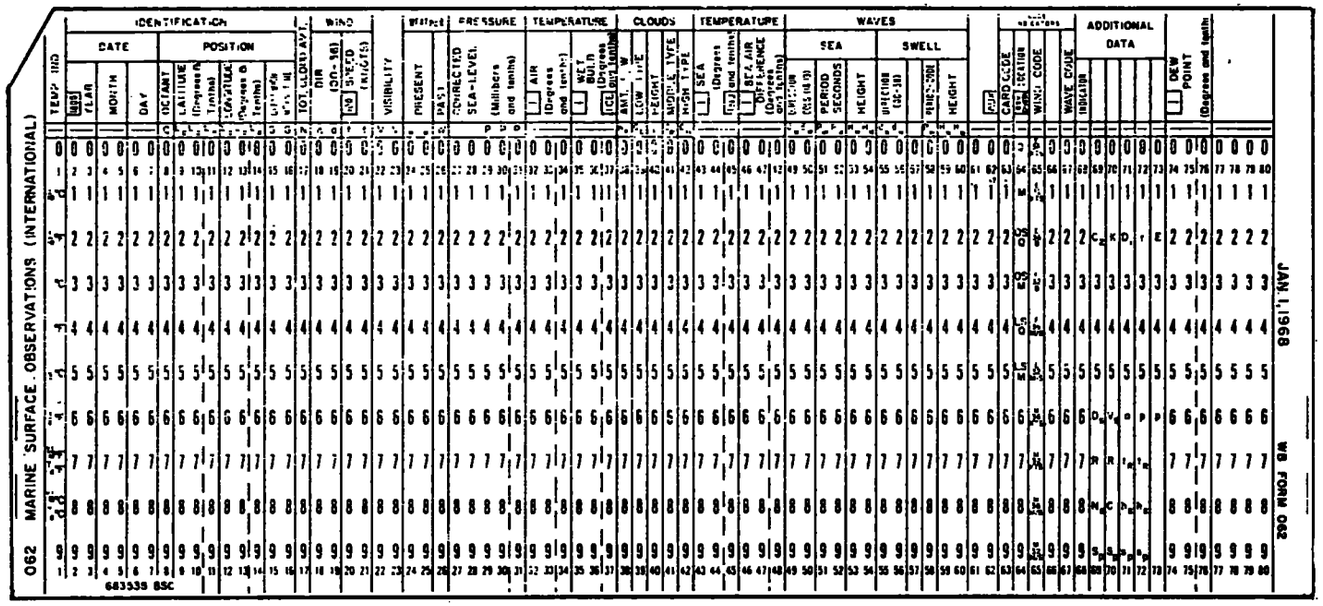
CARD DECK 928 HOURLY SURFACE MARINE OCEAN STATION VESSELS



AREA COVERAGE: Locations of Ocean Station Vessels B, C, D, E, N, and V.

PERIOD OF RECORD: January 1965 -

OBSERVATION TIME: GMT 00 - 23 Hourly

CODES: 1960 WMO Codes FM 21.C and 1968 WMO Codes FM 21.D

SOURCE: WBAN Forms 11A and 11B. The source of data for the 3- and 6-hourly synoptic observations is Form WBAN 11B, Surface Weather Observations. The intermediate observations are obtained from the 16 hourly observations entered in synoptic code on Form WBAN 11A.

MISSING DATA: When data are missing the appropriate columns are left blank. Identification cards are not punched for missing observations.

COLUMNS AND ELEMENTS PUNCHED: Columns 1-45, 49-65, 67-72, and 77-80 are punched in the eight 3-hourly synoptic cards. Columns 1-34, 38-42, 46-62, and 74-80 are punched in the 16 intermediate hourly cards.

68-72

Elements punched in alphabetical order. The number following element indicates beginning column of field.

CLOUD AMOUNT
- Low 38
- Significant 69
- Total 17

CLOUD HEIGHT
- Of Lower 40
- Significant 71

CLOUD TYPE
- High 42
- Low 39
- Middle 41
- Significant 70

ICE ACCRETION
- Rate of 72
- Thickness 70
- Type 69

PRESSURE
- Sea Level 27

TEMPERATURE
- Air 32
- Air-Sea 46
- Dew Point 74
- Sea 43
- Wet Bulb 35

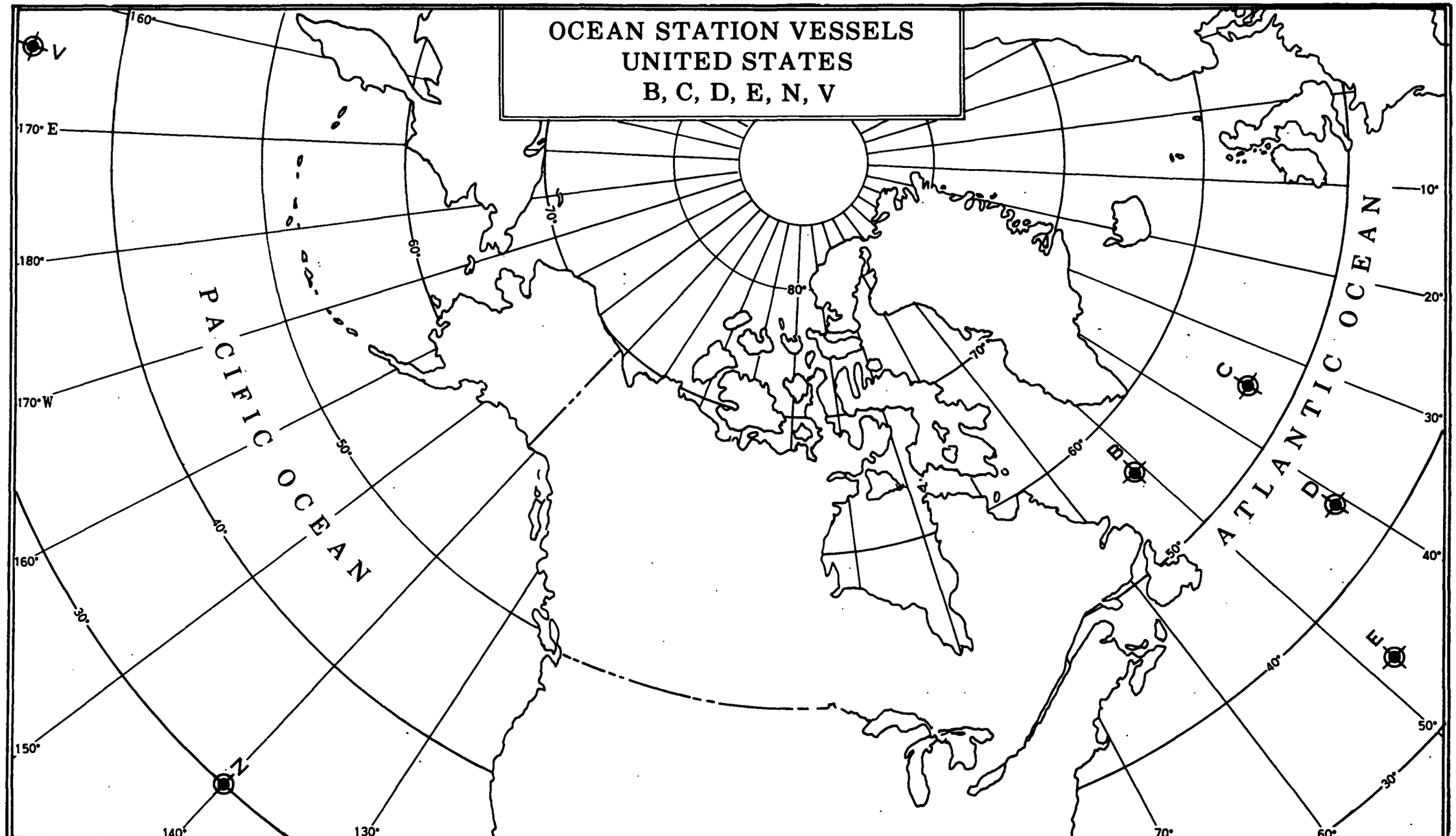
VISIBILITY 22

WAVES
- SEA
  - Direction 49
  - Height 53
  - Period 51
- SWELL
  - Direction 55
  - Height 59
  - Period 57

WEATHER
- Past 26
- Present 24

WIND
- Direction 18
- Speed 20

CORRECTIONS: Any errors detected in this manual should be called to the attention of the Director, National Weather Records Center, Environmental Science Services Administration, EDS, or Chief, Data Processing Division, Environmental Technical Applications Center, USAF. Please give specific instances of error, and correct information if available.


OCEAN STATION VESSELS
UNITED STATES
B, C, D, E, N, V
V
N
C
B
D
E
PACIFIC OCEAN
ATLANTIC OCEAN
160°
170° E
180°
170° W
160°
150°
140°
130°
70°
60°
50°
40°
30°
10°
20°
80°

CARD CONTENT					
COLUMN	ITEM OR ELEMENT	SYMBOLIC LETTER	CARD CODE	CARD CODE DEFINITION	REMARKS
	Missing Data		Blank	Missing data or unknown data	When data are missing the appropriate columns are left blank.
			X/	11 overpunch	X/ indicates an X(11) overpunch in Card Code.
			Y/	12 overpunch	Y/ indicates a Y(12) overpunch in Card Code.
1	Temperature Indicator		1	Punched in all cards 1 July 68 - See SUP. NOTE A, page 7	Hourly data (eight 3-hourly synoptic and 16 intermediate hourly observations) for Ocean Station Vessels B, C, D, E, N, and V. °C and tenths are punched for the eight 3-hourly obs. and for the intermediate obs. beginning 1 Jan 68. °C (whole) are punched for intermediate hourly obs. prior to 1 Jan 68. See SUP. NOTE A, page 7, for changes in punching practices.
			9	Punched in all cards 1 Jan 65 - 30 June 68 See SUP. NOTE A, page 7	
2-3	Year		65-	Last two digits of year	
4-5	Month		01-12	January - December	
6-7	Day	YY	01-31	Day of Month	The day is defined with reference to Greenwich Mean Time (GMT).
8	Octant of Globe	Q	0, 1-3, 5-8	Code Table 1, page 8	Conversion Table of Q to Q_c is given on page 8.
	Quadrant of Globe	Qc	1,3,5,7	Code Table 1A, page 8	Effective 1 Jan 1968. In cards exchanged internationally the Octant is punched.
9-11	Latitude	$L_aL_aL_a$	000-900	00.0° - 90.0° Degrees and tenths	North or South indicated by column 8.
12-14	Longitude	$L_oL_oL_o$	000-999	00.0° - 99.9°	The octant punched in column 8 determines the hundreds position of longitude also whether located in Eastern or Western Hemisphere. Effective 1 Jan 68.
			Y Y 000-800	Degrees and tenths 100.0° - 180.0°	
15-16	Hour of Observation GMT	GG	00-23	00 - 23 GMT nearest whole hour	
17	Total Cloud Amount	N	0, 1-9	Code Table 2, page 8	

CARD CONTENT					
COLUMN	ITEM OR ELEMENT	SYMBOLIC LETTER	CARD CODE	CARD CODE DEFINITION	REMARKS
18-19	Wind Direction	dd	00-36	Tens of degrees Code Table 3, page 8	
			X/Col. 18	Measured wind	X overpunch in column 18 discontinued effective 1 Jan 68, measured wind indicated in column 65 effective this date.
20-21	Wind Speed	ff	00-99	Calm - 99 knots	
			X/Col. 20	100 - 199 knots	X overpunch in column 20 indicates speeds greater than 99 knots.
22-23	Visibility	VV	90-99	Code Table 4, page 9	
24-25	Present Weather	ww	00-99	Code Table 5, pages 9-11	
26	Past Weather	W	0, 1-9	Code Table 6, page 11	Past weather for 6 hours at 00, 06, 12, and 18 GMT observations; for three hours at other hours.
27-31	Sea Level Pressure	PPPPP	07000-10999	Millibars and tenths	
32-34	Air Temperature	TTT	000-999	0.0°C - 99.9°C Degrees Celsius and tenths	When reported to whole degrees, 0 is punched in column 34. In whole degrees for the 16 intermediate observations (other than the eight 3-hourly synoptic). See SUPPLEMENTARY NOTE A, page 7 for changes in punching practices.
			X/Col. 32	Negative temperature	
35-37	Wet Bulb Temperature		000-999 X/Col. 35 X/Col. 37	0.0°C - 99.9°C Negative Temperature Ice on wet bulb	Punched for eight 3-hourly synoptic observations. See SUPPLEMENTARY NOTE A, page 7 for changes in punching practices.
38	Total Amount of Lower Clouds	N_h	0, 1-9	Code Table 2, page 8	Amount of celestial dome covered by all the C_L cloud(s) or all the C_M cloud(s) if no C_L is present.
39	Type of Low Cloud	C_L	0, 1-9	Code Table 7, page 11	The most significant cloud is coded according to its vertical development and cloud amount.
40	Height of Low or Middle Cloud	h	0, 1-9	Code Table 8, page 12	The height of C_M is given when no C_L is present. The height is for the lowest cloud observed, regardless of amount.
41	Type of Middle Cloud	C_M	0, 1-9	Code Table 9, page 12	See Remarks, column 39.
42	Type of High Cloud	C_H	0, 1-9	Code Table 10, page 12	

CARD CONTENT					
COLUMN	ITEM OR ELEMENT	SYMBOLIC LETTER	CARD CODE	CARD CODE DEFINITION	REMARKS
43-45	Sea Temperature	$T_wT_wT_w$	000-999	0.0°C - 99.9°C Degrees Celsius and tenths	When reported to whole degrees, 0 is punched in column 45. Sea temperature punched for eight 3-hourly synoptic observations. See SUPPLEMENTARY NOTE A, page 7, for changes in punching practices.
			X/Col. 43	Negative temperature	
			X/Col. 45	Injection temperature	Effective 1 Jan 68.
46-48	Sea-Air Temperature Difference	$T_sT_sT_s$	000-999	0.0°C - 99.9°C	See SUPPLEMENTARY NOTE A, page 7, for changes in punching practices.
			X/Col. 46	Negative value	An X overpunch in column 46 indicates that the sea temperature is higher than the air temperature (negative value).
49-50	Direction of Sea Waves	d_wd_w	00-36	Code Table 11, page 13	49 was punched when code 99 was reported with a height (H_wH_w). 99 was punched when H_wH_w and P_w (Period) were missing. The relationship between d_wd_w and H_wH_w is given in Remarks for columns 53-54. Effective 1 Jan 68, d_wd_w for sea waves obtained from columns 18-19.
			49, 99		
51-52	Period of Sea Waves (Seconds)	P_w	0, 1-9, X	Code Table 12, page 13	Punched in column 51; column 52 is left blank. Discontinued 1 Jan 68.
			00 01-98 99	No waves, calm sea Number of seconds Confused sea, no estimate	Effective 1 Jan 68. Punched in columns 51-52.
53-54	Height of Sea Waves	H_wH_w	00	Less than 1/4 meter	Decoded from 1960 WMO Code 1555, Code Table 13, page 13. When d_wd_w for sea waves was coded 00-36, 0 was punched in column 53 and the code figure for H_w in column 54. When d_wd_w was coded 51-86, or 99 with a height, 1 was punched in column 53 and code for H_w in column 54. Code 1555 was discontinued 1 Jan 68. Effective 1 Jan 68, 0.5 meter values are transmitted.
			01-99	1/2 - 49 1/2 meters (Half meter values) 01 0.5 meter 02 1 meter 03 1.5 meter, etc	
55-56	Direction of Swell Waves	d_wd_w	00-36 49,99	Code columns 49-50	Code 49 discontinued 1 Jan 68.
57-58	Period of Swell Waves	P_w	0, 1-9, X	Code Table 12, page 13 Code Table 12A, page 13	Punched in column 57 prior to 1 Jan 68. Punched in column 58 beginning 1 Jan 68.
59-60	Height of Swell Waves	H_wH_w	00. 01-99	Code columns 53-54	

CARD CONTENT

COLUMN	ITEM OR ELEMENT	SYMBOLIC LETTER	CARD CODE	CARD CODE DEFINITION	REMARKS
61-62	Station Number of OSV		42,43,44,45, 94, and 95	Number of Station of Ocean Station Vessel	Code Table 18, page 15, lists station names and locations.
63	Card Indicator		X/0	United States origin	
64	OSV Location		2	OSV off station	
			X/2	OSV on station	
65	Wind Code			Direction Speed	Code for United States ships, discontinued 1 Jan 68.
			0	36 points knots	
			0	Estimated 36 points knots	Effective 1 Jan 68.
			6	Measured 36 points knots	
66					This column is not used.
67	Wave Code		0	Coded as defined in Columns 49-54	Punched 0 for United States ships.
68	Indicator for Additional Data		1	Indicates Columns 69-72 punched for Ice Accretion group $I_sE_sE_sR_s$	Code 1, Ice Accretion group, has first priority.
			8	Indicates Columns 69-72 punched for Significant Cloud group $N_sCh_sh_s$	Discontinued 1 Jan 68.
69	Type of Ice Accretion on Ships	I_s	1-5	Code Table 17, page 15	Element punched is indicated in column 68.
	Cloud Amount	N_s	0, 1-9	Code Table 2, page 8	Discontinued 1 Jan 68.

CARD CONTENT					
COLUMN	ITEM OR ELEMENT	SYMBOLIC LETTER	CARD CODE	CARD CODE DEFINITION	REMARKS
70	Significant Cloud Type (Genus)	C	0, 1-9 Blank or X	Code Table 15, page 14	Discontinued 1 Jan 68.
70-71	Ice Thickness	E_sE_s	00-99	0 - 99 centimeters	
71-72	Cloud Height	h_sh_s	00-50, 56-99	Code Table 16, page 14	Discontinued 1 Jan 68.
72	Rate of Ice Accretion on Ships	R_s	0, 1-4	Code Table 14, page 14	
73	Indicator for Ice Distance and Bearing Group		Y(12)	Ice Distance and Bearing group (C_2KD_ire) reported	A Y (12 punch) in column 73 indicates that the Ice Distance and Bearing group has been entered on the original reporting form. This group is not punched on card.
			Blank	C_2KD_ire not reported	
74-76	Dew Point Temperature	$T_dT_dT_d$	000-999	0.0°C - 99.9°C Degrees Celsius and tenths	Effective 1 Jan 68; when dew point is reported to whole degrees, 0 is punched in column 76. Prior to this date, column 76 was left blank. (Applies to intermediate observations only.) See SUPPLEMENTARY NOTE A for changes in punching practices.
			X/Col. 74	Negative temperature	
77-80	Ship Number		0001-9999	Number of Ship (OSV)	Lists of ships are maintained at the National Weather Records Center.

SUPPLEMENTARY NOTE A: Changes in Punching for Temperature Data (All temperature in °C)

(NP indicates NOT PUNCHED)

Period	Col. 1 Code	Air Temp Col. 32-34	Wet Bulb 35-37	Dew Point 74-76	Sea Temp 43-45	Air Minus Sea Temp 46-48
Synoptic Hours 00, 03, 06, 09, 12, 15, 18, 21 GMT						
1 Jan 65-30 Jun 68 1 Jul 68-	9 1	degrees & tenths	degrees & tenths	NP	degrees & tenths	NP
Intermediate Hours 01, 02, 04, 05, 07, 08, 10, 11, 13, 14, 16, 17, 19, 20, 22, 23 GMT						
thru Dec 67	9	whole degrees	NP	whole degrees	NP	degrees and half degrees
1 Jan - 30 Jun 68	9	degrees & tenths	NP	whole degrees	*degrees & tenths	NP
1 Jul 68 -	1	degrees & tenths	degrees & tenths	NP	* degrees & tenths	NP

*Sea Temperature for intermediate hours is not recorded for all ships.

CODE TABLES

When coding a meteorological report, symbolic letters are replaced by figures, which specify the value or the state of the corresponding element. In some cases, the specification of the symbolic letter (or group of letters) is sufficient to permit a direct transcription into figures (e.g., GG or PPP). In other cases, these figures are obtained by means of a special code table (or code, in short) for each element.

The codes elaborated to this end, as far as they are in world-wide use, are called international meteorological code tables. These same codes are used inversely for decoding observations and thus making available the information contained in them.

Besides the specifications given by the code tables in world-wide use, other sets of code tables are established by the WMO for regional use. Further arbitrary codes have been made necessary by the use of data in card decks which were never encoded into WMO forms.

Only codes pertinent to this card deck are included in the present manual. They appear in the order in which the elements were introduced in the description of the card content. They are numbered consecutively, and if applicable, the corresponding WMO code numbers are shown.

Code 1

(1960 WMO Code 3300)

Q - Octant Of The Globe

North Latitude 00°00'-90°00'N		South Latitude 00°01'-90° 00'S	
Octant	Longitude Limits	Octant	Longitude Limits
0	00°00'W - 89°59'W	5	00°00'W - 89°59'W
1	90°00'W - 179°59'W	6	90°00'W - 179°59'W
2	179°59'E - 90°00'E	7	179°59'E - 90°00'E
3	89°59'E - 00°01'E	8	89°59'E - 00°01'E

CONVERSION TABLE

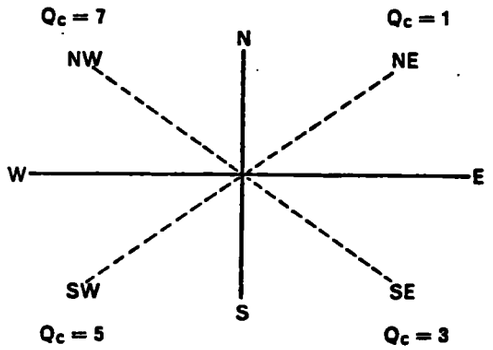
Q Octant of Globe	Q_c Quadrant of Globe
0,1	7
2,3	1
5,6	5
7,8	3

Code 1A

(1968 WMO Code 3333)

Q_c — *Quadrant of the globe*

Code figure	Latitude	Longitude
1	North	East
3	South	East
5	South	West
7	North	West



Note: The choice is left to the observer in the following cases:

- When the ship is on the Greenwich meridian or the 180th meridian ($L_oL_oL_oL_o$ = 0000 or 1800 respectively):
  Q_c = 1 or 7 (northern hemisphere) or
  Q_c = 3 or 5 (southern hemisphere);
- When the ship is on the Equator ($L_aL_aL_a$ = 000):
  Q_c = 1 or 3 (eastern longitude) or
  Q_c = 5 or 7 (western longitude).

Code 2

(1960 WMO Code 2700)

N - The fraction of the celestial dome covered by cloud

N_h - The fraction of the celestial dome covered by the cloud (s) reported for C_L or, if no C_L-cloud present, for C_M

Code figure		
0	0	0
1	1 okta or less, but not zero	1/10 or less, but not zero
2	2 oktas	2/10 - 3/10
3	3 oktas	4/10
4	4 oktas	5/10
5	5 oktas	6/10
6	6 oktas	7/10 - 8/10
7	7 oktas or more, but not 8 oktas	9/10 or more, but not 10/10
8	8 oktas	10/10
9	Sky obscured, or cloud amount cannot be estimated	

Code 3

(1960 WMO Code 0877)

dd - True direction, in tens of degrees, from which wind is blowing (or will blow)

Code figure		Code figure	
00	Calm	19	185° - 194°
01	5° - 14°	20	195° - 204°
02	15° - 24°	21	205° - 214°
03	25° - 34°	22	215° - 224°
04	35° - 44°	23	225° - 234°
05	45° - 54°	24	235° - 244°
06	55° - 64°	25	245° - 254°
07	65° - 74°	26	255° - 264°
08	75° - 84°	27	265° - 274°
09	85° - 94°	28	275° - 284°
10	95° - 104°	29	285° - 294°
11	105° - 114°	30	295° - 304°
12	115° - 124°	31	305° - 314°
13	125° - 134°	32	315° - 324°
14	135° - 144°	33	325° - 334°
15	145° - 154°	34	335° - 344°
16	155° - 164°	35	345° - 354°
17	165° - 174°	36	355° - 4°
18	175° - 184°	99	Variable

Code 4

(1960 WMO Code 4377)

VV - Horizontal visibility

Code Figure	Km.	Yards (Approx.)	Statute Miles (Approx.)	Nautical Miles (Approx.)
90	< 0.05	< 55	< 1/32	
91	0.05	55	1/32	
92	0.2	220	1/8	
93	0.5	550	5/16	1/4
94	1	1,100	5/8	1/2
95	2	2,200	1 1/4	1
96	4	4,400	2 1/2	2
97	10	11,000	6 1/4	5
98	20	22,000	12 1/2	10
99	≥ 50	≥ 55,000	≥ 31 1/4	≥ 25

If the observed visibility is between two of the reportable distances as given in the table, the code figure for the lower reportable distance is reported.

Maximum visible distance regardless of direction.

Code 5

(1960 WMO Code 4677)

ww - Present weather

ww 00 - 49 No precipitation at the station at the time of observation

ww 00 - 19 No precipitation, fog, ice fog (except 11 and 12), duststorm, sandstorm, drifting or blowing snow at the station (land station or ship) at the time of observation or, except for 09 and 17, during the preceding hour.

Code figure

ww

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
- 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
- 11 (Patches of) shallow fog or ice fog at the station, whether on land or sea,
- 12 (More or less continuous) not deeper than about 2 metres on land or 10 metres at sea
- 13 Lightning visible, no thunder heard

Code 5, continued

- 14 Precipitation within sight, not reaching the ground or the 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
- 19 Funnel cloud(s) (tornado cloud or waterspout)

(at or within sight of the station during the preceding hour or at the time of observation)

ww 20 - 29 Precipitation, fog, ice fog or thunderstorm at the station during the preceding hour but not at the time of observation

Code figure

ww

- 20 Drizzle (not freezing) or snow grains
- 21 Rain (not freezing)
- 22 Snow
- 23 Rain and snow or ice pellets, type (a)
- 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 (ice pellets, type (b), snow pellets), or of rain and hail (ice pellets, type (b), snow pellets)
- 28 Fog or ice fog
- 29 Thunderstorm (with or without precipitation)

ww 30 - 39 Duststorm, sandstorm, drifting or blowing snow

Code 5, continued

ww

30)))) (has decreased during the preceding hour
31) Slight or moderate dust-storm or sandstorm (no appreciable change during the preceding hour
32))) (has begun or has increased during the preceding hour

33))) (has decreased during the preceding hour
34) Severe duststorm or sandstorm (no appreciable change during the preceding hour
35))) (has begun or has increased during the preceding hour

36 Slight or moderate drifting snow) generally low (below eye level)
37 Heavy drifting snow)

38 Slight or moderate blowing snow) generally high (above eye level)
39 Heavy blowing snow)

ww 40 - 49 Fog or ice fog at the time of observation

ww

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)

44 Fog or ice fog, sky visible) no appreciable change during the preceding hour
45 Fog or ice fog, sky invisible)

Code 5, continued

46 Fog or ice fog, sky visible) has begun or has become thicker during the preceding hour
47 Fog or ice fog, sky invisible)

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

ww

50 Drizzle, not freezing, intermittent) slight at time of observation
51 Drizzle, not freezing, continuous)

52 Drizzle, not freezing, intermittent) moderate at time of observation
53 Drizzle, not freezing, continuous)

54 Drizzle, not freezing, intermittent) heavy(dense) at time of observation
55 Drizzle, not freezing, continuous)

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

ww

60 Rain, not freezing, intermittent) slight at time of observation
61 Rain, not freezing, continuous)

62 Rain, not freezing, intermittent) moderate at time of observation
63 Rain, not freezing, continuous)

Code 5, continued

64 Rain, not freezing, intermittent) heavy at time of observation
65 Rain, not freezing, continuous)

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

ww

70 Intermittent fall of snow flakes) slight at time of observation
71 Continuous fall of snow flakes)

72 Intermittent fall of snow flakes) moderate at time of observation
73 Continuous fall of snow flakes)

74 Intermittent fall of snow flakes) heavy at time of observation
75 Continuous fall of snow flakes)

76 Ice prisms (with or without fog)

77 Snow grains(with or without fog)

78 Isolated starlike snow crystals (with or without fog)

79 Ice pellets, type (a)

ww 80 - 99 Showery precipitation, or precipitation with current or recent thunderstorm

ww

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

Code 5, continued

87) 88)	Shower(s) of snow pellets or ice pellets, type(b), with or without rain or rain and snow mixed	- slight - moderate or heavy
89 90	Shower(s) of hail, with or without rain or rain and snow mixed, not associated with thunder	- slight - moderate or heavy
91	Slight rain at time of observation	thunderstorm during the preceding hour but not at time of observation
92	Moderate or heavy rain at time of observation	
93	Slight snow, or rain and snow mixed or hail (ice pellets, type (b), snow pellets), at time of observation	
94	Moderate or heavy snow, or rain and snow mixed or hail (ice pellets, type(b), snow pellets) at time of observation	
95	Thunderstorm, slight or moderate, without hail (ice pellets, type (b), snow pellets); but with rain and/or snow at time of observation	
96	Thunderstorm, slight or moderate, with hail (ice pellets, type (b), snow pellets) at time of observation	thunderstorm at time of observation
97	Thunderstorm, heavy, without hail (ice pellets, type(b), snow pellets), but with rain and/or snow at time of observation	
98	Thunderstorm combined with duststorm or sandstorm at time of observation	
99	Thunderstorm, heavy, with hail (ice pellets, type(b), snow pellets) at time of observation	

Code 6

(1960 WMO Code 4500)

W - Past weather

Code figure	
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

Notes:

(1) In the case of a sandstorm, with a temperature below 0°C, the word SANDSTORM is added at the end of the report, but is omitted in punching.

(2) In the case of a shower or a thunderstorm, accompanied by hail, the words PAST HAIL are added at the end of the report, but are omitted in punching.

(3) In the case of a snow shower or a shower of rain and snow mixed, with a temperature above 0°C, the word SNOW or SLEET is added at the end of the report, but is omitted in punching.

Code 7

(1960 WMO Code 0513)

C_L - Clouds of the genera Stratocumulus, Stratus, Cumulus and Cumulonimbus

Code figure	Non technical specifications
0	No Stratocumulus, Stratus, Cumulus or Cumulonimbus
1	Cumulus with little vertical extent and seemingly flattened, or ragged Cumulus other than of bad weather, or both
2	Cumulus of moderate or strong vertical extent, generally with protuberances in the form of domes or towers, either accompanied or not by other Cumulus or by Stratocumulus, all having their bases at the same level
3	Cumulonimbus the summits of which, at least partially, lack sharp outlines, but are neither clearly fibrous (cirriform) nor in the form of an anvil; Cumulus, Stratocumulus or Stratus may also be present
4	Stratocumulus formed by the spreading out of Cumulus; Cumulus may also be present
5	Stratocumulus not resulting from the spreading out of Cumulus
6	Stratus in a more or less continuous sheet or layer, or in ragged shreds, or both, but no Stratus fractus of bad weather
7	Stratus fractus of bad weather (generally existing during precipitation and a short time before and after), or Cumulus fractus of bad weather, or both (pannus), usually below Altostratus or Nimbostratus
8	Cumulus and Stratocumulus other than that formed from the spreading out of Cumulus; the base of the Cumulus is at a different level from that of the Stratocumulus
9	Cumulonimbus, the upper part of which is clearly fibrous (cirriform), often in the form of an anvil; either accompanied or not by Cumulonimbus without anvil or fibrous upper part, by Cumulus, Stratocumulus, Stratus or pannus
	Stratocumulus, Stratus, Cumulus and Cumulonimbus invisible owing to darkness, fog, blowing dust or sand, or other similar phenomena

Code 8
(1960 WMO Code 1600)

h = Height above Ground of the Base of the Cloud

Code Figure	Height in Feet	Height in Meters
0	0- 149	0- 49
1	150- 299	50- 99
2	300- 599	100- 199
3	600 999	200- 299
4	1,000-1,999	300- 599
5	2,000-3,499	600- 999
6	3,500-4,999	1,000-1,499
7	5,000-6,499	1,500-1,999
8	6,500-7,999	2,000-2,499
9	8,000 or higher, or no clouds	2,500 or higher, or no clouds

Note: The heights (in feet) given in this code table approximately correspond to those given in 1949 and 1955 WMO Code 43 and 1960 WMO Code 1600 and those given in the ninth decade (i.e., code figures 90-99) of 1949 and 1955 WMO Code 40 or 1960 WMO Code 1577.

Code 9
(1960 WMO Code 0515)

C_M - Clouds of the genera Altocumulus, Altostratus and Nimbostratus

Code figure	
0	No Altocumulus, Altostratus or Nimbostratus
1	Altostratus, the greater part of which is semi-transparent; through this part the sun or moon may be weakly visible, as through ground glass
2	Altostratus, the greater part of which is sufficiently dense to hide the sun or moon, or Nimbostratus
3	Altocumulus, the greater part of which is semi-transparent; the various elements of the cloud change only slowly and are all at a single level
4	Patches (often in the form of almonds or fishes) of Altocumulus, the greater part of which is semi-transparent; the clouds occur at one or more levels and the elements are continually changing in appearance
5	Semi-transparent Altocumulus in bands, or Altocumulus in one or more fairly continuous layers (semi-transparent or opaque), progressively invading the sky; these Altocumulus clouds generally thicken as a whole
6	Altocumulus resulting from the spreading out of Cumulus (or Cumulonimbus)
7	Altocumulus in two or more layers, usually opaque in places, and not progressively invading the sky; or opaque layer of Altocumulus, not progressively invading the sky; or Altocumulus together with Altostratus or Nimbostratus
8	Altocumulus with sproutings in the form of small towers or battlements, or Altocumulus having the appearance of cumuliform tufts
9	Altocumulus of a chaotic sky, generally at several levels
X	Altocumulus, Altostratus and Nimbostratus invisible owing to darkness, fog, blowing dust or sand or other similar phenomena, or more often because of the presence of a continuous layer of lower clouds

Code 10
(1960 WMO Code 0509)

C_H - Clouds of the genera Cirrus, Cirrocumulus and Cirrostratus

Code figure	Non technical specifications
0	No Cirrus, Cirrocumulus or Cirrostratus
1	Cirrus in the form of filaments, strands or hooks, not progressively invading the sky
2	Dense Cirrus, 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 with sproutings in the form of small turrets or battlements, or Cirrus having the appearance of cumuliform tufts
3	Dense Cirrus, often in the form of an anvil, being the remains of the upper parts of Cumulonimbus
4	Cirrus in the form of hooks or of filaments, or both, progressively invading the sky; they generally become denser as a whole
5	Cirrus (often in bands converging towards one point or two opposite points of the horizon) and Cirrostratus, or Cirrostratus alone; in either case, they are progressively invading the sky, and generally growing denser as a whole, but the continuous veil does not reach 45 degrees above the horizon
6	Cirrus (often in bands converging towards one point or two opposite points of the horizon) and Cirrostratus, or Cirrostratus alone; in either case; they are progressively invading the sky, and generally growing denser as a whole; the continuous veil extends more than 45 degrees above the horizon, without the sky being totally covered
7	Veil of Cirrostratus covering the celestial dome
8	Cirrostratus not progressively invading the sky and not completely covering the celestial dome
9	Cirrocumulus alone, or Cirrocumulus accompanied by Cirrus or Cirrostratus, or both, but Cirrocumulus is predominant
X	Cirrus, Cirrocumulus and Cirrostratus invisible owing to darkness, fog, blowing dust or sand or other similar phenomena, or more often because of the presence of a continuous layer of lower clouds

Code 11
(1960 WMO Code 0885)

$d_w d_w$ - Direction from which waves come, in tens of degrees

Code Figure		Code Figure	
00	Calm (no waves)	19	185° - 194°
01	5° - 14°	20	195° - 204°
02	15° - 24°	21	205° - 214°
03	25° - 34°	22	215° - 224°
04	35° - 44°	23	225° - 234°
05	45° - 54°	24	235° - 244°
06	55° - 64°	25	245° - 254°
07	65° - 74°	26	255° - 264°
08	75° - 84°	27	265° - 274°
09	85° - 94°	28	275° - 284°
10	95° - 104°	29	285° - 294°
11	105° - 114°	30	295° - 304°
12	115° - 124°	31	305° - 314°
13	125° - 134°	32	315° - 324°
14	135° - 144°	33	325° - 334°
15	145° - 154°	34	335° - 344°
16	155° - 164°	35	345° - 354°
17	165° - 174°	36	355° - 4°
18	175° - 184°	49	Waves confused, direction indeterminate (waves equal to or less than 4 3/4 metres)
		99	Waves confused, direction indeterminate (waves greater than 4 3/4 metres)

Code 12
(1960 WMO Code 3155)

P_w - Period of Waves

Code Figure		Code Figure	
2	5 seconds or less	8	16 or 17 seconds
3	6 or 7 seconds	9	18 or 19 seconds
4	8 or 9 seconds	0	20 or 21 seconds
5	10 or 11 seconds	1	Over 21 seconds
6	12 or 13 seconds	/ or X	Calm, or period not determined
7	14 or 15 seconds		

Notes:
(1) The period of the waves is the time between the passage of two successive wave crests past a fixed point (it is equal to the wave length divided by the wave speed).

(2) The average value of the wave period is reported, as obtained from the larger well-formed waves of the wave system being observed.

Code 13
(1960 WMO Code 1555)

H_w - Mean Maximum Height of the Waves

Code Figure *) / **)		If 50 is added to $d_w d_w$	
0	Less than 1/4 m (1 ft)	0	5 m (16 ft)
1	1/2 m (1 1/2 ft)	1	5 1/2 m (17 1/2 ft)
2	1 m (3 ft)	2	6 m (19 ft)
3	1 1/2 m (5 ft)	3	6 1/2 m (21 ft)
4	2 m (6 1/2 ft)	4	7 m (22 1/2 ft)
5	2 1/2 m (8 ft)	5	7 1/2 m (24 ft)
6	3 m (9 1/2 ft)	6	8 m (25 1/2 ft)
7	3 1/2 m (11 ft)	7	8 1/2 m (27 ft)
8	4 m (13 ft)	8	9 m (29 ft)
9	4 1/2 m (14 ft)	9	9 1/2 m (30 1/2 ft)

*) Each code figure provides for reporting a range of heights. For example: 1 = 1/4 m (1 ft) to 3/4 m (2 1/2 ft); 5 = 2 1/4 m (7 ft) to 2 3/4 m (9 ft); 9 = 4 1/4 m (13 1/2 ft) to 4 3/4 m (15 ft), etc.

**) If a wave height comes exactly midway between the heights corresponding to two code figures, the lower code figure should be reported.

Code 12A
(1968 WMO Code 3155)

P_w — *Period of waves*

Code figure		Code figure	
0	10 seconds	5	5 seconds or less
1	11 seconds	6	6 seconds
2	12 seconds	7	7 seconds
3	13 seconds	8	8 seconds
4	14 seconds or more	9	9 seconds
		/	Calm or period not determined

Notes:

(1) The period of the waves is the time between the passage of two successive wave crests past a fixed point (it is equal to the wave length divided by the wave speed).

(2) The average value of the wave period is reported, as obtained from the larger well-formed waves of the wave system being observed.

Code 14
(1960 WMO Code 3551)

R_s - **Rate of ice accretion on ships**

Code Figure	
0	Ice not building up
1	Ice building up slowly
2	Ice building up rapidly
3	Ice melting or breaking up slowly
4	Ice melting or breaking up rapidly

Code 15
(1960 WMO Code 0500)

C - Genus of cloud

Code figure		
0	Cirrus	Ci
1	Cirrocumulus	Cc
2	Cirrostratus	Cs
3	Altocumulus	Ac
4	Altostratus	As
5	Nimbostratus	Ns
6	Stratocumulus	Sc
7	Stratus	St
8	Cumulus	Cu
9	Cumulonimbus	Cb
X	Cloud not visible owing to darkness, fog, dust-storm, sandstorm, or other analogous phenomena	

Code 16
(1960 WMO Code 1577)
(1968 WMO Code 1677)

HH - H_iH_i - hh - h_Bh_B - h_fh_f - h_ih_i - h_sh_s - h_th_t - h_xh_x

Code figure	Metres	Feet (approx.)
00	<30	< 100
01	30	100
02	60	200
03	90	300
04	120	400
05	150	500
06	180	600
07	210	700
08	240	800
09	270	900
10	300	1,000
11	330	1,100
12	360	1,200
13	390	1,300
14	420	1,400
15	450	1,500
16	480	1,600
17	510	1,700
18	540	1,800
19	570	1,900
20	600	2,000
21	630	2,100
22	660	2,200
23	690	2,300
24	720	2,400
25	750	2,500
26	780	2,600
27	810	2,700
28	840	2,800
29	870	2,900
30	900	3,000
31	930	3,100
32	960	3,200
33	990	3,300
34	1,020	3,400
35	1,050	3,500
36	1,080	3,600
37	1,110	3,700
38	1,140	3,800
39	1,170	3,900
40	1,200	4,000
41	1,230	4,100
42	1,260	4,200
43	1,290	4,300
44	1,320	4,400
45	1,350	4,500
46	1,380	4,600
47	1,410	4,700
48	1,440	4,800
49	1,470	4,900
50	1,500	5,000
51	Not used	
52		
53		
54		
55		
56	1,800	6,000
57	2,100	7,000
58	2,400	8,000
59	2,700	9,000
60	3,000	10,000
61	3,300	11,000
62	3,600	12,000
63	3,900	13,000
64	4,200	14,000
65	4,500	15,000
66	4,800	16,000
67	5,100	17,000
68	5,400	18,000
69	5,700	19,000
70	6,000	20,000
71	6,300	21,000
72	6,600	22,000
73	6,900	23,000
74	7,200	24,000
75	7,500	25,000
76	7,800	26,000
77	8,100	27,000
78	8,400	28,000
79	8,700	29,000
80	9,000	30,000
81	10,500	35,000
82	12,000	40,000
83	13,500	45,000
84	15,000	50,000
85	16,500	55,000
86	18,000	60,000
87	19,500	65,000
88	21,000	70,000
89	> 21,000	> 70,000
90	Less than	50 m
91	50 to	100 m
92	100 to	200 m
93	200 to	300 m
94	300 to	600 m
95	600 to	1,000 m
96	1,000 to	1,500 m
97	1,500 to	2,000 m
98	2,000 to	2,500 m
99	2,500 m or more, or no clouds	

Code 17
(1960 WMO Code 1751)

I_s - Form of ice accretion on ships

Code Figure	
1	Icing from ocean spray
2	Icing from fog
3	Icing from spray and fog
4	Icing from rain
5	Icing from spray and rain

Code 18

OCEAN STATION VESSELS (OSV)

STATION NUMBER	STATION NAME	OPERATED BY	STATION CENTER	POSITION LIMITS
41	Atlantic A	Great Britain	62°N 33°W	60° 21'N 29° 27'W 63° 39'N 36° 33'W
42	Atlantic B	United States	56° 30'N 51°W	54° 51'N 48° 00'W 58° 09'N 54° 00'W
43	Atlantic C	United States	52° 45'N 35° 30'W	51° 06'N 32° 45'W 54° 24'N 38° 15'W
44	Atlantic D	United States	44°N 41°W	42° 21'N 38° 40'W 45° 39'N 43° 20'W
45	Atlantic E	United States	35°N 48°W	33° 21'N 45° 58'W 36° 39'N 50° 02'W
39	Atlantic I	Great Britain	58° 48'N 19° W	57° 03'N 15° 38'W 60° 33'N 22° 22'W
90	Atlantic J	Great Britain Netherlands	52° 30'N 20°W	50° 45'N 17° 07'W 54° 15'N 22° 53'W
38	European K	France Netherlands	45°N 16'W	43° 15'N 13° 31'W 46° 45'N 18° 29'W
93	Atlantic M	Norway	66°N 02'E	67° 45'N 02° 18'W 64° 15'N 06° 18'E
94	Pacific N	United States	30°N 140°W	28° 15'N 137° 59'W 31° 45'N 142° 01'W
97	Pacific P	Canada	50°N 145°W	48° 21'N 142° 24'W 51° 39'N 147° 36'W
91	Pacific T	Japan	29°N 135°E	27° 15'N 133°E 30° 45'N 137°E
95	Pacific V	United States	34°N 164°E	32° 15'N 161° 52'E 35° 45'N 166° 08'E