LAND STATION SURFACE SYNOPTIC CODE FM 12-IX SYNOP

I. LAND STATION SURFACE SYNOPTIC CODE FORMAT

The instructions for encoding the land station surface synoptic code is found in the Federal Meteorological Handbook (FMH) Number 2.

There are two basic forms of land station surface synoptic reports, one of which is the complete form and the other is the shortened form. The complete form is referred to as the *primary (or main) synoptic*, the *6-hourly report*, or *SYNOP*. The primary synoptic is reported at the standard hours of observation which are: 0000, 0600, 1200, and 1800 UTC. The shortened form is referred to as the *intermediate synoptic* or the *3-hourly report*. The intermediate synoptic is reported at the standard hours for the intermediate observations which are: 0300, 0900, 1500, and 2100 UTC.

The following examples show the symbolic form of the message for the main synoptic reports for the U.S. stations in WMO Region IV (Continental U.S., Canada, and Alaska, Caribbean, Central America, Mexico, and the Bahamas). Other WMO regions are: Region I — Africa; Region II — Asia; Region III — South America; Region V — Southwest Pacific; Region VI — Europe; Region VII — Antarctica.

Each of the examples shows the maximum number of data groups. Very few reports will use all of the groups. For example, only at a coastal station would the section 222 (wave information) be included, and even that station might not include all of the groups in the 222 section. Also, individual groups may be left out of an observation for a number of reasons. Different regions may have requirements which will include groups or exclude groups, principally in section 333.

The format for a primary synoptic report from a land station in WMO Region IV is shown below.

A. SYMBOLIC FORM OF THE MESSAGE

1. Report Format for WMO Region IV

$M_iM_iM_jM_j$ YYGGi_w

IIiii i_Ri_XhVV Nddff (00fff) $1s_nTTT$ $2s_nT_dT_dT_d$ $3P_oP_oP_oP_o$ 4PPPP 5appp
or 29UUU or $4a_3hhh$

$6RRRt_R$ 7wwW_1W_2 $8N_hC_LC_MC_H$ (9GGgg)
or $7w_aw_aW_{a1}W_{a2}$

222// ($0s_nT_wT_wT_w$) $1P_{wa}P_{wa}H_{wa}H_{wa}$ $2P_wP_wH_wH_w$ $3d_{w1}d_{w1}d_{w2}d_{w2}$
$4P_{w1}P_{w1}H_{w1}H_{w1}$ $5P_{w2}P_{w2}H_{w2}H_{w2}$ $70H_{wa}H_{wa}H_{wa}$
333 ($0C_sD_LD_MD_H$) $1s_nT_xT_xT_x$ $2s_nT_nT_nT_n$ 3Ejjj 4E'sss 5j1j2j3j4 (j5j6j7j8j9)
$7R_{24}R_{24}R_{24}R_{24}$ $8N_sCh_sh_s$ $9S_pS_ps_ps_p$
555(national code groups)

B. DEFINITION OF GROUPS

1. Section 1

This section is standard for all stations transmitting synoptic reports in WMO Region IV.

$M_iM_iM_jM_j$ YYGGi_w - *Bulletin Header and Date/Time Group*

As the reports are collected from various stations they are reformatted (by computer) into bulletins, with each bulletin containing reports from specific stations. The above two groups will be included only as the first line of the text, the *bulletin header*. The bulletin following contains only land station SYNOP reports which were taken at the same time and which use the same units for reporting wind speed.

For the format in which the report was transmitted from the station, the group $M_iM_iM_jM_j$ would not be included, and the YYGGi_w group would be included after the IIiii group.

$M_iM_iM_jM_j$ - *Bulletin Header*

M_iM_i - For land stations, this will be AA. It identifies the bulletin as being composed of SYNOP messages from land stations.

M_jM_j - For land stations, this will be XX. It identifies the part of the message being sent. The letters XX mean "No Distinction" since there is only one part to the SYNOP message.

YYGGi_w - Observation Date-Time Group

YY - *Day of the month* of the observation.

GG - *Actual Time of the observation* in UTC to the nearest whole hour.

i_w - *Wind speed indicator* (code table 1855).

Code Table 1855 i_w — Indicator for source and units of wind speed

Code Figure	Description
0	Wind speed estimated, reported in meters per second.
1	Wind speed obtained from anemometer, reported in meters per second.
3	Wind speed estimated, reported in knots.
4	Wind speed obtained from anemometer, reported in knots.
/	Wind speed not available.

IIiii - ***International Index Number***

II - *Block number*. Block numbers are allocated to one country, part of a country, or several countries in the same region by WMO). See figure 1. Not all block numbers are listed on the map, especially for small countries.

iii - *Station number*. These are assigned to individual stations within each country as station identifiers.

$i_R i_X$hVV - ***Precipitation Inclusion-Exclusion / Type operation / Cloud height / Visibility Group***

i_R - Indicator for inclusion or omission of precipitation data. Encoded using code table 1819.

Code Table 1819 i_R — Indicator for inclusion or omission of precipitation data

Code Figure	Precipitation data are reported:	Group 6RRRt$_R$ is:
0	In Sections 1 and 3	Included in both sections
1	In Section 1	Included
2	In Section 3	Included
3	In neither section 1 or 3	Omitted (precipitation amount = 0)
4	In neither section 1 or 3	Omitted (precipitation amount not available)

i_X - *Type of station operation indicator* (manned or automatic) and whether group 7 is encoded in section 1. Use code table 1860.

Code Table 1860 i_X — Indicator for type of station operation and for present and past weather data

Code	Type of station	Group 7wwW$_1$W$_1$ or 7w$_a$w$_a$W$_{a1}$W$_{a2}$
1	Manned	Included
2	Manned	Omitted (no significant phenomenon to report)
3	Manned	Omitted(no observation, data not available)
4	Automatic	Included using code tables 4677 and 4561
5	Automatic	Omitted (no significant phenomenon to report)
6	Automatic	Omitted (no observation, data not available)
7	Automatic	Included using code tables 4680 and 4531

Note: Manned station operations use only the group 7wwW$_1$W$_1$ and indicator i_X = 1, 2, and 3. Automatic station operations normally use the group 7w$_a$w$_a$W$_{a1}$W$_{a2}$ and indicator i_X = 5, 6, and 7. However, only when an automatic station operation is sufficiently sophisticated and able to cope automatically with code tables 4677 and 4561 should the group 7wwW$_1$W$_1$ and indicator i_X = 4 be used.

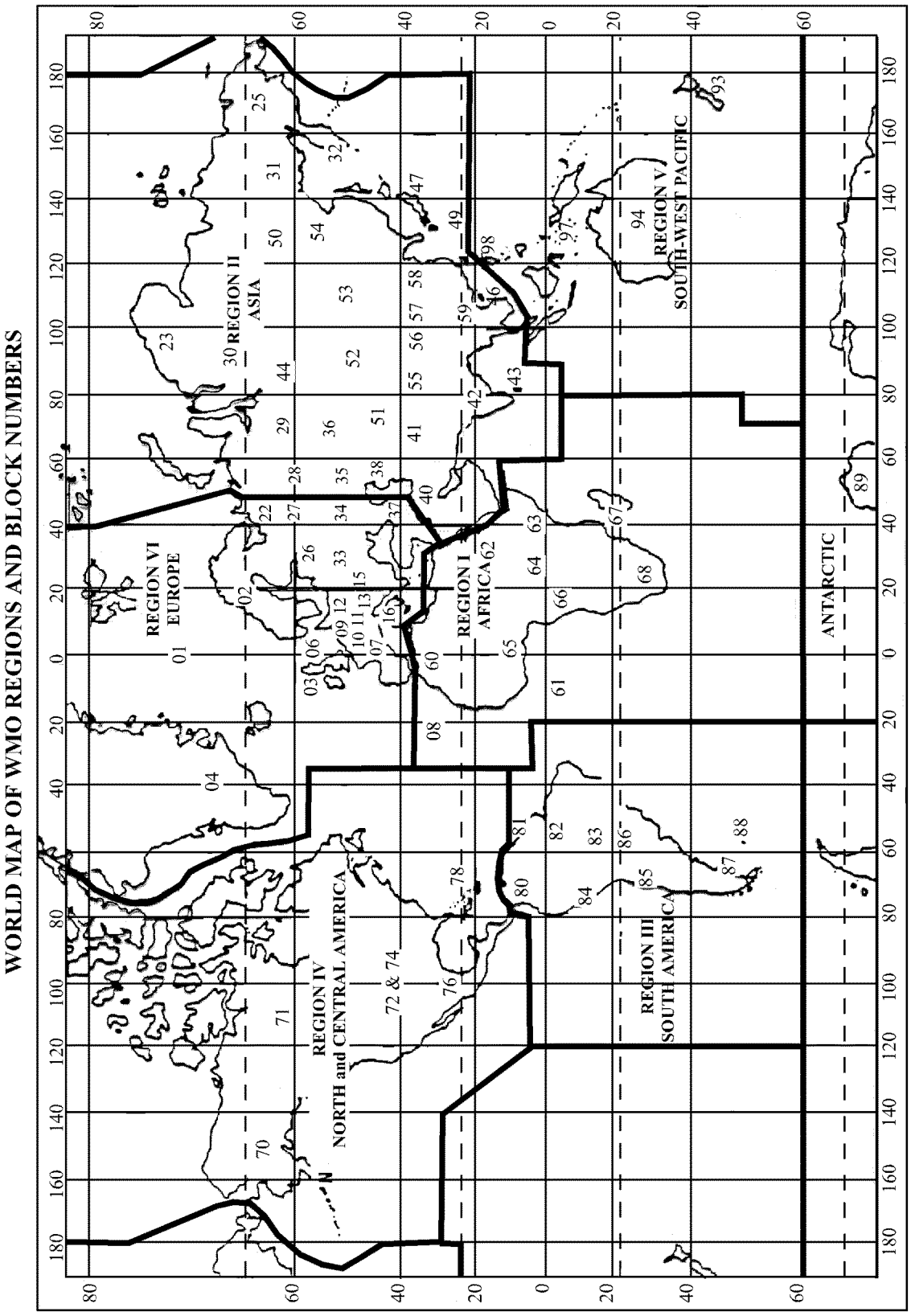

Figure 1. WMO Regions and Block Numbers.

h - *Height above the surface of the base of the lowest cloud* seen. Use code table 1600. If the height is, for example, 300 feet, then the higher code figure (in this case 2) will be reported.

Code table 1600 h — Height above surface of the base of the lowest cloud seen

Code Figure	Feet	Meters
0	0-100	0-50
1	100-300	50-100
2	300-600	100-200
3	600-900	200-300
4	900-1,900	300- 600
5	1,900-3,200	600-1,000
6	3,200-4,900	1,000-1,500
7	4,900-6,500	1,500-2,000
8	6,500-8,000	2,000-2,500
9	8,000 or higher or no clouds	2,500 or higher or no clouds
/	Height of base of cloud is not known.	

VV - *Horizontal surface visibility*. Use code table 4377.

Nddff - *Total Cloud Cover and Wind Group*

N - *Total cloud cover*. Use code table 2700.

Cloud table 2700 N — Amount of cloud cover

Code figure	Cloud amount (oktas)	Cloud amount (tenths)
0	0	0
1	1/8 or less, not zero	1/10 or less, not zero
2	2/8	2/10 - 3/10
3	3/8	4/10
4	4/8	5/10
5	5/8	6/10
6	6/8	7/10 - 8/10
7	7/8 or more, but not 8/8	9/10 or more, but not 10/10
8	8/8	10/10
9	Sky obscured, or cannot be estimated.	Sky obscured, or cannot be estimated.
/	No measurement made; (automatic stations only)	No measurement made; (automatic stations only)

dd - *True wind direction* in tens of degrees, from which the wind is blowing. Use code table 0877.

ff - *Wind speed* in units indicated by i_W. When the wind speed, in units indicated by i_W, is 99 units or more, ff shall be encoded 99, and the group **00fff** shall be included immediately following the group Nddff.

Code Table 4377 Horizontal Visibility at the Surface

Code Figure	Statute Miles	Km	Code Figure	Statute Miles	Km	Code Figure	Statute Miles	Km
00	<1/16	<0.1						
01	1/16	0.1	34		3.4	67		17
02	1/8	0.2	35		3.5	68	11	18
03	3/16	0.3	36	2 1/4	3.6	69	12	19
04	1/4	0.4	37		3.7	70		20
05	5/16	0.5	38		3.8	71	13	21
06	3/8	0.6	39		3.9	72		22
07	7/16	0.7	40	2 1/2	4	73	14	23
08	1/2	0.8	41		4.1	74	15	24
09	9/16	0.9	42		4.2	75		25
10	5/8	1	43		4.3	76		26
11		1.1	44	2 3/4	4.4	77		27
12	3/4	1.2	45		4.5	78		28
13		1.3	46		4.6	79		29
14	7/8	1.4	47		4.7	80		30
15		1.5	48	3	4.8	81	20	35
16	1	1.6	49		4.9	82	25	40
17		1.7	50		5	83		45
18	1 1/8	1.8	51	Not used		84	30	50
19		1.9	52			85	35	55
20	1 1/4	2	53			86		60
21		2.1	54			87	40	65
22	1 3/8	2.2	55			88		70
23		2.3	56		6	89	>40	>70
24	1 1/2	2.4	57	4	7	90	<1/16	<0.05
25		2.5	58	5	8	91	1/16	0.05
26	1 5/8	2.6	59		9	92	1/8	0.2
27		2.7	60	6	10	93	1/4	0.5
28	1 3/4	2.8	61	7	11	94	1/2	1
29		2.9	62		12	95	1	2
30	1 7/8	3	63	8	13	96	2 1/2	4
31		3.1	64		14	97	6	10
32	2	3.2	65	9	15	98	12	20
33		3.3	66	10	16	99	≥30	≥50

Notes:

(1) The code is direct reading in units of 100 m from 0 to 50.

(2) The code figures 51 to 55 are not used.

(3) For code figures 56 to 80, 50 is subtracted and the remaining figure is direct reading in units of km.

(4) Code figures 90 to 99 are used to report visibility in the ship synoptic code.

$1s_nTTT$ - Air Temperature Group

1 - Identifier for the air temperature group.

s_n - Sign of the temperature. 0 = temperature is positive or zero, 1 = temperature is negative.

TTT - Air temperature in tenths of degrees Celsius.

Code table 0877 True Direction, in tens of degrees

Code figure	Direction	Code figure	Direction
00	Calm (no motion, or no waves)	19	185°-194°
		20	195°-204°
01	5°-14°	21	205°-214°
02	15°-24°	22	215°-224°
03	25°-34°	23	225°-234°
04	35°-44°	24	235°-244°
05	45°-54°	25	245°-254°
06	55°-64°	26	255°-264°
07	65°-74°	27	365°-274°
08	75°-84°	28	275°-284°
09	85°-94°	29	285°-294°
10	95°-104°	30	295°-304°
11	105°-114°	31	305°-314°
12	115°-124°	32	315°-324°
13	125°-134°	33	325°-334°
14	135°-144°	34	335°-344°
15	145°-154°	35	345°-354°
16	155°-164°	36	355°-4°
17	165°-174°	99	Variable, or all directions,
18	175°-184°		or unknown, or waves confused, direction indeterminate.

$2s_nT_dT_dT_d$- Dew Point Temperature Group or Relative Humidity

2 - Identifier for the dew point temperature group.

s_n - Sign of the dew point temperature. 0 = dew point temperature is positive or zero, 1 = dew point temperature is negative, 9 = relative humidity follows.

$T_dT_dT_d$ - Dew point temperature in tenths of degrees Celsius.

UUU - Relative humidity of the air, in per cent, the first figure being zero except for UUU = 100 per cent. Relative humidity is reported if dew point temperature is unavailable. Every effort should be made to convert relative humidity to a dew point temperature.

$3P_oP_oP_oP_o$- Station Pressure Group

3 - Identifier for the station pressure group.

$P_oP_oP_oP_o$ - Pressure at station level, in tenths of a hectopascal. If the station pressure is more than 999.9 hectopascal, drop the thousands digit of the pressure.

Example: station pressure = 1016.7 hPa
$P_oP_oP_oP_o$ = 0167

4PPPP - Sea Level Pressure Group

4 - Identifier for sea level pressure group.

PPPP - *Sea level pressure*. This is the station pressure "reduced" to mean sea level in tenths of a hectopascal. If the sea level pressure is more than 999.9 hectopascal, the thousands digit of the pressure is omitted.

a3 - The standard isobaric surface for which the following height is reported. See code table 0264. The group **4a3hhh** is used, by regional decision, by a high-level station which cannot give pressure at mean sea-level to a satisfactory degree of accuracy. The standard height of an agreed standard isobaric surface shall be reported.

Code table 0264 Standard Isobaric surface for which the geopotential is reported

Code figure	Standard isobaric surface
1	1000 hPa
2	925 hPa
5	500 hPa
7	700 hPa
8	850 hPa

hhh - Geopotential of an agreed standard isobaric surface given by a3, reported in standard geopotential meters, omitting the thousands digit.

5appp - 3-Hour Pressure Tendency Group

5 - Identifier for the group reporting pressure tendency and pressure change for the three hours preceding the time of observation.

a - Characteristic of the pressure tendency during the three hours preceding the time of the observation. Use code table 0200.

Code Table 0200 Characteristic of Pressure Tendency		
0	Increasing, then decreasing; atmospheric pressure the same or higher than 3 hours ago.	
1	Increasing, then steady; or increasing, then increasing more slowly.	Atmospheric pressure now higher than 3 hours ago.
2	Increasing (steadily or unsteadily).	
3	Decreasing or steady, then increasing; or increasing, then increasing more rapidly.	
4	Steady; atmospheric pressure the same as 3 hours ago.	
5	Decreasing, then increasing; atmospheric pressure the same or lower than 3 hours ago.	
6	Decreasing, then steady; or decreasing, then decreasing more slowly.	Atmospheric pressure now lower than 3 hours ago.
7	Decreasing (steadily or unsteadily)	
8	Steady or increasing, then decreasing; or decreasing, then decreasing more rapidly.	

ppp - *Actual change in the pressure* during the three hours ending at the actual time of the observation, expressed in tenths of hectopascal.

6RRRt$_R$ - Amount of Precipitation Group

6 - Identifier for the precipitation group. When precipitation data are to be exchanged in time periods of six hours at main standard times, the group is included in section 1. When precipitation data are to be exchanged in time periods of three hours or other periods required for regional exchange, the group is included in section three. If no precipitation occurs or if precipitation is unmeasured, the group is omitted.

RRR - Total amount of precipitation fallen during the period preceding the time of observation, as indicated by t_R. This is the actual amount of liquid precipitation and the water equivalent of solid precipitation. The amount is reported in millimeters. Use code table 3590.

Code table 3590 Amount of precipitation

Code figure	Amount (mm)	Code figure	Amount (mm)
000	Not used	990	Trace
001	1	991	0.1
002	2	992	0.2
003	3	993	0.3
004	4	994	0.4
etc.	etc.	995	0.5
987	987	996	0.6
988	988	997	0.7
989	989 or more	998	0.8
		999	0.9

t_R - Length of time covered by the group. Code table 4019 is used.

Code table 4019 Duration of period of precipitation	
Code figure	
1	6 hours preceding time of observation.
2	12 hours preceding time of observation.
3	18 hours preceding time of observation.
4	24 hours preceding time of observation.
5	1 hour preceding time of observation.
6	2 hours preceding time of observation.
7	3 hours preceding time of observation.
8	9 hours preceding time of observation.
9	15 hours preceding time of observation.

$7wwW_1W_2$ - Present and Past Weather Group reported from an manned weather station.

7 - Identifier for the present and past weather group. This group is included only if present or past weather phenomena of significance, or both, were observed.

ww - Present weather at the time of the observation. Use code table 4677. Figure 2 contains the plotting symbols for these present weather phenomena.

W_1W_2 - *Past weather*. The most significant and the second most significant past weather during the period. In general, W_1 and W_2 together will cover a maximum of three or six hours and will be different code figures. See code table 4561. For primary reports sent at the main synoptic times, the past weather covers the last six hours. For intermediate synoptic reports, the period covers the last three hours.

Code table 4561 Past weather	
Code figure	Description
0	Cloud covering 1/2 or less of the sky throughout the appropriate period.
1	Cloud covering more than 1/2 of the sky during part of the appropriate period and covering 1/2 or less during part of the period.
2	Cloud covering more than 1/2 of the sky throughout the appropriate period.
3	Sandstorm, duststorm, or 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	Thunderstorm(s) with or without precipitation.

Table 4677. ww — Present weather reported from a manned weather station

ww = 00 — 49	No precipitation at the station at the time of observation	
ww = 00 — 19	No precipitation, fog, ice fog (except for 11 and 12), duststorm, sandstorm, drifting or blowing snow at the station* at the time of observation or, except for 09 and 17, during the preceding hour	
No meteors except photometeors	00	Cloud development not observed or not observable
	01	Clouds generally dissolving or becoming less developed
	02	State of sky on the whole unchanged
	03	Clouds generally forming or developing
		} Characteristic change of the state of sky during the past hour
Haze, dust, sand or smoke	04	Visibility reduced by smoke, e.g. veldt or forest fires, industrial smoke or volcanic ashes
	05	Haze
	06	Widespread dust in suspension in the air, not raised by wind at or near the station at the time of observation
	07	Dust or sand raised by wind at or near the station at the time of observation, but no well-developed dust whirl(s) or sand whirl(s), and no duststorm or sandstorm seen; or, in the case of ships, blowing spray at the station
	08	Well-developed dust whirl(s) or sand whirl(s) seen at or near the station during the preceding hour or at the time of observation, but no duststorm or sandstorm
	09	Duststorm or sandstorm within sight at the time of observation, or at the station during the preceding hour
	10	Mist } shallow fog or ice fog at the station, whether on land or sea, not deeper than about 2 meters on land or 10 meters at sea
	11	Patches }
	12	More or less continuous }
	13	Lightning visible, no thunder heard
	14	Precipitation within sight, not reaching the ground or surface of the sea
	15	Precipitation within sight, reaching the ground or the surface of the sea, but distant, i.e. estimated to be more than 5 km from the station
	16	Precipitation within sight, reaching the ground or the surface of the sea, near to, but not at the station
	17	Thunderstorm, but no precipitation at the time of observation
	18	Squalls } at or within sight of the station during the preceding hour or at the time of observation
	19	Funnel cloud(s), tornado cloud or waterspout }
ww = 20 — 29	Precipitation, fog, ice fog or thunderstorm at the station during the preceding hour but not at the time of observation	
	20	Drizzle (not freezing) or snow grains
	21	Rain (not freezing)
	22	Snow
	23	Rain and snow or ice pellets
	24	Freezing drizzle or freezing rain
		} Not falling as shower(s)
	25	Shower(s) of rain
	26	Shower(s) of snow, or of rain and snow
	27	Shower(s) of hail**, or of rain and hail**
	28	Fog or ice fog
	29	Thunderstorm (with or without precipitation)

ww = 30 — 39	Duststorm, sandstorm, drifting or blowing snow		
	30	Slight or moderate duststorm or sandstorm	— has decreased during the preceding hour
	31	Slight or moderate duststorm or sandstorm	— no appreciable change during the preceding hour
	32	Slight or moderate duststorm or sandstorm	— has begun or has increased during the preceding hour
	33	Severe duststorm or sandstorm	— has decreased during the preceding hour
	34	Severe duststorm or sandstorm	— no appreciable change during the preceding hour
	35	Severe duststorm or sandstorm	— has begun or has increased during the preceding hour
	36	Slight or moderate drifting snow	generally low (below eye level)
	37	Heavy drifting snow	generally low (below eye level)
	38	Slight or moderate blowing snow	generally high (above eye level)
	39	Heavy blowing snow	generally high (above eye level)
ww = 40 — 49	Fog or ice fog at the time of observation		
	40	Fog or ice fog at a distance at the time of observation, but not at the station during the preceding hour, the fog or ice fog extending to a level above that of the observer	
	41	Fog or ice fog in patches	
	42	Fog or ice fog, sky visible	has become thinner during the preceding hour
	43	Fog or ice fog, sky invisible	has become thinner during the preceding hour
	44	Fog or ice fog, sky visible	no appreciable change during the preceding hour
	45	Fog or ice fog, sky invisible	no appreciable change during the preceding hour
	46	Fog or ice fog, sky visible	has begun or has become thicker during the preceding hour
	47	Fog or ice fog, sky invisible	has begun or has become thicker during the preceding hour
	48	Fog, depositing rime, sky visible	
	49	Fog, depositing rime, sky invisible	
ww = 50 — 99	Precipitation at the station at the time of observation		
ww = 50 — 59	Drizzle		
	50	Drizzle, not freezing, intermittent	slight at time of observation
	51	Drizzle, not freezing, continuous	slight at time of observation
	52	Drizzle, not freezing, intermittent	moderate at time of observation
	53	Drizzle, not freezing, continuous	moderate at time of observation
	54	Drizzle, not freezing, intermittent	heavy (dense) at time of observation
	55	Drizzle, not freezing, continuous	heavy (dense) at time of observation
	56	Drizzle, freezing, slight	
	57	Drizzle, freezing, moderate or heavy (dense)	
	58	Drizzle and rain, slight	
	59	Drizzle and rain, moderate or heavy	
ww = 60 — 69	Rain		
	60	Rain, not freezing, intermittent	slight at time of observation
	61	Rain, not freezing, continuous	slight at time of observation
	62	Rain, not freezing, intermittent	moderate at time of observation
	63	Rain, not freezing, continuous	moderate at time of observation
	64	Rain, not freezing, intermittent	heavy at time of observation
	65	Rain, not freezing, continuous	heavy at time of observation
	66	Rain, freezing, slight	
	67	Rain, freezing, moderate or heavy	
	68	Rain or drizzle and snow, slight	
	69	Rain or drizzle and snow, moderate or heavy	

ww = 70 — 79	Solid precipitation not in showers	
	70 Intermittent fall of snowflakes	slight at time of observation
	71 Continuous fall of snowflakes	slight at time of observation
	72 Intermittent fall of snowflakes	moderate at time of observation
	73 Continuous fall of snowflakes	moderate at time of observation
	74 Intermittent fall of snowflakes	heavy at time of observation
	75 Continuous fall of snowflakes	heavy at time of observation
	76 Diamond dust (with or without fog)	
	77 Snow grains (with or without fog)	
	78 Isolated star-like snow crystals (with or without fog)	
	79 Ice pellets	

ww = 80 — 99	Showery precipitation, or precipitation with current or recent thunderstorm	
	80 Rain shower(s), slight	
	81 Rain shower(s), moderate or heavy	
	82 Rain shower(s), violent	
	83 Shower(s) of rain and snow mixed, slight	
	84 Shower(s) of rain and snow mixed, moderate or heavy	
	85 Snow shower(s), slight	
	86 Snow shower(s), moderate or heavy	
	87 Shower(s) of snow pellets or small hail, with or without rain or rain and snow mixed	— slight
	88 Shower(s) of snow pellets or small hail, with or without rain or rain and snow mixed	— moderate or heavy
	89 Shower(s) of hail*, with or without rain or rain and snow mixed, not associated with thunder	— slight
	90 Shower(s) of hail*, with or without rain or rain and snow mixed, not associated with thunder	— moderate or heavy
	91 Slight rain at time of observation	
	92 Moderate or heavy rain at time of observation	Thunderstorm during the preceding hour but not at time of observation
	93 Slight snow, or rain and snow mixed or hail** at time of observation	Thunderstorm during the preceding hour but not at time of observation
	94 Moderate or heavy snow, or rain and snow mixed or hail** at time of observation	Thunderstorm during the preceding hour but not at time of observation
	95 Thunderstorm, slight or moderate, without hail,** but with rain and/or snow at time of observation	Thunderstorm at time of observation
	96 Thunderstorm, slight or moderate, with hail** at time of observation	Thunderstorm at time of observation
	97 Thunderstorm, heavy, without hail**, but with rain and/or snow at time of observation	Thunderstorm at time of observation
	98 Thunderstorm combined with duststorm or sandstorm at time of observation	Thunderstorm at time of observation
	99 Thunderstorm, heavy, with hail** at time of observation	Thunderstorm at time of observation

TABLE 1. PRESENT WEATHER (ww) CODE

00	Cloud development NOT observed or NOT observable during past hour.	Clouds generally dissolving or becoming less developed during past hour.	State of sky on the whole unchanged during past hour.	Clouds generally forming or developing during past hour.	Visibility reduced by smoke.	Haze	Widespread dust in suspension in the air, NOT raised by wind at time of observation.	Dust or sand raised by wind at time of observation.	Well-developed dust devil(s) within past hour.	Dust storm or sandstorm within sight of at station during past hour.
10	Light fog.	Patches of shallow fog at stations, NOT deeper than 6 feet on land.	More or less continuous shallow fog at station, NOT deeper than 6 feet on land.	Lightning visible, no thunder heard.	Precipitation within sight, but NOT reaching the ground.	Precipitation within sight, reaching the ground, but ~5 km from station.	Precipitation within sight, reaching the ground. NOT at station.	Thunder heard, but no precipitation at the station.	Squall(s) within sight during past hour.	Funnel cloud(s) within sight during past hour.
20	Drizzle (NOT freezing) and NOT falling as shower(s) during past hour. NOT at time of observation.	Rain (NOT freezing) and NOT falling as showers) during past hour, but NOT at time of observation.	Snow (NOT falling as showers) during past hour, but NOT at time of observation.	Rain and snow (NOT falling as showers) during past hour, but NOT at time of observation.	Freezing drizzle or freezing rain (NOT falling as showers) during past hour, but NOT at time of observation.	Showers of rain during past hour, but NOT at time of observation.	Showers of snow, or of rain and snow, during past hour, but NOT at time of observation.	Showers of hail, or of hail and rain during past hour, but NOT at time of observation.	Fog during past hour, but NOT at time of observation	Thunderstorm (with or without precipitation) during past hour, but NOT at time of obs.
30	Slight or moderate dust/storm or sandstorm, has decreased during past hour.	Slight or moderate dust/storm or sandstorm, no appreciable change during past hour.	Slight or moderate dust/storm or sandstorm, has increased during past hour.	Severe dust/storm or sandstorm, has decreased during past hour.	Severe dust/storm or sandstorm, no appreciable change during past hour.	Severe dust/storm or sandstorm, has increased during past hour.	Slight or moderate drifting snow, generally low.	Heavy drifting snow, generally low.	Slight or moderate drifting snow, generally high.	Heavy drifting snow generally high.
40	Fog at distance at time of observation, but NOT at station during past hour.	Fog in patches.	Fog, sky discernible, has become thinner during past hour.	Fog, sky NOT discernible, has become thinner during past hour.	Fog, sky discernible, no appreciable change during past hour.	Fog, sky NOT discernible, no appreciable change during past hour.	Fog, sky discernible, has begun or become thicker during past hour.	Fog, sky NOT discernible, has begun or become thicker during past hour.	Fog, depositing rime, sky discernible.	Fog, depositing rime, sky NOT discernible.
50	Intermittent drizzle, NOT freezing, slight at time of observation.	Continuous drizzle, NOT freezing, slight at time of observation.	Intermittent drizzle, NOT freezing, moderate at time of observation.	Continuous drizzle, NOT freezing, moderate at time of observation.	Intermittent drizzle, NOT freezing, thick at time of observation.	Continuous drizzle, NOT freezing, thick at time of observation.	Slight freezing drizzle.	Moderate or thick freezing drizzle.	Drizzle and rain, slight.	Drizzle and rain, moderate or heavy.
60	Intermittent rain, NOT freezing, slight at time of observation.	Continuous rain, NOT freezing, slight at time of observation.	Intermittent rain, NOT freezing, moderate at time of observation.	Continuous rain, NOT freezing, moderate at time of observation.	Intermittent rain, NOT freezing, thick at time of observation.	Continuous rain, NOT freezing, thick at time of observation.	Slight freezing rain.	Moderate or heavy freezing rain.	Rain or drizzle and snow, slight.	Rain or drizzle and snow, moderate or heavy.
70	Intermittent fall of snowflakes, slight at time of observation.	Continuous fall of snowflakes, slight at time of observation.	Intermittent fall of snowflakes, moderate at time of observation.	Continuous fall of snowflakes, moderate at time of observation.	Intermittent fall of snowflakes, heavy at time of observation.	Continuous fall of snowflakes, heavy at time of observation.	Ice needles (with or without fog).	Granular snow (with or without fog).	Isolated starlike snow crystals (with or without fog).	Ice pellets (sleet, U.S. definition).
80	Slight rain shower(s).	Moderate or heavy rain shower(s).	Violent rain shower(s).	Slight shower(s) of rain and snow mixed.	Moderate or heavy shower(s) of rain and snow mixed.	Slight snow shower(s).	Moderate or heavy snow shower(s).	Slight snow shower(s), or slight rain and snow mixed or hail.	Moderate or heavy shower(s) of rain and/or snow with or without fog.	Slight shower(s) of hail, with or without rain or rain and snow mixed. NOT associated with thunder.
90	Moderate or heavy shower(s) of hail with or without rain or rain and snow mixed. NOT associated with thunder.	Slight rain at time of observation, thunderstorm during past hour, but NOT at time of observation.	Moderate or heavy rain at time of observation, thunderstorm during past hour, but NOT at time of observation.	Slight snow or rain and snow mixed or hail at time of obs., thunderstorm during past hour, but NOT at time of observation.	Moderate or heavy snow or rain and snow mixed or hail at time of obs., thunderstorm during past hour, but NOT at time of obs.	Slight or moderate thunderstorm, without hail, but with rain and/or snow at time of obs.	Slight or moderate thunderstorm, with hail at time of ob.	Heavy thunderstorm without hail, but with rain and/or snow at time of observation.	Thunderstorm combined with duststorm or sandstorm at time of observation.	Heavy thunderstorm with hail at time of observation.

$7w_aw_aW_{a1}W_{a2}$ - Present and Past Weather Group reported from an automatic weather station.

w_aw_a - Present weather at time of the observation. Use code table 4680.

$W_{a1}W_{a2}$ - Past weather reported from an automatic weather station. Use code table 4531.

Code table 4680 w_aw_a — Present weather reported from an automatic weather station

Code figure	Description
00	No significant weather observed.
01	Clouds generally dissolving or becoming less developed during the past hour.
02	State of sky on the whole unchanged during the past hour.
03	Clouds generally forming or developing during the past hour.
04	Haze or smoke, or dust in suspension in the air, visibility equal to, or greater than, 1 km.
05	Haze or smoke, or dust in suspension in the air, visibility less than 1 km.
06 07 08 09	Reserved
10	Mist
11	Diamond dust
12	Distant lightning
13 14 15 16 17	Reserved
18	Squalls
19	Reserved
Code figures 20-26 are used to report precipitation, fog (or ice fog) or thunderstorm at the station during the preceding hour but not at the time of observation.	
20	Fog
21	PRECIPITATION
22	Drizzle (not freezing) or snow grains
23	Rain (not freezing)
24	Snow
25	Freezing drizzle or freezing rain
26	Thunderstorm (with or without precipitation)
27	Blowing or Drifting snow or sand
28	Blowing or drifting snow or sand, visibility equal to, or greater than, 1 km
29	Blowing or drifting snow or sand, visibility less than 1 km
30	FOG
31	Fog or ice fog in patches
32	Fog or ice fog, has become thinner during the past hour
33	Fog or ice fog, no appreciable change during the past hour
34	Fog or ice fog, has begun or become thicker during the past hour
35	Fog, depositing rime
36 37 38 39	Reserved

40	PRECIPITATION
41	Precipitation, slight or moderate
42	Precipitation, heavy
43	Liquid precipitation, slight or moderate
44	Liquid precipitation, heavy
45	Solid precipitation, slight or moderate
46	Solid precipitation, heavy
47	Freezing precipitation, slight or moderate
48	Freezing precipitation, heavy
49	Reserved
50	DRIZZLE
51	Drizzle, not freezing, slight
52	Drizzle, not freezing, moderate
53	Drizzle, not freezing, heavy
54	Drizzle, freezing, slight
55	Drizzle, freezing, moderate
56	Drizzle, freezing, heavy
57	Drizzle and rain, slight
58	Drizzle and rain, moderate or heavy
59	Reserved
60	RAIN
61	Rain, not freezing, slight
62	Rain, not freezing, moderate
63	Rain, not freezing, heavy
64	Rain, freezing, slight
65	Rain, freezing, moderate
66	Rain, freezing, heavy
67	Rain (or drizzle) and snow, slight
68	Rain (or drizzle) and snow, moderate or heavy
69	Reserved
70	SNOW
71	Snow, slight
72	Snow, moderate
73	Snow, heavy
74	Ice pellets, slight
75	Ice pellets, moderate
76	Ice pellets, heavy
77 78 79	Reserved
80	SHOWER(S) or INTERMITTENT PRECIPITATION
81	Rain shower(s) or intermittent rain, slight
82	Rain shower(s) or intermittent rain, moderate
83	Rain shower(s) or intermittent rain, heavy
84	Rain shower(s) or intermittent rain, violent
85	Snow shower(s) or intermittent snow, slight
86	Snow shower(s) or intermittent snow, moderate
87	Snow shower(s) or intermittent snow, heavy
88 89	Reserved
90	THUNDERSTORM
91	Thunderstorm, slight or moderate, with no precipitation
92	Thunderstorm, slight or moderate, with rain showers and/or snow showers
93	Thunderstorm, slight or moderate, with hail
94	Thunderstorm, heavy, with no precipitation
95	Thunderstorm, heavy, with rain showers and/or snow showers

96	Thunderstorm, heavy, with hail
97 98 }	Reserved
99	Tornado

Code table 4532 $W_{a1}W_{a2}$ — Past weather reported from an automatic weather station

Code figure	Description
0	No significant weather.
1	Visibility reduced.
2	Blowing phenomena, visibility reduced.
3	Fog.
4	Precipitation.
5	Drizzle.
6	Rain.
7	Snow, or Ice pellets.
8	Showers or intermittent precipitation.
9	Thunderstorm.

$8N_hC_LC_MC_H$ - Cloud Type Group

8 - Identifier of the type of cloud group. The group is omitted when there are no clouds, when the sky is obscured, or the cloud cover in indiscernible.

N_h - Amount of low cloud present or, if no low cloud is present, the amount of all the C_M cloud present. Use code table 2700 with the Nddff group.

C_L - Clouds of the genera stratocumulus, stratus, cumulus, and cumulonimbus. Use code table 0513.

C_M - Clouds of the genera Altocumulus, Altostratus, and Nimbostratus. Use code table 0515.

C_H - Clouds of the genera Cirrus, Cirrocumulus, and Cirrostratus. Use code table 0509.

Code table 0513 C_L — Clouds of the genera stratocumulus, stratus, cumulus, and cumulonimbus	
Code figure	Technical specifications
0	No C_L clouds
1	Cumulus humilis or cumulus fractus other than of bad weather,* or both.
2	Cumulus mediocris or congestus, with or without cumulus of species fractus or humilis or stratocumulus, all having their bases at the same level.
3	Cumulonimbus calvus, with or without cumulus, stratocumulus or stratus.
4	Stratocumulus cumulogenitus.
5	Stratocumulus other than stratocumulus cumulogenitus.
6	Stratus nebulosus or stratus fractus other than of bad weather,* or both.
7	Stratus fractus or cumulus fractus of bad weather,* or both (pannus), usually below altostratus or nimbostratus.
8	Cumulus and stratocumulus other than stratocumulus cumulogenitus, with bases at different levels.
9	Cumulonimbus capillatus (often with an anvil), with or without cumulonimbus calvus, cumulus, stratocumulus, stratus or pannus.
/	C_L clouds invisible owing to darkness, fog, blowing dust or sand, or other similar phenomena.
*	"Bad weather" denotes the conditions which generally exist during precipitation and a short time before and after.

Code table 0515 C_M — Clouds of the genera altocumulus, altostratus, and nimbostratus	
Code figure	Technical specifications
0	No C_M clouds
1	Altostratus translucidus
2	Altostratus opacus or nimbostratus
3	Altocumulus translucidus at a single level.
4	Patches (often lenticular) of altocumulus translucidus, continually changing and occurring at one or more levels.
5	Altocumulus translucidus in bands, or one or more layers of altocumulus translucidus or opacus, progressively invading the sky; these altocumulus clouds generally thicken as a whole.
6	Altocumulus cumulogenitus (or cumulonimbogenitus)
7	Altocumulus translucidus or opacus in two or more layers, or altocumulus opacus in a single layer, not progressively invading the sky, or altocumulus with altostratus or nimbostratus.
8	Altocumulus castellanus or floccus.
9	Altocumulus of a chaotic sky, generally at several levels.
/	C_M clouds invisible owing to darkness, fog, blowing dust or sand, or other similar phenomena, or because of continuous layer of lower clouds.

Code table 0509 C_H — Clouds of the genera cirrus, cirrocumulus, and cirrostratus	
Code figure	Technical specifications
0	No C_H clouds.
1	Cirrus fibratus, sometimes uncinus, not progressively invading the sky.
2	Cirrus spissatus, in patches or entangled sheaves, which usually do not increase and sometimes seem to be the remains of the upper part of a cumulonimbus; or cirrus castellanus or floccus.
3	Cirrus spissatus cumulonimbogenitus.
4	Cirrus uncinus or fibratus, or both, progressively invading the sky; they generally thicken as a whole.
5	Cirrus (often in bands) and cirrostratus, or cirrostratus alone, progressively invading the sky; they generally thicken as a whole, but the continuous veil does not reach 45 degrees above the horizon.
6	Cirrus (often in bands) and cirrostratus, or cirrostratus alone, progressively invading the sky; they generally thicken as a whole; the continuous veil extends more than 45 degrees above the horizon, without the sky being totally covered.
7	Cirrostratus covering the whole sky.
8	Cirrostratus not progressively invading the sky and not entirely covering it.
9	Cirrocumulus alone, or cirrocumulus predominant among the C_H clouds.
/	C_H clouds invisible owing to darkness, fog, blowing dust or sand, or other similar phenomena, or because of a continuous layer of lower clouds.

9GGgg - **Actual time of observation group**. This group is included when the actual time of observation differs by more than 10 minutes from the standard time GG reported in section 0, or when additionally specified by regional requirements. WMO regions IV and V include this group as 9YYGG at the end of section 5. It is the day and hour (UTC) of the observation, a redundant reporting of YYGG.

9 - Identifier for actual time of observation group.
GGgg - Actual time of the observation, in hours and minutes UTC.

2. Section 2

Land stations include section 2 only in reports from selected manned coastal stations which have been authorized to include information about water temperature, wind waves and swell waves in their observations. The group is also included in observations from ships, buoys, and platforms at sea or on lakes.

222// - Section 2 Identifier Group for Reporting Wind and Swell Waves

222 - Identifier for section 2 of the report..

$0s_nT_WT_WT_W$ - Sea-surface temperature group.

0 - Identifier for sea-surface temperature group.

s_n - Sign of the temperature: 0 = temperature is positive or zero; 1 = temperature is negative.

$T_WT_WT_W$ - Sea-surface water temperature given in units of tenths of degree Celsius.

$1P_{wa}P_{wa}H_{wa}H_{wa}$ - Instrumental wave data group.

1 - Identifier for the instrumental wave data group.

$P_{wa}P_{wa}$ - Period of the waves obtained by instrumental methods, in whole seconds.

$H_{wa}H_{wa}$ - Height of waves, obtained by instrumental methods, in units of 0.5 meters. See wave height table below.

Wave height $H_{wa}H_{wa}$

Code figure	meters	feet
00	<0.25	<0.8
01	0.25 - <0.75	0.8 - <2.5
02	0.75 - <1.25	2.5 - <4.1
03	1.25 - <1.75	4.1 - <5.7
04	1.75 - <2.25	5.7 - <7.4
05	2.25 - <2.75	7.4 - <9.0
06	2.75 - <3.25	9.0 - <10.7
07	3.25 - <3,75	10.7 - <12.3
08	3.75 - < 4.25	12.3 - < 13.9
09	4.25 - < 4.75	13.9 - < 15.6
10	4.75 - < 5.25	15.6 - < 17.2
11	5.25 - < 5.75	17.2 - < 18.9
12	5.75 - < 6.25	18.9 - <20.5
13	6.25 - < 6.75	20.5 - < 22.1
14	6.75 - < 7.25	22.1 - < 23.8
15	7.25 - < 7.75	23.8 - < 25.4
16	7.75 - < 8.25	25.4 - <27.1
17	8.25 - <8.75	27.1 - <28.7
18	8.75 - <9.25	28.7 - <30.3
19	9.25 - <9.75	30.3 - <32.0
20	9.75- <10.25	32.0 - <33.6

$2P_WP_WH_WH_W$ - Wind Wave Group. This group is used to report wind waves when instrumental wave data is not available. The period and wave heights are estimated.

2 - Identifier for the non-instrumental wind wave group.

P_WP_W - Estimated period of the wind wave in whole seconds.

H_WH_W - Estimated height of the wind waves in units of half-meters. A half-meter is 1 1/2 feet. The wave height reported in code form is the significant wave height which is the average height of the highest one-third of the waves observed. When an observer estimates the average height of a group of waves, the value most commonly estimated is the average height of the highest one-third of the waves rather than the average height of all the waves.

$3d_{w1}d_{w1}d_{w2}d_{w2}$ - Swell Wave Direction Group

3 - Identifier for the swell wave direction group.

$d_{w1}d_{w1}$ - The true direction, in tens of degrees <u>from</u> which the first swell wave system is moving. Code table 0877 is used.

$d_{w2}d_{w2}$ - The true direction, in tens of degrees from which the second swell wave system is moving. Code table 0877 is used.

$4P_{w1}P_{w1}H_{w1}H_{w1}$ - First Swell System Group

4 - Identifier for the first swell system group.

$P_{w1}P_{w1}$ - Period of the first swell system in whole seconds.

$H_{w1}H_{w1}$ - Average height of the significant swell waves of the first swell system reported in half-meters. Use the code table associated with group 2 above.

$5P_{w2}P_{w2}H_{w2}H_{w2}$ - Second Swell Wave System Group

5 - Identifier for the second swell wave system group.

$P_{w2}P_{w2}$ - Period of the second swell wave system in whole seconds.

$H_{w2}H_{w2}$ - Average height of the significant swell waves of the second swell system. Use the code table associated with group 2 above.

$70H_{wa}H_{wa}H_{wa}$ - Instrumental Wave Height Group. This group is reported in addition to the $1P_{wa}P_{wa}H_{wa}H_{wa}$ when the station has the capability of accurately measuring instrumental wave height in units of 0.1 meter.

70 - Identifier for the instrumental wave height group.

$H_{wa}H_{wa}H_{wa}$ - Height of waves, obtained by instrumental methods, in units of 0.1 meter.

3. Section 3

Section 3 contains information that is needed within a particular WMO region, or a portion of a region. Not all of the following groups are used in every region.

333 - Group Identifier for Section 3

$0C_sD_LD_MD_H$ - State of the Sky in the Tropics Group

This group is a regionally developed group and is used only by certain stations in the southern part of WMO Region IV. It is normally included only during the season when tropical cyclones are most active.

0 - Identifier for the state of the sky in the tropics group.

C_s - State of the sky in the tropics. Use code table 430.

$D_L D_M D_H$ - Directions from which the low clouds, middle clouds, and high clouds are moving, respectively. Use code table 0700.

Code table 0430 C_S — State of Sky in Tropics

Code figure	Technical specifications
0	Cumulus, if any, are quite small; generally less than 2/8 coverage, except on windward slopes of elevated terrain; average width of cloud is at least as great as its vertical thickness.
1	Cumulus of intermediate size with cloud cover less than 5/8; average cloud width is more than its vertical thickness; towers are vertical with little or no evidence of precipitation, except along slopes of elevated terrain; a general absence of middle and upper clouds.
2	Swelling cumulus with rapidly growing tall turrets which decrease in size with height and whose tops tend to separate from the lower cloud body and evaporate within minutes of the separation.
3	Swelling cumulus with towers having a pronounced tilt in a downwind direction; vertical cloud thickness is more than 11/2 times that of its average width.
4	Swelling cumulus with towers having a pronounced tilt in an upwind direction; vertical cloud thickness is more than 11/2 times that of its average width.
5	Tall cumulus congestus with vertical thickness more than twice the average width; not organized in clusters or lines; one or more layers of clouds extend out from the cloud towers, no continuous cloud layers exist.
6	Isolated cumulonimbus or large clusters of cumulus turrets separated by wide areas in which clouds are absent; cloud bases are generally dark with showers observed in most cells; some scattered middle and upper clouds may be present; individual cumulus cells are one to two times higher than they are wide.
7	Numerous cumulus extending through the middle troposphere with broken to overcast sheets of middle clouds and/or cirrostratus; cumulus towers do not decrease generally in size with height; ragged dark cloud bases with some showers are present.
8	Continuous dense middle clouds and/or cirrostratus cloud sheets with some large isolated cumulonimbus or cumulus congestus clouds penetrating these sheets; light rain occasionally observed from the altostratus; cumulonimbus bases are ragged and dark with showers visible.
9	Continuous sheets of middle clouds and/or cirrostratus with cumulonimbus and cumulus congestus in organized lines or cloud bands; rain is generally observed from altostratus sheets and heavy showers from cumulonimbus; wind has a squally character.
/	State of the sky unknown or not described by any of the above.
Note:	In the event of obscuration of clouds due to heavy rain, the observer should use classification 5 or 8. Use 5 if the rain is localized or is brief in duration; use 8 if the rain is widespread or lasts for longer periods.

Code Table 0700 Direction or Bearing	
Code figure	Description
0	Calm (in D, DK), or stationary (in Ds), or at the station (in Da, D1), or stationary or no clouds (in DH, DL, DM).
1	NE
2	E
3	SE
4	S
5	SW
6	W
7	NW
8	N
9	All directions (in Da, D1), or confused (in Dk), or variable (in D(wind)), or unknown (in Ds), or unknown or clouds invisible (in DH, DL, DM).
/	Report from a coastal land station or displacement of ship not reported (in Ds only).

$1s_nT_xT_xT_x$ - ***Maximum Temperature Group.*** The period of time covered by the maximum and the minimum temperature and the synoptic hour at which these temperatures are reported is determined by regional decision.

1 - Identifier for the maximum temperature group.

s_n - Sign of the temperature. 0 = positive or zero maximum temperature. 1 = negative maximum temperature.

$T_xT_xT_x$ - Maximum temperature in tenths of degrees Celsius.

For stations in WMO Region IV:

- ♣ 0000Z Report maximum temperature during past 12 hours.
- ♣ 0600Z Report maximum temperature during past 24 hours.
- ♣ 1200Z Report maximum temperature during previous calendar day ending at midnight time.
- ♣ 1800Z Report maximum temperature during past 12 hours.

$2s_nT_nT_nT_n$ - **Minimum Temperature Group**

s_n - *Sign of the temperature*. 0 = positive or zero; 1 = temperature is negative.

$T_nT_nT_n$ - *Minimum temperature* in tenths of degrees Celsius.

For stations in WMO Region IV:

- ♣ 0000Z Report minimum temperature for past 18 hours.
- ♣ 0600Z Report minimum temperature for past 24 hours.
- ♣ 1200Z Report minimum temperature for past 12 hours.
- ♣ 1800Z Report minimum temperature for past 24 hours.

3Ejjj - **State of the ground without snow or measurable ice cover.** The inclusion of this group is left to the discretion of member nations within Regional Association IV.

3 - Identifier for state of the ground group

E - State of the ground. Use code table 0901.

Code table 0901 E — State of the ground without snow or measurable ice cover

Code figure	Description
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

jjj - No regional decision has been made for the use of these letters so they will be encoded as solidi (///).

4E'sss - **State of the ground with snow or ice cover.** The inclusion of this group is left to the discretion of member nations within Regional Association IV.

4 - Identifier for state of the ground with snow or ice cover group.

E' - State of the ground code figure. Use code table 0975.

Code table 0975 E' — State of the ground with snow or measurable ice cover

Code figure	Description
0	Ground predominantly covered by ice
1	Compact or wet snow (with or without ice) covering less than one-half of the ground
2	Compact or wet snow (with or without ice) covering at least one-half of the ground but ground not completely covered
3	Even layer of compact or wet snow covering ground completely
4	Uneven layer of compact or wet snow covering ground completely
5	Loose dry snow covering less than one-half of the ground
6	Loose dry snow covering at least one-half of the ground (but not completely)
7	Even layer of loose dry snow covering ground completely
8	Uneven layer of loose dry snow covering ground completely
9	Snow covering ground completely; deep drifts

sss - Total depth of snow. Use code table 3889.

Code table 3889 sss — Total depth of snow	
Code figure	
000	Not used
001	1 cm
002	2 cm
etc	etc.
996	996 cm
997	Less than 0.5 cm
998	Snow cover, not continuous
999	Measurement impossible or inaccurate

$5j_1j_2j_3j_4$ - Regional Supplementary Information group

$5EEEi_E$ -Amount of evaporation or evapotranspiration group

EEE - Amount of either evaporation or evapotranspiration, in tenths of a millimeter, during the preceding 24 hours. The first E will be a 0, 1, 2, or 3.

i_E - Indicator of the type of instrumentation for evaporation measurement or type of crop for which evapotranspiration is reported.

$54g_os_nd_T$ - Temperature change group

54 - indicator for temperature change group.

g_o - Period of time, in hours, between the time of the observation and the time of the temperature change. The value of g_o can be 0 to 5, with 0 meaning within the hour preceding the time of observation.

s_n - Sign of the change. 0 = positive, or zero; 1 = negative.

d_T - - Amount of temperature change. Use code table 0822.

Code table 0822 d_T — Amount of temperature change	
Code figure	
0	10°C
1	11°C
2	12°C
3	13°C
4	14°C or more
5	5°C
6	6°C
7	7°C
8	8°C
9	9°C

55SSS ($j_5F_{24}F_{24}F_{24}F_{24}$) - Duration of sunshine and amount of radiation group

55 - Indicator for duration of sunshine group. It is included at either 0000, 0600, 1200, or 1800 UTC.

SSS - Duration of daily sunshine, in hours and tenths of an hour. The symbolic expression 553SS j5FFFF shall be used to report the duration of sunshine in the past hour, in tenths of an hour.

j5 - The sign of the radiation during the preceding 24 hours. Use the following code table.

Code table j5 — Sign of radiation during preceding 24 hours	
Code figure	
0	$F_{24}F_{24}F_{24}F2_{24}$ = positive net radiation during the preceding 24 hours, in j cm^{-2}
1	$F_{24}F_{24}F_{24}F2_{24}$ = negative net radiation during the preceding 24 hours, in J cm^{-2}
2	$F_{24}F_{24}F_{24}F2_{24}$ = global solar radiation during the preceding 24 hours, in J cm^{-2}
3	$F_{24}F_{24}F_{24}F2_{24}$ = diffused solar radiation during the preceding 24 hours, in J cm^{-2}
4	$F_{24}F_{24}F_{24}F2_{24}$ = downward long-wave radiation during the preceding 24 hours , in J cm^{-2}
5	$F_{24}F_{24}F_{24}F2_{24}$ = upward long-wave radiation during the preceding 24 hours, in J cm^{-2}
6	$F_{24}F_{24}F_{24}F2_{24}$ = short-wave radiation during the preceding 24 hours, in J cm^{-2}

Code table j5 — Sign of radiation during previous hour	
Code figure	
0	FFFF = positive net radiation during the previous hour, in kJ m^{-2}
1	FFFF = negative net radiation during the the previous hour, in kJ m^{-2}
2	FFFF = global solar radiation during the previous hour, in kJ m^{-2}
3	FFFF = diffused solar radiation during the previous hour, in kJ m^{-2}
4	FFFF = downward long-wave radiation during the previous hour, in kJ m^{-2}
5	FFFF = upward long-wave radiation during the previous hour, in kJ m^{-2}
6	FFFF = short-wave radiation during the previous hour, in kJ m^{-2}

$j_5j_6j_7j_8j_9$ - j_5 gives the sign of the net radiation; j_6 gives the thousands digit of net radiation; j_7 gives the hundreds digit; j_8 gives the tens digit; and j_9 gives the units digit.

$56D_LD_MD_H$ - Cloud Direction Movement Group

In WMO Region V, Tropical Pacific, this group is used to report the direction of cloud movement as the group $0C_sD_LD_MD_H$ is used in the southern part of WMO Region IV for the same purpose.

56 - Identifier for cloud direction movement group.

$D_L D_M D_H$ - True direction from which the low clouds, mid. clouds, and high clouds are moving, respectively. See code table 0700, page 17.

$58P_{24}P_{24}P_{24}$ - These groups are used in reports from stations in the southern or **$59P_{24}P_{24}P_{24}$** part of WMO Region IV.

- The first two digits of each group show whether the pressure at the time of observation was higher than it was 24 hours ago, or no change (use group 58), or lower than it was 24 hours ago (use group 59).

- The last three characters in the group ($P_{24}P_{24}P_{24}$) are the actual pressure change from the pressure 24 hours before, reported to the nearest tenths of hectopascal.

$7R_{24}R_{24}R_{24}R_{24}$ - 24-Hour Precipitation Group

This group is reported by all stations capable of doing so, and is included at least once daily at either 0000, 0600, 1200, or 1800 UTC. If the station is part of the U.S. CLIMAT network, this group will always be included on the 0600 UTC report regardless of whether or not there was any precipitation.

7 - Identifier for the 24-hour precipitation group.

$R_{24}R_{24}R_{24}R_{24}$ - Precipitation amount for the past 24 hours. The total amount of liquid precipitation and the water equivalent for solid precipitation is encoded to the nearest tenths of millimeters. It is coded 79998 for 999.8 mm or more, and if only a trace has fallen, encode 79999.

$8N_sCh_sh_s$ - Individual Cloud Layer Group

The inclusion of this group is left to the discretion of individual members of Region IV and V. This group is normally included only in reports from staffed stations in WMO Region IV and V that do not transmit hourly observations.

8 - *Identifier for the individual cloud layer group*. The group may be repeated up to three times (four if one layer is cumulonimbus) in one report.

N_s - *The amount of the individual cloud layer* reported. Use code table 2700. See the table with the Nddff group.

C - *Cloud type* for the layer. Use code table 0500.

h_sh_s - *Height above the ground* of the base of the cloud layer. Use code table 1677.

Code table 0500 C — Genus of cloud					
Code figure	Cloud genus		Code figure	Cloud genus	
0	Cirrus (Ci)	CI	5	Nimbostratus (Ns)	NS
1	Cirrocumulus (Cc)	CC	6	Stratocumulus (Sc)	SC
2	Cirrostratus (Cs)	CS	7	Stratus (St)	ST
3	Altocumulus (Ac)	AC	8	Cumulus (Cu)	CU
4	Altostratus (As)	AS	9	Cumulonimbus (Cb)	CB
/	Cloud not visible owing to darkness, fog, duststorm sandstorm, or other analogous phenomena.				

Code table 1677 h_Sh_S — Height of cloud above ground								
Code figure	feet	meters	Code figure	feet	meters	Code figure	feet	Meters
00	<100	<30						
01	100	30	34	3,400	1020	67	17,000	5,100
02	200	60	35	3,500	1050	68	18,000	5,400
03	300	90	36	3,600	1080	69	19,000	5,700
04	400	120	37	3,700	1110	70	20,000	6,000
05	500	150	38	3,800	1,140	71	21,000	6,300
06	600	180	39	3,900	1,170	72	22,000	6,600
07	700	210	40	4,000	1,200	73	23,000	6,900
08	800	240	41	4,100	1,230	74	24,000	7,200
09	900	270	42	4,200	1,260	75	25,000	7,500
10	1,000	300	43	4,300	1,290	76	26,000	7,800
11	1,100	330	44	4,400	1,320	77	27,000	8,100
12	1,200	360	45	4,500	1,350	78	28,000	8,400
13	1,300	390	46	4,600	1,380	79	29,000	8,700
14	1,400	420	47	4,700	1,410	80	30,000	9,000
15	1,500	450	48	4,800	1,440	81	31,000	10,500
16	1,600	480	49	4,900	1,470	82	32,000	12,000
17	1,700	510	50	5,000	1,500	83	33,000	13,500
18	1,800	540	51			84	34,000	15,000
19	1,900	570	52			85	35,000	16,500
20	2,000	600	53	Not used		86	36,000	18,000
21	2,100	630	54			87	37,000	19,500
22	2,200	660	55			88	38,000	21,000
23	2,300	690	56	6,000	1,800	89	<38,000	<21,000
24	2,400	720	57	7,000	2,100	90		<50
25	2,500	750	58	8,000	2,400	91		50-100
26	2,600	780	59	9,000	2,700	92		100-200
27	2,700	810	60	10,000	3,000	93		200-300
28	2,800	840	61	11,000	3,300	94		300-600
29	2,900	870	62	12,000	3,600	95		600-1000
30	3,000	900	63	13,000	3,900	96		1000-1500
31	3,100	930	64	14,000	4,200	97		1500-2000
32	3,200	960	65	15,000	4,500	98		2000-2500
33	3,300	990	66	16,000	4,900	99		>2,500

$9S_pS_ps_ps_p$ - Special Phenomena Group

This group is used to give additional information about certain phenomena occurring at the time of observation and/or during the period covered by ww or W1W2. The relevant time or time period may be indicated by inclusion of one or more time groups, when and where appropriate. The possible phenomena reported here is so large that only a few examples are given. Complete information can be found in the WMO Manual on Codes, Volumes 1 and 2. Tables presented here to encode and decode this group are applicable only to WMO Region IV. Other regions have their own code tables for this group.

9 - *Identifier for the special phenomena group*.

S_pS_p - *Code figure for a particular phenomena*. Code tables are determined by each region.

s_ps_p - *Code value of the phenomena* given by S_pS_p.

Examples:

$909R_td_c$ - Time of beginning or ending of precipitation, duration and character group. This group is included in observations from most Caribbean stations in section 3 every time the group $6RRRt_R$ is reported in section 1.

09 - *Indicator for time of beginning or ending of precipitation* as well as the duration and character of the precipitation.

R_t - *Code for the time precipitation began or ended*. If there is precipitation at the time of the observation, or if there was precipitation during the hour before the observation, encode the time the precipitation began using table 3552.

d_c - *Indicator for the duration and character of the precipitation.*. Use code table 0833.

Code table 3552 R_t — Time at which precipitation given by RRR began or ended

Code figure	Description
1	Less than 1 hour before time of observation
2	1 to 2 hours before time of observation
3	2 to 3 hours before time of observation
4	3 to 4 hours before time of observation
5	4 to 5 hours before time of observation
6	5 to 6 hours before time of observation
7	6 to 12 hours before time of observation
8	More than 12 hours before time of observation
9	Unknown

Code Table 0833 — Duration and Character of Precipitation	
Code figure	Description
0 Lasted less than 1 hour 1 Lasted 1 to 3 hours 2 Lasted 3 to 6 hours 3 Lasted more than 6 hours	Only one period of precipitation has occurred during the past 6 hours

931ss - Code group for depth of new fallen snow.

31 - Indicator for depth of new fallen snow during the past 6 hours.

ss - Depth of snow in millimeters. Use code table 3870.

Code table 3870 ss — Depth of new fallen snow			
Code figure	(mm)	Code figure	(mm)
00	0	70	2000
01	10	etc.	etc.
02	20	90	4000
etc.	etc.	91	1
55	550	92	2
56	600	93	3
57	700	94	4
etc.	etc.	95	5
59	900	96	6
60	1000	97	Less than 1 mm
61	1100	98	More than 4000 mm
etc.	etc.	99	Measurement impossible or inaccurate

938nn - Average Rate of Accrual of Glaze Group

38 - Indicator for average rate of accrual of glaze group.

nn - Average rate of accrual of glaze in millimeters per hour. To find the average rate, measure the accumulated depth of the glaze to the nearest whole millimeter, and divide it by the actual time the glaze was accumulating, rounded to the nearest whole our. If the time is less than 30 minutes, then round it up to 1 hour. Finally, round the average rate to the nearest whole millimeter per hour.

4. Section 5, National Code Groups

This part of the code is reserved for national use. Each country is free to use section 5 for transmission of groups that are of interest within that particular country. The format of section 5 will vary from country to country. The format shown below is included in U.S. reports from NWS stations only. Military stations will not include this section.

This is the format for the entire section. It is unlikely that any one station would include all of the groups in any one report.

555 RECORD $0i_tt_Dt_Dt_D$ $1s_nTT$ $s_nT_xT_xs_nT_nT_n$ RECORD
$2R_{24}R_{24}R_{24}R_{24}$ $3s_nTT$ $4R_1R_1R_1R_1$ $44s_nT_wT_w$ $5s_nTT$ 6RRRR 9YYGG

555 - Identifier for Section 5

RECORD - Device used to show that an old record temperature has been equaled or exceeded. The following table shows the contractions to be used for record high and low temperatures. The table is divided into contractions for temperatures equaled and temperatures exceeded, for the entire year and for a particular season. For example, in January suppose you measure a new record low temperature for the month. Then, at the intersection of the Winter row and the Low Exceeded column you find the contraction LOXFM. This contraction would be substituted for RECORD in section 555.

The contraction is included only one time, in the first observation that includes the actual record temperature, in section 3 of the report.

In addition to the contractions in the table, each NWS region may also decide to use contractions for record temperatures for the day. These contractions are:

HIEDA - The record high temperature for the day has been equaled
HIXDA - The record high temperature for the day has been exceeded.
LOEDA - The record low temperature for the day has been equaled.
LOXDA - The record low temperature for the day has been exceeded.

Record Temperature Contractions

Time of Year (type of record)	High		Low	
	Equaled	Exceeded	Equaled	Exceeded
All Year (all time)	HIEAT	HIXAT	LOEAT	LOXAT
Summer (June, July, Aug.) or Winter (Dec., Jan., Feb.)	HIEFM	HIXFM	LOEFM	LOXFM
Spring (Mar., Apr., May) (so early)	HIESE	HIXSE		
(so late)			LOESL	LOXSL
Fall ((Sept., Oct., Nov.) (so early)		LOESE	LOXSE	
(so late)	HIESL	HIXSL		

$0i_t t_D t_D t_D$ - Tide Information Group

This group is included in reports from selected coastal stations to report tide information.

0 - Identifier for the tide data group.

i_t - Tide Indicator. Tell whether or not the observation was made at the time of a predicted low or high tide, and gives the sign of the departure if the observed level is different from the predicted level. Use the following code table.

Tide Information	
Code figure	Description
0	Data not available.
1	Low tide: observed tide below predicted level.
2	Low tied; observed tide same as predicted level.
3	Low tide; observed tide above predicted level.
4	Neither low nor high tide; observed tide below predicted level.
5	Neither low nor high tide; observed tide same as predicted level.
6	Neither low nor high tide; observed tide above predicted level.
7	High tide; observed tide below predicted level.
8	High tide; observed tide same as predicted level.
9	High tide; observed tide above predicted level.

$t_D t_D t_D$ - *Actual departure from the predicted level*, in tenths of feet. If there is not departure from the predicted level, then encode $t_D t_D t_D$ as 000.

5. City Data

In many cases there is a large difference between the conditions at the station where the observation is taken and in a nearby city. Each of the NWS regions has the authority to decide whether to add the city data to the synoptic observation. The format is as follows:

$1s_n TT$ $s_n T_x T_x s_n T_n T_n$ RECORD $2R_{24}R_{24}R_{24}R_{24}$

$1s_n TT$ - Present City Temperature Group.

1 - *Indicator for present city temperature group* and the next maximum/minimum temperature group also.

s_n - *Sign of the present temperature*; 0 = positive or zero, 1 = negative.

TT - *Air temperature at the city station*, in whole Fahrenheit degrees. Always encoded using two digits.

$s_n T_x T_x s_n T_n T_n$ - City Maximum/Minimum Temperature Group

s_n - *Sign of the maximum temperature*; 0 = positive or zero, 1 = negative.

T_xT_x - *Maximum temperature* in whole degrees Fahrenheit.

s_n - *Sign of the minimum temperature*.

T_nT_n - *Minimum temperature* in whole degrees Fahrenheit.

RECORD - *A contraction from table 3845* is included here to show if a record temperature was equaled or exceeded.

$2R_{24}R_{24}R_{24}R_{24}$ - 24-Hour Precipitation Group for the City

2 - Identifier for the 24-hour precipitation.

$R_{24}R_{24}R_{24}R_{24}$ - Total amount of actual liquid precipitation and water equivalent for the city. Reported in hundredths of an inch.

$3s_nTT$ $4R_1R_1R_1R_1$ - *Weekly Data* . The weekly data groups are included in the 1200 UTC observation every Monday if required by the NWS Region.

$3s_nTT$ - Weekly Mean Temperature Group.

3 - *Identifier for the weekly mean temperature group*.

s_n - *Sign of the temperature*.

TT - *Mean weekly temperature* in whole degrees Fahrenheit. If the temperature is over 100^oF, use three digits to encode the mean temperature.

$4R_1R_1R_1R_1$ - Total Weekly Precipitation Group.

4 - Identifier for the total weekly precipitation.

$R_1R_1R_1R_1$ - Total weekly liquid precipitation and water equivalent of solid precipitation for the week.

$44s_nT_WT_W$ - Lake Temperature Group.

44 - *Identifier for the lake temperature group*.

s_n - *Sign of the temperature*.

T_WT_W - *Lake water temperature* in whole degrees Fahrenheit.

$5s_nTT$ 6RRRR - *Monthly Data*. Monthly data are included in the 1800 UTC observation on the first day of the month that isn't a Saturday, Sunday, or holiday from stations required to send monthly data.

$5s_nTT$ - ***Monthly Mean Temperature Group.*** This group is encoded as is the weekly mean temperature group with the temperature in whole degrees Fahrenheit.

6RRRR - ***Total Monthly Precipitation Group.*** This group is encoded as is the weekly total precipitation group with the precipitation encoded to the nearest hundredths of an inch.

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* The expression "at the station" refers to a land station or a ship.
** Hail, small hail, snow pellets.
* French: grêle.
** Hail, small hail, snow pellets.