average elapsed time to reach levels indicated (hpa)				
	Number of Types	Maker	Type	Design Modi- fied			00	12	300	100	50	30	10
AFGHANISTAN (3)	1	J	2	NO	ALL	YES	0	0	2	2	2	2	3
ALGERIA (4)	4	L	2	NO	60390	NO	0	0	2	2	2	2	2
		J	1	NO	60390	NO	0	0	2	2	2	2	2
		L	1	NO	60751,660	NO	0	0	2	2	2	2	2
		J	2	NO	60550	NO	0	0	2	2	2	2	2
ANGOLA (1)													
ARGENTINA (6)	2	L	1	NO	87047,623	YES	0	0	2	2	3	3	*
		L	2	NO	87155,344,420,576	YES	0	0	2	2	3	3	*
AUSTRALIA (32)	3	I	1	YES	ALL except 94672,975	NO	0	0	3	3	3	3	4
		L	2	NO	94672	NO	0	0	3	3	3	3	4
		N	3	NO	94975	NO	0	0	3	3	3	3	4
AUSTRIA (1)	2	N	1	NO	11035	NO	0	0	2	2	3	3	3
		B	1	NO	11035	NO	0	0	2	2	3	3	3
BAHAMAS (1)	1	N	7	NO	ALL	NO	*	0	3	2	3	3	4
BANGLADESH (3)													
BARBADOS (1)	1	N	7	YES	ALL	NO	0	0	3	3	4	4	4
BELGIUM (2)	3	C	2	NO	06447	NO	0	0	2	2	2	2	2
		N	2	NO	06447	NO	0	0	2	2	2	2	2
		L	2	NO	06476	YES	0	0	2	2	3	2	3
BELIZE (1)	1	N	1	NO	ALL	NO	0	0	3	4	4	4	4
BERMUDA (1)													
BOLIVIA (1)	1	N	1	NO	ALL	NO	*	0	2	2	2	2	2
BRAZIL (10)	3	L	2	NO	ALL except 82599,83650	NO	0	0	3	3	3	3	3
		L	1	NO	83650	NO	0	0	3	3	3	3	3
		L	3	NO	82599	NO	0	0	3	3	3	3	3

TABLE 4 (Continued)

Member Country (Total of stations operated by Members)	Radiosondes in Use				Stations Using the Sonde Type	Solar correction applied to data?	Average release time GMT		Typical Ascent Rates expressed in terms of average elapsed time to reach levels indicated (hpa)					
	Number of Types	Maker	Type	Design Modi- fied			00	12	300	100	50	30	10	
BRITISH CARIBBEAN (1) TERRITORIES	1	N	1	NO	ALL	NO	0	0	3	4	4	4	4	
BULGARIA (2)	3	J	1,3	NO	15730	YES	0	0	2	2	2	2	2	
		J	2	NO	15616	YES	0	0	2	2	2	2	2	
BURMA (2)	1	L	1	NO	ALL	NO	0	*	2	3	3	2	*	
CANADA (33)	1	K	1	NO	ALL	NO	0	0	2	3	3	3	4	
CAPE VERDE (1)	1	N	1	NO	ALL	NO	*	0	3	3	3	3	3	
CENTRAL AFRICAN (1) REPUBLIC	1	H	-	NO	ALL	NO	*	0	2	3	3	4	*	
CHAD (1)														
CHILE (6)	1	N	7	NO	ALL	NO	*	0	*	*	*	*	*	
CHINA (90)														
COLOMBIA (4)	2	N	1	YES	ALL except 80241,337	YES	0	0	3	3	3	3	3	
		L	1	NO	80241,337	NO	0	0	3	3	3	3	3	
COSTA RICA (1)	1	N	1	NO	ALL	NO	*	0	2	3	3	2	3	
CUBA (1)														
CZECHOSLOVAKIA (2)	1	M	1	NO	ALL	YES	0	0	2	2	2	2	2	
DEMOCRATIC PEOPLES (2) REPUBLIC OF KOREA														
DEMOCRATIC YEMEN (1)														
DENMARK (8)	2	L	1	NO	04220,320	YES	0	0	2	2	2	2	3	
		L	2	NO	04270,339,360,06011 and 06181	YES	0	0	2	2	2	2	3	

TABLE 4 (Continued)

Member Country (Total of stations operated by Members)	Radiosondes in Use				Stations Using the Sonde Type	Solar correction applied to data?	Average release time GMT		Typical Ascent Rates expressed in terms of average elapsed time to reach levels indicated (hpa)					
	Number of Types	Maker	Type	Design Modi- fied			00	12	300	100	50	30	10	
DOMINICAN REPUBLIC (1)														
ECUADOR (2)														
EGYPT (3)	1	N	3a	YES	ALL	NO	0	0	2	2	2	2	3	
ETHIOPIA (2)	1	L	1	NO	ALL	YES	*	0	2	2	2	2	*	
FIJI (1)														
FINLAND (3)	1	L	5	NO	ALL	YES	0	0	2	2	3	3	4	
FRANCE (11)	1	H	1	NO	ALL	NO	0	0	2	2	2	2	3	
FRENCH POLYNESIA (7)	1	H	1	NO	ALL	NO	0	*	2	2	2	2	3	
GERMAN DEMOCRATIC REPUBLIC (3)	2	J	1	NO	09548	YES	0	0	2	2	2	2	2	
		J	2	NO	09184,393	YES	0	0	2	2	2	2	2	
GERMANY, FEDERAL REPUBLIC (7)	2	C	1	NO	10035,338,460,739,868	YES	0	0	3	3	3	3	3	
		N	1	NO	10384	NO	0	0	3	3	3	3	3	
		N	1	NO	10962 (irregular)	NO	-	-	3	3	3	3	3	
GHANA (1)	1	H	1	NO	ALL	NO	*	0	3	4	4	4	*	
GREECE (3)	2	H	1	NO	16672	NO	0	0	2	3	3	3	3	
		L	2	NO	16716,754	NO	0	0	2	3	3	3	3	
GUATEMALA (1)														
HONDURAS (2)														
HONG KONG (1)	1	L	2	NO	45004	YES	0	0	2	2	2	1	2	



TABLE 4 (Continued)

Member Country (Total of stations operated by Members)	Radiosondes in Use				Stations Using the Sonde Type	Solar correction applied to data?	Average release time GMT		Typical Ascent Rates expressed in terms of average elapsed time to reach levels indicated (hpa)					
	Number of Types	Maker	Type	Design Modi- fied			00	12	300	100	50	30	10	
LIBYAN ARAB JAMAHIRIYA (5)	2	L	2	NO	62010,053	YES	0	0	2	2	2	2	3	
		L	1	NO	62271,124,103	YES	0	0	2	2	2	2	3	
MADAGASCAR (3)	2	H	1	NO	67083,197	NO	-1	-1	2	2	2	2	3	
		H	2	NC	67009	NO	-1	-1	2	2	2	2	3	
MALAWI (1)	1	L	1	NO	ALL	YES	0	0	2	2	2	2	*	
MALAYSIA (8)	3	L	1	NO	48601,94671	YES	0	0	2	3	3	2	*	
		L	2	NO	58615,96481	YES	0	0	3	3	3	3	*	
		I	1	NO	48647,657,96413,441	NO	0	0	2	3	3	3	*	
MALI (3)														
MAURITANIA (1)	1	H	1	NO	ALL	NO	*	-1	2	2	2	1	*	
MAURITIUS (1)	1	L	1	NO	ALL	NO	0	*	2	2	2	2	*	
MEXICO (11)	1	N	7	YES	ALL	NO	0	0	2	2	2	2	2	
MONGOLIA (8)														
MOROCCO (2)	2	H	1	NO	(No details)	NO	0	0	2	2	2	1	*	
		L	1	NO		NO	0	0	2	2	2	2	*	
MOZAMBIQUE (2)	1	L	3	NO	ALL	YES	0	0	3	3	3	3	*	
NEPAL (1)														
NETHERLANDS (1)	1	L	2	NO	ALL	YES	0	0	2	3	3	3	*	
NETHERLANDS ANTILLES (2)	1	N	1	NO	ALL	NO	0	0	3	3	4	4	4	
NEW CALEDONIA (1)	1	H	1	NO	ALL	NO	0	*	2	2	2	2	3	



TABLE 4 (Continued)

Member Country (Total of stations operated by Members)	Radiosondes in Use				Stations Using the Sonde Type	Solar correction applied to data?	Average release time GMT		Typical Ascent Rates expressed in terms of average elapsed time to reach levels indicated (hpa)					
	Number of Types	Maker	Type	Design Modi- fied			00	12	300	100	50	30	10	
NEW ZEALAND (6)	1	N	3	NO	ALL	NO	0 [-1]	0 [-1]	2	2	2	2	3	
NIGER (1)	1	H	1	YES	ALL	NO	*	0	2	2	2	2	3	
NIGERIA (3)														
NORWAY (7)	3	L	1	NO	01001,028	YES	0	0	2	2	3	2	3	
		N	5	NO	01152,241,415	NO	0	0	2	2	3	2	3	
		N	6	NO	01384	NO	0	0	2	2	3	2	3	
		N	5	NO	Ocean Weather Station "M" 66N 02E	NO	0	0	2	3	3	3	4	
OMAN (1)	1	N	6	NO	ALL	NO	0	0	2	2	3	2	3	
PAKISTAN (6)	2	N	2	NO	(No details)	NO	0	0	2	2	2	2	*	
		I	1	NO		NO	0	0	2	2	2	2	*	
PANAMA (1)	1	N	7	NO	ALL	NO	0	0	3	3	3	3	4	
PERU (2)														
PHILIPPINES (4)	1	L	1	NO	98223,646,836	YES	0	*	3	3	3	3	*	
POLAND (4)	3	J	1	NO	12120,12330	YES	0	0	2	2	2	2	3	
		J	2	NO	12374	YES	0	0	2	2	2	2	3	
		J	3a	NO	12425	YES	0	0	2	2	2	2	3	
PORTUGAL (3)	2	L	2	NO	08579	YES	0	0	3	3	3	3	3	
		N	1	NO	08509,521	NO	0	0	3	3	3	3	3	
REPUBLIC OF KOREA (3)	1	E	1	NO	ALL	NO	0	0	2	2	2	2	2	
ROMANIA (3)	1	J	3	NO	ALL	NO	0	0	3	3	3	3	3	

TAELE 4 (Continued)

Member Country (Total of stations operated by Members)	Radiosondes in Use				Stations Using the Sonde Type	Solar correction applied to data?	Average release time GMT		Typical Ascent Rates expressed in terms of average elapsed time to reach levels indicated (hpa)					
	Number of Types	Maker	Type	Design Modi- fied			00	12	300	100	50	30	10	
SAUDI ARABIA (10)	3	L	2	NO	40375,416,438,477,569	NO	0	0	*	*	*	3	*	
		L	1	NO	40400,455,572	NO	0	0	*	*	*	3	*	
		L	6	NO	40373,430	NO	0	0	*	*	*	3	*	
SENEGAL (1)														
SEYCHELLES (1)	1	L	2	NO	ALL	YES	*	0	3	3	3	3	4	
SINGAPORE (1)														
SOMALIA (2)														
SPAIN (4)	2	N	1	NO	08001,221	NO	0	0	2	2	2	2	3	
		L	2	NO	08302,60020	NO	0	0	2	2	2	2	3	
SRI LANKA (1)														
SUDAN (5)														
SWEDEN (5)	1	L	1	NO	ALL	YES	0	0	2	2	2	2	2	
SWITZERLAND (1)	1	F	1	NO	ALL	YES	0	0	3	3	3	3	4	
SYRIAN ARAB REPUBLIC (2)	1	L	1	NO	ALL	YES	-1	-1	2	2	2	2	2	
THAILAND (4)	3	N	1	NO	) ALL except 48455	NO	0	0	3	3	3	3	*	
		I	1	NO	)	NO	0	0	3	3	3	3	3	
		L	2	NO	48455	YES	0	0	3	3	3	3	3	
TRINIDAD AND TOBAGO (1)	1	N	7	NO	ALL	NO	0	0	3	4	4	4	4	
TUNISIA (2)	2	L	1	NO	60715,760	YES	0	0	2	2	3	*	*	
		L	2	NO	60715 (some)	YES	0	0	2	2	3	*	*	

TABLE (Continued)

Member Country (Total of stations operated by Members)	Radiosondes in Use				Stations Using the Sonde Type	Solar correction applied to data?	Average release time GMT		Typical Ascent Rates expressed in terms of average elapsed time to reach levels indicated (hpa)							
	Number of Types	Maker	Type	Design Modi- fied						00	12	300	100	50	30	10
TURKEY (6)	2	N	1	NO	(Both used at all)	NO	0	0	2	2	3	3	4			
		L	3	NO		YES	0	0	2	2	3	3	4			
UGANDA (1)																
U.S.S.R. (158)																
UNITED KINGDOM (18)	4	O	1	NO	ALL except C8495,619C1 and OWS "L" C8495 61901 Ocean Weather Station "L" 57N 20W	YES	0	0	3	2	2	3	3			
		C	1a	NO		YES	0	0	3	2	2	3	3			
		L	2	NO		YES	*	0	3	2	2	3	3			
		N	5	YES		NO	0	0	3	2	2	3	3			
UNITED REPUBLIC OF CAMERCON (1)																
UNITED REPUBLIC OF TANZANIA (1)	1	L	1	NO	ALL	YES	0	0	2	2	3	2	*			
UNITED STATES (102)	2	N	7	YES	ALL except 72402	NO	0	0	3	3	3	3	4			
		N	5	YES		NO	0	0	3	3	3	3	4			
UPPER VOLTA (1)	1	H	1	NO	ALL	NO	*	0	*	*	*	*				
VENEZUELA (3)																
VIETNAM (3)	1	J	3	NO	ALL	YES	0	0	2	2	2	2	2			
YUGOSLAVIA (2)	1	N	4	NO	ALL	NO	0	0	2	2	2	2	2			
ZAMBIA (1)	1	L	2	NO	ALL	NO	*	0	2	3	3	3	*			
ZIMBABWE (2)	1	L	1	NO	67774	YES	+5	*	2	2	*	*	*			
		L	1	NO	67964	YES	-1	*	2	2	*	*	*			

TABLE 5

METNO TELEGRAPHIC MESSAGE, PART G  
Coding Instructions

Changes in radiosonde instruments and observation procedures

Element of Message	Information Contained	Significant Change Criteria
Identifier	G Iiiii Station Name	(Not applicable)
(1)	Instrument Type as characterized by Table 1	Any change in type (see Table 1)
(2)	Release Times as coded in Table 2 (average for past 2 weeks to month)	Any change in the hour (see Table 2)
(3)	Balloon ascent rate expressed in terms of the code in Table 3.	Any significant change in code figures for ascent
(4)	Corrections for solar radiation made? (Yes or NO)	Any change. (Yes to NO or No to Yes)

Examples of message:

G 72201 KEY WEST/INT (1) L5 (2) 0,0 (3) 2,2,2,2,2 (4) NO  
G 72201 KEY WEST/INT (4) YES

