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	-	$M_iM_iM_jM_j$	$YYGGi_v$	$\begin{cases} IIiii & * \\ 99L_aL_aL_a\ Q_cL_oL_oL_o & ** \end{cases}$		
SECTION 1	-	i_Ri_xhVV	Nddff	$1s_nTTT$	$2s_nT_dT_dT_d$	$3P_oP_oP_oP_o$
		$4PPPP$	$5appp$	$6RRRt_R$	$7wwW_1W_2$	$8N_hC_LC_MC_H$ $9hh//$
SECTION 2	-	$222D_sv_s$	$(0s_nT_wT_wT_w)$	$(1P_{wa}P_{wa}H_{wa}H_{wa})$		$(2P_wP_wH_wH_w)$
		$((3d_{w1}d_{w1}d_{w2}d_{w2})$	$(4P_{w1}P_{w1}H_{w1}H_{w1})$	$(5P_{w2}P_{w2}H_{w2}H_{w2}))$		
		$(6I_sE_sE_sR_s)$	$(ICE + \begin{cases} plain\ language \\ c_iS_ib_iD_iz_i \end{cases})$			
SECTION 3	-	333	(0.....)	$(1s_nT_xT_xT_x)$	$(2s_nT_nT_nT_n)$	
			(3Ejjj)	(4Esss)	$(5j_ij_sj_sj_s)$	
			$(6RRRt_r)$	(7....)	$(8N_sCh_sh_s)$	
			$(9S_PS_Ps_ps_p)$	(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 $M_iM_iM_jM_j$ $YYGGi_v$ shall be included only as the first line of the text in the following cases:

(a) Bulletin of SYNOP reports from land stations;

(b) Bulletin of SHIP reports from sea stations;

and provided all the reports of a given bulletin consist of observation data which were taken at the same time and which use the same unit for reporting wind speed.

12.1.3

Use of sections

12.1.3.1

Observation reports from a land station shall always include at least sections 0 and 1, and the position of the station shall be indicated by means of the group IIiii.

12.1.3.2

Observation reports from a sea station shall always include at least sections 0, 1 and 2, and 6 or 7 as the case may be; the position of the station shall be indicated by means of the groups $99L_aL_aL_a$ $Q_cL_oL_oL_oL_o$.

12.1.3.3

Whenever the observation reports from a coastal land station contain maritime data, they shall always include at least sections 0, 1 and 2 and the position of the station shall be indicated by means of the group IIiii.

12.2

Section 1

12.2.1

Groups $i_R i_x$hVV Nddff

12.2.1.1

These groups shall always be included in the report.

12.2.1.2

Visibility VV

12.2.1.2.1

When the horizontal visibility is not the same in different directions, the shortest distance shall be given for VV.

12.2.2

Groups 1s_nTTT, 2$s_n T_d T_d T_{d'}$ 4PPPP, 5appp

12.2.2.1

These groups shall always be included whenever the corresponding data are available.

12.2.2.2

Group 2$s_n T_d T_d T_d$

12.2.2.2.1

The group 29UUU shall replace the group 2$s_n T_d T_d T_d$ 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$_1$W$_2$

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 $222D_sv_s$

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 $Os_nT_wT_wT_w$

This group shall always be included in reports from ocean weather stations, when data are available.

12.3.3

Groups $(1P_{wa}P_{wa}H_{wa}H_{wa})$ $(2P_wP_wH_wH_w)$

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 $(2P_wP_wH_wH_w)$ 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_wP_w and H_wH_w, shall be reported as 00.

(b) When the estimation of the period is impossible owing to confused sea, P_wP_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_wP_w) shall be reported as //. When the same situation occurs for the height of waves, $H_{wa}H_{wa}$ (or H_wH_w) shall be reported as //.

12.3.3.5

If there is a swell and no wind waves, the group $(2P_wP_wH_wH_w)$ shall not be included.

12.3.4

Groups ($(3d_{w1}d_{w1}d_{w2}d_{w2})$ $(4P_{w1}P_{w1}H_{w1}H_{w1})$ $(5P_{w2}P_{w2}H_{w2}H_{w2})$)

12.3.4.1

When swell can be distinguished from wind waves, the swell shall be reported by the groups

($(3d_{w1}d_{w1}//)$ $(4P_{w1}P_{w1}H_{w1}H_{w1})$)

12.3.4.2

The group with indicator figure 5 shall be used when a second system of swell can be distinguished. The direction shall be encoded in the position indicated by $d_{w2}d_{w2}$ in the group with indicator figure 3.

12.3.4.3

Ocean weather stations shall always include wind wave and swell data in their reports when data are available.

12.3.5

Group $(6I_sE_sE_sR_s)$

When the ice accretion on ships is reported in plain language, it shall be preceded by the word ICING.

12.3.6

Groups (ICE + $\begin{bmatrix} \text{plain language} \\ \text{or} \\ c_iS_ib_iD_iz_i \end{bmatrix}$)

12.3.6.1

The reporting of sea ice and ice of land origin in FM 13-VII shall not supersede the reporting of sea ice and icebergs in accordance with the International Convention for the Safety of Life at Sea.

12.3.6.2

The group $c_i S_i b_i D_i z_i$ shall be reported whenever sea ice and/or ice of land origin are observed from the ship's position at the time of observation, unless the ship is required to report ice conditions by means of a special sea-ice code.

12.3.6.3

When an ice edge is crossed or sighted between observation hours, it shall be reported as a plain-language addition in the form "ice edge lat. long." (with position in degrees and minutes).

12.3.6.4

If the ship is in the open sea reporting an ice edge, the concentration c_i and stage of development S_i shall be reported only if the ship is close to the ice (i.e. within 0.5 nautical mile).

12.3.6.5

The situation in which the ship is in open lead more than 1.0 nautical mile wide shall be coded as $c_i = 1$ and $D_i = 0$. The situation in which the ship is in fast ice with ice boundary beyond limit of visibility shall be coded as $c_i = 1$ and $D_i = 9$.

12.3.6.6

If no sea ice is visible and the code group is used to report ice of land origin only, the group shall be coded as $0/b_i/0$; e.g. 0/2/0 would mean 6 - 10 icebergs in sight, but no sea ice.

12.3.6.7

In coding concentration or arrangement of sea ice (code c_i), that condition shall be reported which is of the most navigational significance.

12.3.6.8

The bearing of the principal ice edge reported shall be to the closest part of that edge.

N O T E:

The requirements for sea-ice reporting are as follows:

Symbolic code letter c_i

(a) The purpose of the first code figure (0) is to establish in relation to code z_i (code figure 0) and code b_i whether the floating ice that is visible is only ice of land origin.

(b) The possible variations in sea-ice concentration and arrangement within an area of observation are almost infinite. However, the field of reasonably accurate observation from a ship's bridge is limited. For this reason, and also because minor variations are of temporary significance, the choice of concentrations and arrangements has been restricted for reporting purposes to those representing significantly different conditions from a navigational point of view. The code figures 2 - 9 have been divided into two sections depending on:

(i) Whether sea-ice concentration within the area of observation is more or less uniform (code figures 2 - 5); or

(ii) Whether there are marked contrasts in concentration or arrangement (code figures 6 - 9).

Symbolic code letter S_i

(a) This table represents a series of increasing navigational difficulties for any given concentration - i.e., if the concentration is, for example, 8/10ths, then new ice would hardly have any effect on navigation while predominantly old ice would provide difficult conditions requiring reductions in speed and frequent course alterations;

(b) The correlation between the stage of development of sea ice and its thickness is explained in the Guide to Meteorological Instrument and Observing Practices.

Symbolic code letter b_i

(a) This code provides a scale of increasing navigational hazard;

(b) Growlers and bergy bits, being much smaller and lower in the water than icebergs, are more difficult to see either by eye or radar. This is especially so if there is a heavy sea running. For this reason, code figures 4 and 5 represent more hazardous conditions than code figures 1 to 3.

Symbolic code letter D_i

There is no provision in this code for the reporting of distance from the ice edge. It will be assumed by those receiving the report that the bearing has been given to the closest part of the ice edge. From the reported code figures for concentration and stage of development, it will be clear whether the ship is in ice or within 0.5 nautical mile of the ice edge. If the ship is in open water and more than 0.5 nautical mile from the ice edge, the ice edge will be assumed to be aligned at right-angles to the bearing which is reported.

Symbolic code letter z_i

(a) The purpose of this element in the code is to establish:

(i) Whether the ship is in pack ice or is viewing floating ice (i.e. sea ice and/or ice of land origin) from the open sea; and

(ii) A qualitative estimate, dependent on the sea-ice navigation capabilities of the reporting ship, of the penetrability of the sea ice and of the recent trend in conditions;

(b) The reporting of the conditions represented by code figures 1 - 9 in Code table 5239 can be used to help in the interpretation of reports from the two code tables (concentration c_i and stage of development S_i).

12.4

Section 3

This section shall be used for regional exchange.

12.5

Section 4

12.5.1

The inclusion of this section shall be fixed nationally.

12.5.2

The top of persistent condensation trails and cloud masses which have obviously developed from condensation trails shall be reported, using the appropriate C_t code figure.

12.5.3

Regulations 12.2.2.2.1 to 12.2.2.2.6 inclusive shall apply.

12.5.4

Spaces occupied by mountains emerging from the cloud layers shall be counted as occupied by cloud.

12.6

Section 5

12.6.1

The use of this section, the symbolic form of groups and the specifications of symbolic letters shall be determined by national decision.

12.7

Section 6

12.7.1

This section shall be used to report the ship's call sign from a sea station.

12.8

Section 7

12.8.1

This section shall be used to report the identifier of an environmental data buoy.

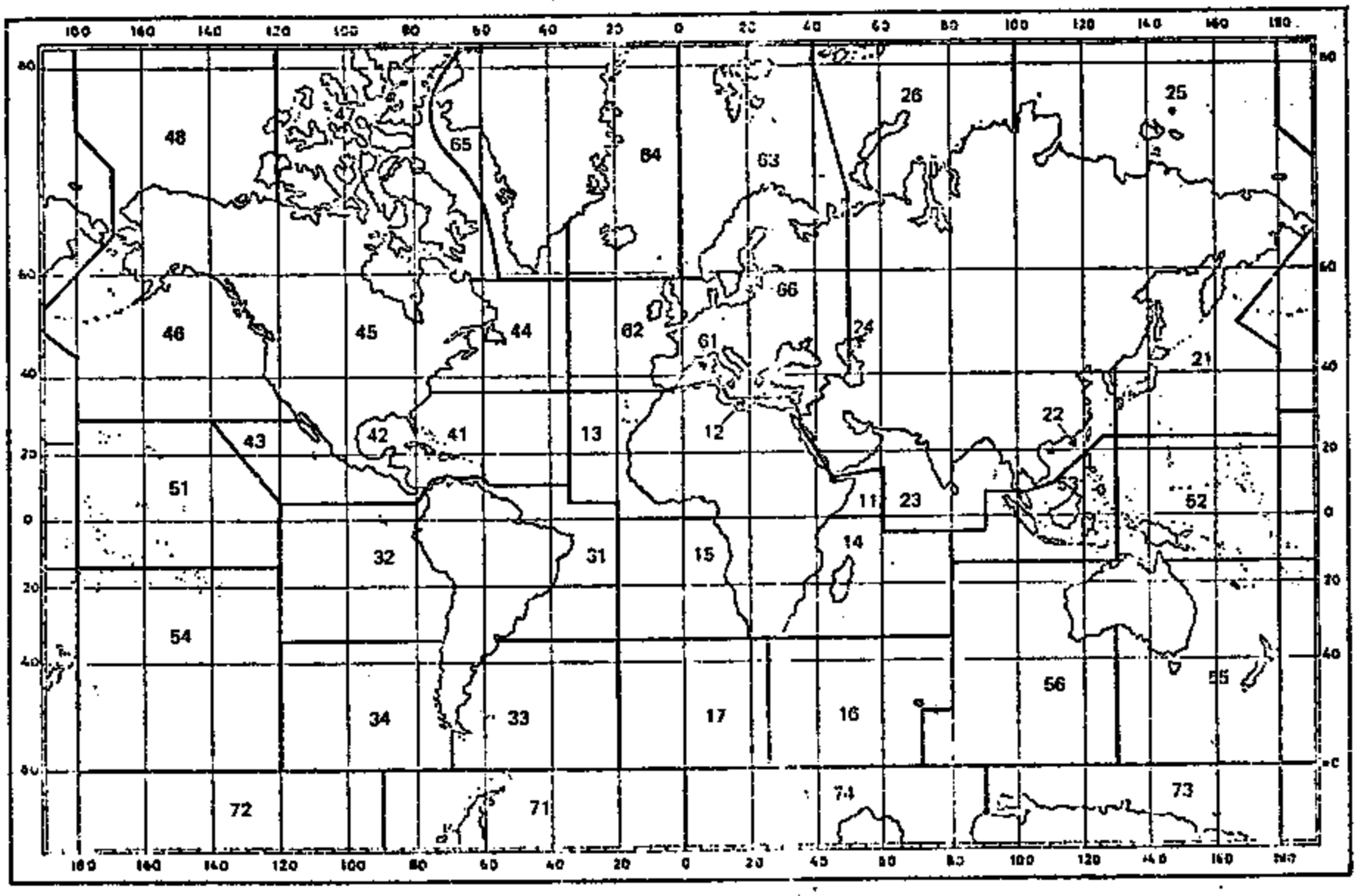
SPECIFICATIONS OF NEW SYMBOLIC LETTERS

A_1 WMO 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.
$n_bn_bn_b$	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 7w$_w$W$_1$W$_2$ is:
1	manned	included
2	manned	omitted (no significant phenomenon to report)
3	manned	omitted (not observed, data not available)
4	automatic	included
5	automatic	omitted (no significant phenomenon to report)
6	automatic	omitted (not observed, data not available)

0264

a_3 - Indicator for standard isobaric level of which the geopotential is reported

Code figure	
0	1000 mb
1	Not used
2	
3	
4	
5	500 mb
6	Not used
7	700 mb
8	850 mb
9	Not used

3590

RRR - Amount of precipitation which has fallen during the period preceding the time of observation as indicated by t_R

Code figure	mm	Code figure	mm
000	0	990	Trace
001	1	991	0.1
002	2	992	0.2
.	.	993	0.3
.	.	994	0.4
.	.	995	0.5
.	.	996	0.6
.	.	997	0.7
988	988	998	0.8
989	989 or more	999	0.9

Amendments to Volume I of Manual on Codes

1. Remove FM 11-V, FM 14-V, FM 21-V, FM 22-V, FM 23-V, FM 24-V and the corresponding notes and regulations.

2. Insert FM 12-VII, FM 13-VII and the corresponding notes and regulations.

3. Introduce new specifications i_v, i_R, i_x, W_1, W_2, t_R, $P_{wa}P_{wa}$, $H_{wa}H_{wa}$, hh, RRR, A_1, b_w, $n_bn_bn_b$.

4. Introduce new Code tables 1819, 1860, 0264 and 3590.

5. Remove Code tables 1819, 0264, 0264+, 3590, 0200+, 1555, 1855, 2855, 2955, 3551+, 3577, 3590, 3852, 4019, 4300+, 4577, 4677+, 4080.

6. Adopt specifications for D_s and v_s and add one code figure for D_s -/ and v_s -/.

7. Delete all references to code forms listed under 1 above from sections A, B, C and D of the Manual on Codes.

8. Code table for $M_iM_iM_jM_j$: replace the first 7 code forms by the following:

Code form	M_iM_i			M_jM_j
	LAND STATION	SEA STATION	AIRCRAFT	unchanged
FM 12-VII SYNOP	AA			
FM 13-VII SHIP		BB		
FM 20-V RADOB	FF	GG		

9. Change heading of Table 4500 to read: W_1W_2 - Past weather.

10. Replace symbolic letter W_1 as used in FM 61-IV MAFOR by W_m (pages I-A-105/106, I-C-46 and I-D-100).

11. Make all other small editorial amendments, as required.