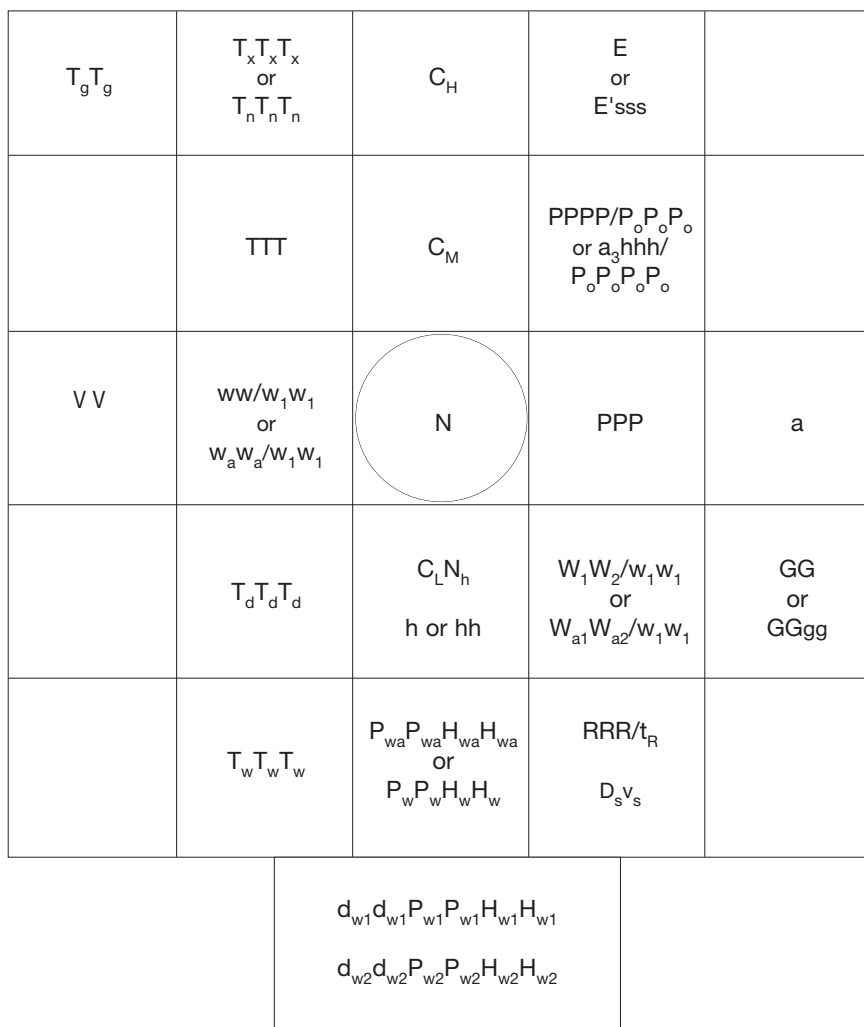


APPENDIX II-4

GRAPHICAL REPRESENTATION OF DATA, ANALYSES AND FORECASTS

1. THE SURFACE PLOTTING MODEL

If it is required to plot the elements shown in the model, they should be placed in the relative positions shown. Any of the elements may be omitted.














The "boxes" are included in the diagram simply to fix the relative positions of the elements and are not included in the actual plot. The wind plot is not shown in the model. Ship identification letters or buoy identifiers should be plotted above the model. In the case of automatic weather stations, an equilateral triangle should be plotted round the station circle so that the apex of the triangle (\triangle) points towards the position of the medium-cloud symbol.

2. GRAPHIC REPRESENTATION OF DATA ON WEATHER CHARTS

2.1 The following rules concern the symbols to be used for the plotting of various elements figuring in a surface observation:

N Total cloud cover

<i>Code</i>	<i>Symbol</i>
0 = 0	
1 = 1 okta or 1/10 or less, but not zero	
2 = 2 oktas or 2/10-3/10	
3 = 3 oktas or 4/10	
4 = 4 oktas or 5/10	
5 = 5 oktas or 6/10	
6 = 6 oktas or 7/10-8/10	
7 = 7 oktas or 9/10 or more, but not 8 oktas or 10/10	
8 = 8 oktas or 10/10	
9 = 9 Sky obscured, or cloud amount cannot be estimated	
/ = No measurements made	

ddff True direction, in tens of degrees, from which wind is blowing (dd) and wind speed in units indicated by i_w (ff)

Wind is represented by barbs and solid pennants in black, the full barbs representing 5 m s^{-1} or 10 knots, the half barbs representing 2.5 m s^{-1} or 5 knots and the solid pennant representing 25 m s^{-1} or 50 knots.

The wind shaft in black is directed along the axis of the wind towards the centre of the station circle and stops at its circumference.

All pennants and barbs lie to the left of the wind shaft in the northern hemisphere and to the right of the wind shaft in the southern hemisphere.

Barbs are at an angle of approximately 120° from the wind shaft. Pennants are triangles with their bases on the wind shaft.

A calm should be indicated by a circle drawn around the station circle:



Missing wind speed should be indicated by placing an "x" at the end of the wind shaft in lieu of the wind barbs. Wind direction is indicated in the usual manner, e.g. x—o. When the wind direction is missing, no wind should be plotted.

V V Horizontal visibility at surface

The code figures are plotted.

ww

Present weather reported from a manned weather station (see Note 1)

The symbols for the appropriate code figures are given in the following table:

ww	0	1	2	3	4	5	6	7	8	9
00					☰	∞	☿	☼	☾	(☼)
10	=	≡≡	≡≡	◁	☺)•((•)	☞	▽	∥
20	·]	•]	*]	•*]	~]	∇]	∇]	∇]	≡]	☞]
30	☼	☼	☼	☼	☼	☼	☼	☼	☼	☼
40	(≡)	≡≡	≡≡	≡≡	≡≡	≡≡	≡	≡	≡≡	≡≡
50	,	,,	;	,,	;	,;	~	~	;	;
60	•	••	••	•••	•••	•••	~	~	••	•••
70	*	**	*•	*••	*••	*•••	↔	↔	↔	△
80	∇	∇	∇	∇	∇	∇	∇	∇	∇	∇
90	∇	☞•	☞•	☞•	☞•	☞•	☞	☞	☞	☞

In the polychromatic method, black is used.

In the symbols $\text{☞}^*/\Delta$ and $\text{☞}^*/\Delta$, Δ or $*$ are alternatives, according to the observation.

In the symbols $\text{☞}^{\bullet/*}$ and $\text{☞}^{\bullet/*}$, the rain symbol and the snow symbol are alternatives, either \bullet or $*$ being used, except in cases of doubt.

- NOTES:
- (1) The meanings of the code figures for present weather are given in Code table 4677 in the *Manual on Codes* (Publication No. 306) (Annex II to the *Technical Regulations*).
 - (2) When present and past weather are not included because:
 - (a) They are not significant ($i_x = 2$ or 5), the spaces for ww and W_1W_2 are left blank;
 - (b) No observation was made ($i_x = 3$ or 6) or the data are missing ($i_x = 1$ or 4 , but no 7-group in the message), ww and W_1W_2 are both plotted as //.

w_aw_a

Present weather reported from an automatic weather station (see Note 2)

The symbols for the appropriate code figures are given in the following table:

w _a w _a	0	1	2	3	4	5	6	7	8	9
00					8	8	/	/	/	/
10	=	↔	↙	/	/	/	/	/	∇	/
20	≡]	∩]	∩]	•]	*]	~]	⊞]	⊞]	⊞]	⊞]
30	≡≡	≡≡	≡≡	≡≡	≡≡	≡≡	/	/	/	/
40	∩	∩	∩∩	∩∩	∩∩	∩∩	∩∩	∩∩	∩∩	/
50	∩	∩∩	∩∩∩	∩∩∩	∩∩∩	∩∩∩	∩∩∩	∩∩∩	∩∩∩	/
60	○	••	•••	••••	∩	∩	∩	∩	∩	/
70	△△	* *	* *	* *	△	△△	△△	△△	△△	/
80	∇	∇	∇	∇	∇	∇	∇	∇	∇	▲
90	⊞	⊞	⊞	⊞	⊞	⊞	⊞	⊞	⊞	⊞

The symbols 30, 50, 60 and 70 represent the generic form of weather phenomena and may be plotted in an enlarged form.

The symbol ∩ can specify any form of precipitation. • specifies rain or drizzle. X specifies solid precipitation.

The symbols in row 80 represent intermittent precipitation, including showers.

NOTES: (1) The meaning of the code figures for present weather reported from an automatic station are given in Code table 4680 in the *Manual on Codes* (WMO-No. 306) (Annex II to the *Technical Regulations*).

(2) When present weather and past weather are not included because:

- (a) They are not significant (i_x = 5), the squares for w_aw_a and W_{a1}W_{a2} are left blank;
- (b) No observation was made (i_x = 6) or the data are missing (i_x = 7 but no 7-group in the message), w_aw_a and W_{a1}W_{a2} are both plotted as //.

w₁w₁

Present weather (in addition to ww or w_aw_a)

The symbols for the appropriate code figures are given in the following table:

w ₁ w ₁	0	1	2	3	4	5	6	7	8	9
00	/	/	/	/	△	/	S	∞	\$	ƒ
10	∞*	∞	/	/	/	/	/	/	/	∞
20	△	S	∞	∇	∇	∇	L	∞	∞	/
30	ƒ	/	/	/	/	/	/	/	/	↑↓
40	/	≡	≡	↑	↑	↑	↔	≡	≡	≡
50	/0	/1	/2	/3	/4	/5	/6	/7	/	*/*
60	/0	/1	/2	/3	/4	/5	/6	/7	/	*/*
70	/0	/1	/2	/3	/4	/5	/6	/7	∞*	∞
80	•	∞	•	*	△	△	△*	△*	△	△
90	△*	△*	∇/∞	∇/∞	/	/	/	/	/	/

The pairs of symbols ∇/∞ , */* or •/* are alternatives according to the observation.

The symbol /2 means drizzle, rain or snow whose rates of fall are indicated by code figures 52, 62, and 72 respectively. The symbols are plotted in conjunction with ww, present weather, or w_aw_a or W₁W₂ or W_{a1}W_{a2}. (e.g. , /2).

Symbol ∞ means over sea, lake or river (over water).

Symbol ∞ means on or over mountains.

Symbol ∞ means in or over valleys.

NOTE: The meanings of code figures for present weather are given in Code table 4687 in the *Manual on Codes* (Publication No. 306) (Annex II to the *Technical Regulations*).

W_1W_2

Past weather reported from a manned station

The symbols to be plotted for both W_1 and W_2 are taken from the following list:

<i>Code figure</i>	<i>Symbol</i>
3 Sandstorm or dust storm	St
3 Blowing snow	†
4 Fog or ice fog or thick haze	≡
5 Drizzle	,
6 Rain	•
7 Snow or rain and snow mixed	*
8 Shower(s)	∇
9 Thunderstorms	⚡

The two symbols are plotted as W_1W_2 .

In the polychromatic method, red is used.

NOTE: See Note (2) under ww.

 $W_{a1}W_{a2}$

Past weather reported from an automatic station

<i>Code figure</i>	<i>Symbol</i>
1 VISIBILITY REDUCED	III
2 Blowing phenomena, visibility reduced	St
3 FOG	≡
4 PRECIPITATION	∩
5 Drizzle	,
6 Rain	•
7 Snow or ice pellets	*△
8 Snow shower(s) or intermittent precipitation	∇
9 Thunderstorm	⚡

NOTE: The meanings of code figures for past weather reported from an automatic station are given in Code table 4531 in the *Manual on Codes* (Publication No. 306) (Annex II to the *Technical Regulations*).

PPPP
or
a₃hhh

Pressure at mean sea-level in tenths of a hectopascal omitting thousands digit of hectopascal of the pressure value or geopotential of the standard "constant pressure level" given by a₃ in standard geopotential metres omitting the thousands digit

Normally the pressure is that which has been reduced to mean sea-level. It may be plotted as reported in four figures or alternatively in three figures by plotting the last three figures only of the group. If a₃hhh has been reported instead of pressure reduced to mean sea-level and it is to be plotted on the same chart as mean sea-level pressure observations then it is plotted in four figures and the first figure (a₃) can be used to indicate the datum plane, other than mean sea-level, to which the plotted value refers.

TTT

Air temperature in tenths of a degree Celsius, its sign given by s_n

The actual value of this temperature may be plotted in degrees and tenths of a degree Celsius, the tenths figure being separated by a decimal point , or it may be plotted in whole degrees Celsius, having first been rounded to the nearest degree. Negative values are preceded by a minus sign.

C_LC_MC_H

Cloud of the genera Stratocumulus, Stratus, Cumulus and Cumulonimbus (C_L); Altocumulus, Altostratus and Nimbostratus (C_M); and Cirrus, Cirrocumulus and Cirrostratus (C_H)

The symbols for the appropriate code figure are given in the following table:

	1	2	3	4	5	6	7	8	9
C _L									
C _M									
C _H									

In the polychromatic method, black is used. However, the use of red for plotting C_H symbols is optional.

- NOTES: (1) The meanings of the code figures for type of cloud are given in Codes tables 0509, 0513 and 0515 in the *Manual on Codes* (Publication No. 306) (Annex II to the *Technical Regulations*).
 (2) If, with C_L = 8, it is known that the base of the Sc is below the base of the Cu, the symbol is used.

N_h

Amount of all C_L cloud(s) present or, if no C_L cloud is present, the amount of all the C_M cloud(s) present
 The code figure for N_h is entered to the right of the position allotted to C_L.

h or hh

Height, above ground, of the base of the lowest cloud seen. The cloud figure for h is entered below the position allotted to C_L. If hh is reported, the two code figures for hh may be entered in lieu of h.

8N₅Ch₃h₅

Genus of cloud (C)

Code figure

- 0 Cirrus Ci
- 1 Cirrocumulus Cc
- 2 Cirrostratus Cs

Monochromatic



<i>Code figure</i>		<i>Monochromatic</i>
3	Alto cumulus Ac	
4	Alto stratus As	
5	Nimbo stratus Ns	
6	Strato cumulus Sc	
7	Stratus St	
8	Cumulus Cu	
9	Comulonimbus Cb	

The symbols corresponding to code figures 6 to 9 will be plotted in the position allotted to C_L , those corresponding to code figures 3 to 5 in the position allotted to C_M and those corresponding to code figures 0 to 2 in the position allotted to C_H . The symbols should be arranged in ascending order of height of cloud base, i.e. the lowest cloud will be at the bottom.

The code figures for N_s and $h_s h_5$ relating to the lowest cloud layer should normally be plotted in the positions reserved for N_h and h . If the purpose of the chart requires it, the code figures for N_s and $h_s h_5$ for each cloud layer may be plotted against the corresponding cloud symbol in the same manner as are N_h and h for C_L .










$T_d T_d T_d$


Dew-point temperature in tenths of a degree Celsius, its sign being given by s_n

The actual value of this temperature may be plotted in degrees and tenths of a degree Celsius, the tenths figure being separated by a decimal point, or it may be plotted in whole degrees Celsius, having first been rounded to the nearest degree. Negative values are preceded by a minus sign.

a

Characteristic of pressure tendency during the three hours preceding the time of observation

<i>Code figure</i>		<i>Monochromatic</i>
0	Increasing, then decreasing; atmospheric pressure the same as or higher than three hours ago	
1	Increasing, then steady; or increasing, then increasing more slowly; atmospheric pressure now higher than three hours ago	
2	Increasing (steadily or unsteadily); atmospheric pressure now higher than three hours ago	
3	Decreasing or steady, then increasing; or increasing, then increasing more rapidly; atmospheric pressure now higher than three hours ago	
4	Steady; atmospheric pressure the same as three hours ago	
5	Decreasing, then increasing; atmospheric pressure the same as or lower than three hours ago	
6	Decreasing, then steady; or decreasing, then decreasing more slowly; atmospheric pressure now lower than three hours ago	
7	Decreasing (steadily or unsteadily); atmospheric pressure now lower than three hours ago	
8	Steady or increasing, then decreasing; or decreasing, the decreasing more rapidly; atmospheric pressure now lower than three hours ago	

ppp	<p>Amount of pressure tendency at station level during the three hours preceding the time of observation, expressed in tenths of a hectopascal</p> <p>The pressure change is plotted in two figures by plotting only the last figures of ppp unless the first figure of ppp is other than zero, in which case the pressure change is plotted as reported in three figures. The plotting figures may be preceded by a plus sign when a = 0, 1, 2 or 3 and by a minus sign when a = 5, 6, 7 or 8. In this case the symbol for a = 2, 4 (if used) or 7 may be omitted.</p>
$D_s v_s$	<p>Direction (true) of resultant displacement of the ship (D_s) and ship's average speed made good (v_s) during the three hours preceding the time of observation</p> <p>The direction D_s is plotted by means of an arrow pointing in the direction towards which the ship is moving and the code figure for the speed v_s is entered to the right of the arrow.</p>
$T_w T_w T_w$	<p>Sea-surface temperature in tenths of a degree Celsius, its sign given by s_n</p> <p>The actual value of this temperature is plotted in degrees and tenths of a degree Celsius, the tenths figure being separated by a decimal point, or it may be plotted in whole degrees Celsius, having first been rounded to the nearest degree. Negative values are preceded by a minus sign.</p>
$d_{w1} d_{w1} d_{w2} d_{w2}$	<p>True direction, in tens of degrees, from which swell waves are coming</p> <p>This is represented by an arrow with a wavy shaft; the arrow-heads point in the direction towards which the waves are moving. If $d_{w1} d_{w1}$ is reported as 00, a wavy line without an arrow-head is drawn in a north-south direction.</p> <p>If $d_{w1} d_{w1}$ is reported as 99, crossed arrows with wavy shafts are drawn one from south-west to north-east and the other from south-east to north-west, thus .</p> <p>If $d_{w1} d_{w1}$ is missing, it is plotted as for $d_{w1} d_{w1}$ 99 but the arrowheads are omitted.</p> <p>When there is a second swell system reported by $d_{w2} d_{w2}$, this is plotted below the first.</p>
$P_{w1} P_{w1} P_{w2} P_{w2}$	<p>Period of swell waves in seconds</p> <p>The code figures for $P_{w1} P_{w1}$ and $P_{w2} P_{w2}$ are plotted immediately to the right of the symbol for $d_{w1} d_{w1}$ and $d_{w2} d_{w2}$.</p> <p>When there are no swell waves $P_{w1} P_{w1}$ and $P_{w2} P_{w2}$ are not plotted.</p>
$H_{wa} H_{wa} H_w H_w$ $H_{w1} H_{w1} H_{w2} H_{w2}$	<p>Height of waves, obtained by instrumental methods ($H_{wa} H_{wa}$), wind waves ($H_w H_w$) or swell waves ($H_{w1} H_{w1}$ and $H_{w2} H_{w2}$), respectively in units of 0.5 metre</p> <p>These code figures are plotted immediately to the right of the symbols for $P_{wa} P_{wa}$, $P_w P_w$, $P_{w1} P_{w1}$ or $P_{w2} P_{w2}$ respectively.</p> <p>When there are no swell waves H_{w1} and H_{w2} are not plotted.</p> <p>NOTE: If instrumental wave data, as reported in group 1 $P_{wa} P_{wa} H_{wa} H_{wa}$, are plotted, they should be underlined.</p>
$P_{wa} P_{wa} P_w P_w$	<p>Period of waves, obtained by instrumental methods ($P_{wa} P_{wa}$) or period of wind waves ($P_w P_w$), in seconds</p> <p>The code figure either for $P_{wa} P_{wa}$ or for $P_w P_w$ is plotted under the symbol for low clouds.</p> <p>NOTE: If instrumental wave data, as reported in group 1 $P_{wa} P_{wa} H_{wa} H_{wa}$, are plotted, they should be underlined.</p>
RRR	<p>Amount of precipitation which has fallen during the period preceding the time of observation, as indicated by t_R</p> <p>If following a national decision this element is to be plotted, the following cases may occur:</p> <p>(a) Precipitation amount is reported ($i_R = 1$ or 2), the figures of RRR are entered at the appropriate place in the plotting model (see paragraph 1 of this Appendix);</p>

- (b) Precipitation amount is zero ($i_R = 3$), RRR is not entered on the map;
- (c) No observation was made ($i_R = 4$), RRR is entered as ///.

t_R Duration of period of reference for amount of precipitation, expressed in units of six hours, and ending at the time of the report











The code figure for t_R is entered, except in cases where precipitation is not reported ($i_R = 3$ or 4).

$T_x T_x T_x$ or $T_n T_n T_n$ Maximum ($T_x T_x T_x$) or minimum ($T_n T_n T_n$) temperature in degrees Celsius and tenths, its sign given by s_n
 The actual maximum or minimum temperature is entered in degrees and tenths of a degree Celsius, the tenths figure being separated by a decimal point and negative values being preceded by a minus sign.




$T_g T_g$ Ground (grass) minimum temperature of the preceding night in whole degrees Celsius, its sign given by s_n
 The actual value is entered in degrees Celsius, negative values being preceded by a minus sign.

E or E' State of the ground without (E) or with (E') snow or measurable ice cover
 One of these is plotted using the appropriate symbol from the following tables:

Code figure for E

0	Surface of ground dry (without cracks and no appreciable amount of dust or loose sand)	
1	Surface of ground moist	
2	Surface of ground wet (standing water in small or large pools on surface)	
3	Flooded	
4	Surface of ground frozen	
5	Glaze on ground	
6	Loose dry dust or sand not covering ground completely	
7	Thin cover of loose dry dust or sand covering ground completely	
8	Moderate or thick cover of loose dry dust or sand covering ground completely	
9	Extremely dry with cracks	

Code figure for E'

0	Ground predominantly covered by ice	
1	Compact or wet snow (with or without ice) covering less than one-half of the ground	
2	Compact or wet snow (with or without ice) covering at least one-half of the ground but ground not completely covered	

Code figure for E' (continued)

3	Even layer of compact or wet snow covering ground completely	
4	Uneven layer of compact or wet snow covering ground completely	
5	Loose dry snow covering less than one-half of the ground	
6	Loose dry snow covering at least one-half of the ground (but not completely)	
7	Even layer of loose dry snow covering ground completely	
8	Uneven layer of loose dry snow covering ground completely	
9	Snow covering ground completely; deep drifts	

sss Total depth of snow in centimetres
This is plotted in code figures or actual depths in accordance with national or regional decisions.

GG Actual time of observation to the nearest hour UTC
GG is plotted only if it is different from the reference hour of the chart.

2.2 The following rules determine the symbols to be used for the plotting of the various upper-air observation elements which appear on the constant pressure charts.

- (a) The wind at the level of the chart should be plotted with a solid shaft touching the station circle, the barbs and solid pennants flying to the left of the wind shaft in the northern hemisphere and to the right of the wind shaft in the southern hemisphere. The full barbs represent 5 m s^{-1} or 10 knots, the half-barbs represent 2.5 m s^{-1} or 5 knots, and the solid pennant represents 25 m s^{-1} or 50 knots.

Derived winds should be plotted with the shaft touching the station circle and the barbs and solid pennants flying towards the side of higher pressure. If one derived wind is plotted, the shaft should be a solid line. If two derived winds are plotted, one of them should be plotted with a broken shaft.

Colour separation between the observed and derived winds is recommended. In wind field analyses code figures may replace the barbs and pennants.

- (b) Clouds should be plotted with the same symbols as used on surface charts.

3. ANALYSES AND FORECASTS ON WEATHER CHARTS

3.1 General rules

- (a) The basic symbol shown in the table below is placed on the chart along the line of the phenomenon and it is repeated as necessary to indicate the extent of the phenomenon;
- (b) The arrows on items 1 to 10 of the table are not part of the symbol but are entered to indicate the orientation of the symbol with respect to the direction of motion of the phenomenon.

3.2 Symbols

<i>Term</i>	<i>Symbol</i>		
	<i>Monochromatic</i>	<i>Polychromatic</i>	
1. Cold front at the surface	↑		} blue
2. Cold front above the surface	↑		
3. Cold front frontogenesis	↑		
4. Cold front frontolysis	↑		
5. Warm front at the surface	↑		} red
6. Warm front above the surface	↑		
7. Warm front frontogenesis	↑		
8. Warm front frontolysis	↑		
9. Occluded front at the surface	↑		} purple
10. Occluded front above the surface	↑		
11. Quasi-stationary front at the surface			} alternate red and blue
12. Quasi-stationary front above the surface			
13. Quasi-stationary front frontogenesis			
14. Quasi-stationary front frontolysis			
15. Instability line			} black
16. Shear line			
17. Convergence line			} orange
18. Intertropical convergence zone			
19. Intertropical discontinuity			
20. Axis of trough			} black
21. Axis of ridge			







NOTE: The separation of the two lines gives a qualitative representation of the width of the zone; the hatched lines may be added to indicate areas of activity.

3.3 Representation of weather features

Weather features on charts may be shown in the manner indicated below:

<i>Feature</i>	<i>Monochromatic</i>	<i>Polychromatic</i>
(a) Zones of continuous precipitation	or	or
	Solid shading or cross-hatching	Solid shading or cross-hatching in green
(b) Zones of intermittent precipitation		
	Single hatching	Single hatching in green

The appropriate weather symbol may be distributed over the zone.

<i>Feature</i>	<i>Monochromatic</i>	<i>Polychromatic</i>
(c) Areas of showers	Large shower symbols distributed over the area with the symbol for rain, snow or hail added as appropriate, e.g.	As monochromatic system but in green
		
(d) Areas of thunderstorms	Large thunderstorm symbols distributed over the area with the symbol for rain, snow or hail added as appropriate, e.g.	As monochromatic system but in red
		
(e) Areas of fog	Large fog symbols distributed over the area	 Solid shading in yellow
(f) Areas of duststorm, sandstorm or dust haze	Large symbols for the appropriate phenomenon distributed over the area	 Solid brown shading with the appropriate weather symbol distributed over the area

NOTE: In all cases, the extent of the area affected by the phenomena may be delineated by a thin boundary line of the same colour. The shading, hatching or superimposed symbols should not obliterate the plotted data.

4. REPRESENTATION OF THE ANALYSIS AND FORECAST ON SPECIFIC CHARTS

4.1 Surface charts

4.1.1 Fronts

Fronts will be shown using the symbols given in paragraph 3.2.


4.1.2 Isobars


It is recommended that isobars be drawn at intervals of 4 or 5 hPa. Multiples or sub-multiples of these basic intervals may be used depending on the scale and purposes of the chart but, whatever the intervals, the 1 000 hPa isobar should always be included in the series.

4.1.3 Pressure centres

(a) The location of a pressure centre may be indicated by a cross. To indicate the nature of the centre, a capital letter appropriate to the language of the country is entered above the symbol marking the centre.

(b) In the case of tropical cyclonic circulations the centre is marked by a special symbol as shown below:

 For a tropical cyclonic circulation with observed or estimated maximum winds of 17 to 63 kt (29 to 117 km/h);

 For a tropical cyclonic circulation with observed or estimated maximum winds of 64 kt (118 km/h) or more.

- (c) The letter or the symbol for a tropical cyclonic circulation should be aligned parallel to the adjacent meridian.
- (d) Pressure centres may be given an identifying letter to assist in their tracking from chart to chart. This should be written as a suffix to the letter or symbol defining the pressure centre. A tropical cyclonic circulation may have a name assigned to it. This may be entered in block letters near to the centre.
- (e) The value of the pressure at the centre should be entered in whole hectopascals immediately below the symbol marking the centre, the number being parallel to the adjacent line of latitude.

4.1.4 **Tracks of pressure centres**

The previous positions of a pressure centre may be entered by means of symbols in the same way as the present position. Above each symbol may be entered the corresponding time in hours (two figures) and below it the pressure of the centre at that time in hectopascals. The symbols should be joined by a thick broken line. The forecast position of a pressure centre may also be indicated by a symbol in the same way as the present position, the time and the estimated pressure being entered above and below the symbol respectively. The present position and the forecast position should be joined by a solid arrow drawn along the track the centre is forecast to take.

4.1.5 **Isallobars**

Isallobars of three-hour change should normally be drawn for intervals of single hectopascals. Large intervals may be used if the scale of the chart is small or if the period is longer than three hours. The "no change" line will be numbered with a zero and the numbers on the other lines will be preceded by a plus sign if the pressure has risen and a minus sign if it has fallen.

4.2 **Charts of isobaric surfaces**

4.2.1 **Fronts**

If fronts are entered, the symbols given in paragraph 3.2 should be used.

4.2.2 **Isohypes of absolute topography or contour lines**

It is recommended that contour lines be drawn at intervals of either 40 gpm (80, 20 and 10 when appropriate) or 60 gpm (120, 30, 15 when appropriate). The lines should be numbered in geopotential decametres, e.g. 5280 gpm should be labelled 528.

4.2.3 **Height centres**

The positions present, past and forecast of high and low centres in the contours may be indicated in the same way as for pressure centres on surface charts (see paragraphs 4.1.3 and 4.1.4). Above the symbol marking a centre may be entered a capital letter appropriate to the language of the country. The value of the height at the centre should be entered immediately below the symbol marking the centre to the nearest ten metres, e.g. 5280. The number should be entered parallel to the adjacent line of latitude.

4.2.4 **Isotachs**

Isotachs should normally be drawn at intervals of 20 kt (40, 10 and 5 when appropriate). Centres of regions of minimum and maximum speed may be marked according to national practices. On the maximum wind charts, however, the maximum should be marked by a "J" followed by the estimated maximum speed, e.g. J 120.

4.2.5 **Jet streams**

A jet stream should be marked by a heavy, solid line with arrow-heads placed at intervals along it pointing in the direction of the flow in the stream.

4.2.6 **Isohypes of relative topography or thickness lines**

If thickness lines are drawn, the following intervals are recommended: either 40 gpm (80, 20 and 10 when appropriate) or 60 gpm (120, 30, 15 when appropriate).

4.2.7 **Isotherms**

Isotherms will not normally be drawn on charts on which thickness lines are entered. Isotherms should be drawn at intervals of either 5°C (10°C and 2.5°C when appropriate) or 2°C (1°C when appropriate).

4.2.8 **Moisture lines**

If lines of equal dew point are drawn, the same intervals as for isotherms may be used.
