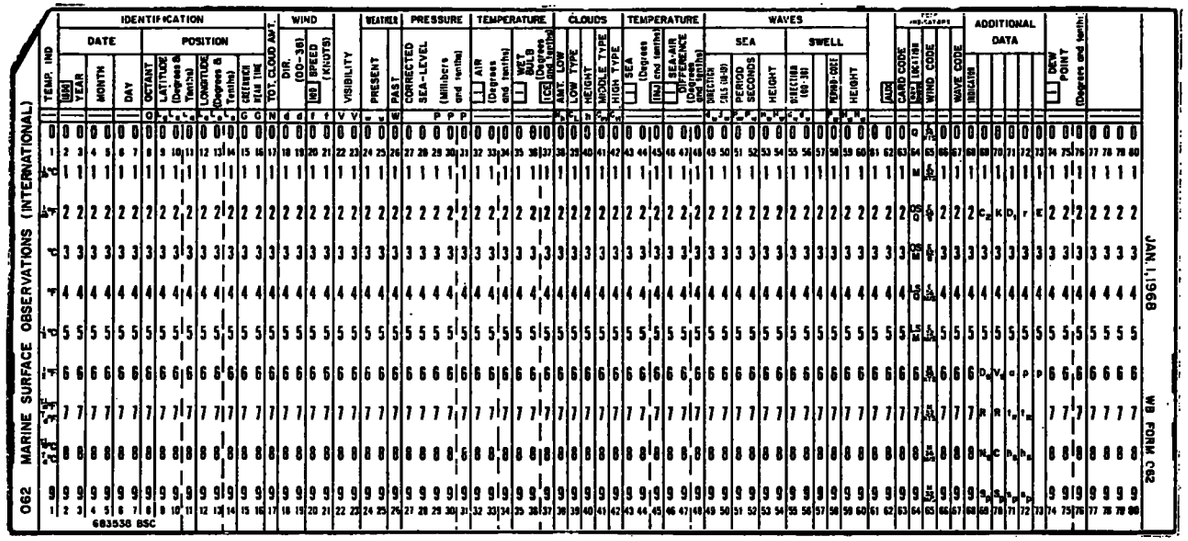
CARD DECK 128 INTERNATIONAL MARINE SURFACE SYNOPTIC OBSERVATIONS



AREA COVERAGE: World-wide marine areas.

PERIOD OF RECORD: July 1963 - (Some OSV's punched for earlier POR.) Prior to this period, records are included for a few months in 1955, 1962, and 1963. Data are being added to this deck from other countries. Similar data for prior periods are in decks 116,117,184, and 194. Card Deck 928 contains hourly surface marine data for OSV's B, C,D,E,N, and V for the period beginning Jan 65.

OBSERVATION TIME: GMT: 3 or 6 hourly at 00,03,06,09,12,15,18,21.

CODES: 1960 WMO FM 21.B; 1964 WMO FM 21.C; 1968 WMO FM 21.D.

SOURCE: Forms: WBAN 11-B(OSV's); OPNAV 3144-1 and 3140/8; 615-15, revised 1 Jan 68, ESSA 72-2. Punched cards or cards punched from data received from other countries.

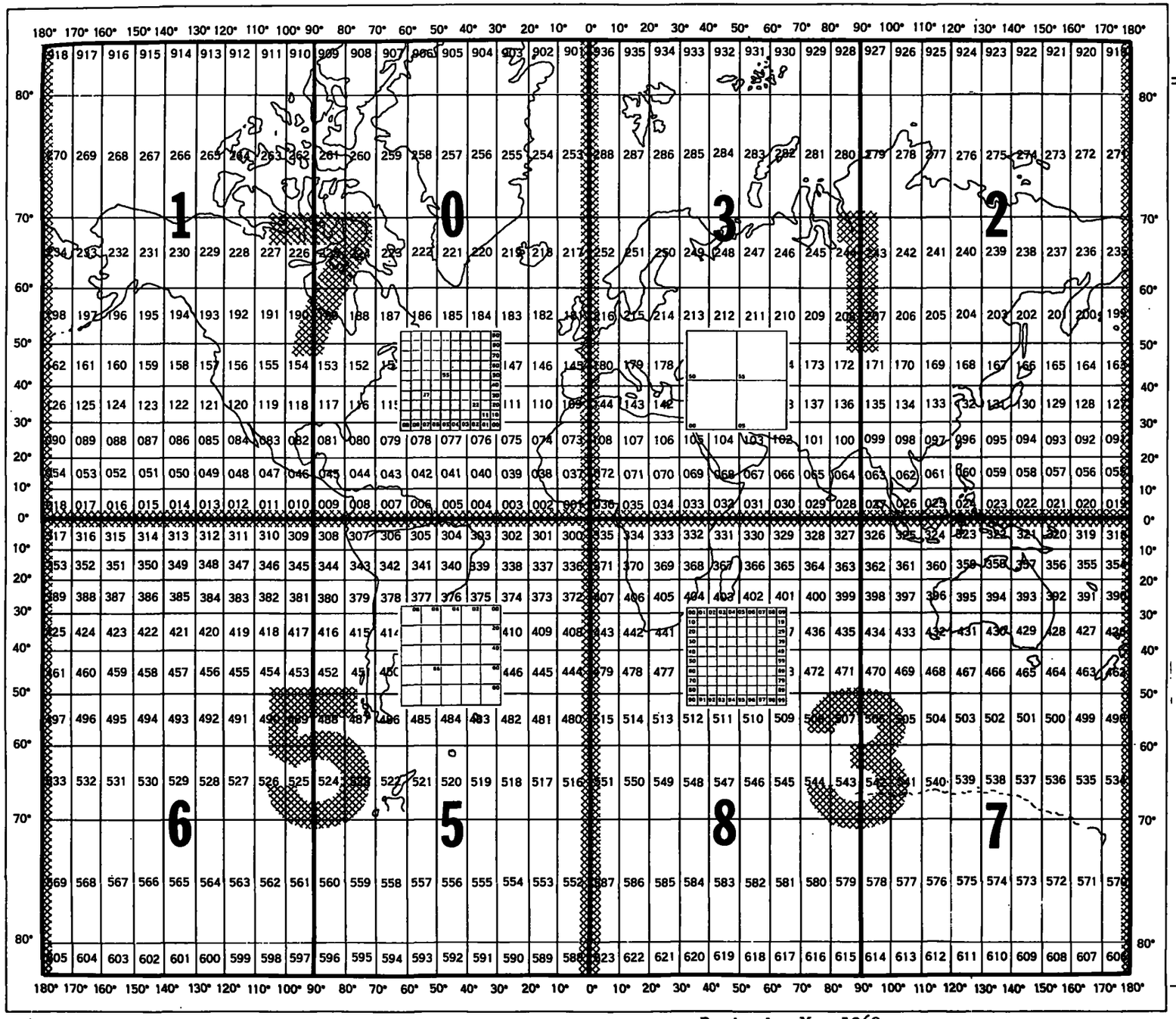
MISSING DATA: When data are missing the appropriate columns are left blank. Identification cards are not punched for missing observations.

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

ELEMENTS (ITEMS) AND COLUMNS PUNCHED:

The card content, page No. and the first column of each field (Page/Col) are listed.

For international exchange, Cols. 64, 66-72, 77-80 are not punched.



INT MARINE SFC 128

Boundaries of Quadrants (▨), Octants (—) and Marsden Squares (—), and Orientation of Marsden sub-squares (inserts)

The Marsden Square map is intended to furnish information about the assignment of numbers and the orientation of Marsden Squares and sub-squares with respect to latitude and longitude; the outlines of land masses are for reference purposes only. For this reason the map should not be used in geographical data survey work, particularly along coastal waters and near islands. For example, the 80th Meridian (West) actually lies along the east coast of Florida, but the Marsden Square map shows this meridian bisecting the state and is in error. However, Marsden Square 080 is accurately located on the map as being bounded by 70° and 80° W longitude and 20° and 30° north latitude.

Additional information about marine weather observations, forms, records, and summaries may be obtained from the Director, National Weather Records Center, Asheville, N. C. 28801

Revised: May 1969

CARD CONTENT					
COLUMN	ITEM OR ELEMENT	SYMBOLIC LETTER	CARD CODE	CARD CODE DEFINITION	REMARKS
	Missing Data		Blank or X, Y	Missing or unknown data	When data are missing the appropriate columns are left blank. (Some cards are punched with unauthorized X or Y punches.)
1	Temperature Indicator		1 2 3 4 5 6	°C (Celsius) to tenths °F (Fahrenheit) to tenths Whole °C Whole °F Halves of °C Halves of °F	
			7	°F to tenths, and dewpoint to whole °F	In these cases 0 is punched in Column 76.
			8	°C to tenths, and dewpoint to whole °C	
2-3	Year		00-99 X/Col. 2	Last two digits of year 1800-1899	An X (11) overpunch in Column 2 indicates the nineteenth century.
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 12	Conversion Table of Q to Q_c is given on page 12, below Code 1.
	Quadrant of Globe	Q_c	1, 3, 5, 7	Code Table 1A, page12	Effective 1 Jan 68. In cards exchanged internationally, octant and coordinates punched according to 1967 and earlier rules.
9-11	Latitude	$L_aL_aL_a$	000-900	00.0° - 90.0° Degrees and tenths	North or South latitude distinguished in Column 8.
12-14	Longitude	$L_oL_oL_o$	000-999	00.0° - 99.9° Degrees and tenths	East or West longitude and hundreds position of longitude are indicated in Column 8.
			Y Y 000-800	100.0° - 180.0°	Effective 1 Jan 68: 12(Y) overpunch in Column 12 indicates hundreds place(not punched in cards reproduced from magnetic tape).
15-16	Hour of Observation GMT	GG	00-23	00 - 23 GMT Nearest whole hour	3 or 6 hourly at 00, 03, 06, 09, 12, 15, 18, and 21.
17	Total Cloud Amount	N	0, 1-9	Code Table 2, page 12	

CARD CONTENT					
COLUMN	ITEM OR ELEMENT	SYMBOLIC LETTER	CARD CODE	CARD CODE DEFINITION	REMARKS
18-19	Wind Direction (True)	dd	00-36, 99	Tens of degrees	Reference Code Table 3, page 12 Note: The type of wind data in Columns 18-21 is indicated by the code in Column 65.
			00-32		32 point code. Code Table 33, page 24.
			X/Col. 18	Measured wind	On 1 Jan 68, the X overpunch in Column 18 was discontinued and estimated and measured winds are indicated by a 0 or 6 punch in Column 65, respectively.
			00-36	16 of 36 points	Code Table 31, page 24
			00-32	16 of 32 points	Code Table 32, page 24.
20-21	Wind Speed	ff	00-99 X/Col. 20	00 (Calm) - 99 knots 100 - 199 knots	X overpunch in Column 20 indicates speeds greater than 99 knots. See Remarks for Columns 18-19.
			0, 1-12	Code Table 25, page 22	Beaufort Scale, punched in Column 77, page 11, see Remarks.
			00-99	Meters per second (mps)	Code 4, 5, 8, or 9 punched in Column 65.
22-23	Visibility	VV	90-99	Code Table 4, page 13	For conversion from Card Codes 00-89 in 1949 and 1955 WMO codes to the current 1960 WMO Code 4377 (90-99) use Code Table 4A, page 13.
			X/Col. 22	Measured visibility	X overpunch in Column 22 effective 1 Jan 66.
			$\frac{X}{93}$	Fog present, visibility not reported	Effective 1 Jan 66: Card code 93 in Columns 22-23 with an X overpunch in Column 23 indicates fog present and visibility not reported.
24-25	Present Weather	ww	00-99	Code Table 5, pages 13-15	
26	Past Weather	W	0, 1-9	Code Table 6, page 15	Past weather for 6 hours at 00, 06, 12, and 18 GMT obs. Past weather for 3 hours at 03, 09, 15, and 21 GMT obs. The combination of present (Columns 24-25) and past (Col. 26) gives as complete a description as possible of the weather in the time interval concerned.
27-31	Sea Level Pressure	PPPPP	07000-10999	700.0 - 1099.9 mb Millibars and tenths	When reported in whole millibars, 0 is punched in Column 31.
32-34	Air Temperature	TTT	000-999 X/Col. 32	0.0°C thru 99.9°C -0.1°C thru -99.9°C	Generally punched to 0.1°C and Col. 1 punched "1." When reported to whole degrees "0" is punched in low order position of field and Col. 1 is punched "3." X/0 in high order position when the value is between -00.1 through -09.9°C. Refer to Col. 1 for scale and units indicator.

CARD CONTENT					
COLUMN	ITEM OR ELEMENT	SYMBOLIC LETTER	CARD CODE	CARD CODE DEFINITION	REMARKS
35-37	Wet Bulb Temperature		000-999 X/Col. 35 X/Col. 37	0.0°C through 99.9°C -0.1°C through -99.9°C Ice on wet bulb	See Remarks in Column 32-34.
38	Total Amount of Lower Clouds	N_h	0, 1-9	Code Table 2, page 12	Amount of the celestial dome covered by all type C_L or type C_M when C_L is not present. Prior to 1966 it was the amount of cloud coded as C_L or C_M if C_L is not present.
39	Type of Low Cloud	C_L	0, 1-9	Code Table 7, page 15	The most significant type is coded in priority of vertical development and amount, respectively. When code "X" or "/" is reported, the column is left blank. The "X" punch of code was generally in use and punched prior to Dec 63.
40	Height of base of Low or Middle Cloud	h	0, 1-9	Code Table 8, page 16	The height of C_M is given when no C_L is present. The height is for the lowest cloud observed regardless of amount, since 1 Jan 55.
			X/Col. 40	Measured height	Effective 1 Jan 66.
41	Type of Middle Cloud	C_M	0, 1-9	Code Table 9, page 16	The most significant type is coded in priority of vertical development and amount, respectively. When code "X" or "/" is reported, the column is left blank. The "X" punch of code was generally in use and punched prior to Dec 63.
42	Type of High Cloud	C_H	0, 1-9	Code Table 10, page 16	
43-45	Sea Temperature	$T_wT_wT_w$	000-999	0.0°C through 99.9°C Degrees Celsius and tenths	When reported to whole degrees, 0 is punched in Column 45. (See Remarks Column 32-34.)
			X/Col. 43	Negative temperature	
			X/Col. 45	Water Injection temperature	Effective 1 Jan 68. X overpunch in Column 45 indicates that sea temperature is an injection value not observed by bucket.
46-48	Air minus Sea Temperature Difference	$T_sT_sT_s$	000-999	0.0°C through 99.9°C	Beginning Jan 65, for U.S. sources these columns were computed by machine and included in the cards for international exchange only and are not punched in Card Deck 128.
			X/Col. 46	Negative value	An X overpunch in Column 46 indicates that the sea temperature is higher than the air temperature therefore a negative value. (See Remarks Columns 32-34.)
49-50	Direction of Sea Waves	d_wd_w	00-36 49, 99	Code Table 11, page 17	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. Discontinued 1 Jan 68. d_wd_w for sea waves was considered same as Columns 18-19.

CARD CONTENT					
COLUMN	ITEM OR ELEMENT	SYMBOLIC LETTER	CARD CODE	CARD CODE DEFINITION	REMARKS
51-52	Period of Sea Waves	P_w	0, 1-9, X	Code Table 12, page 17	Punched in Column 51, Column 52 was blank. Discontinued 1 Jan 68.
		P_wP_w	00 01-98 99	No waves, calm sea Number of seconds Confused sea	Effective 1 Jan 68.
53-54	Height of Sea Waves	H_wH_w	00 01-99	Less than 1/4 meter 1/2 m - 49 1/2 meters (half meter units) 01 0.5 meter 02 1 meter 03 1.5 meters, etc.	Decoded from 1960 WMO Code 1555, Code Table 13, page 17, and remark on original records. 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, 1/2 meter units are punched.
55-56	Direction of Swell Waves	d_wd_w	00-36 49	Code Table 11, page 17	 Code figure 49 discontinued 1 Jan 68.
			99	Confused	See Columns 57-58.
57-58	Period of Swell Waves	P_w	0, 1-9, X	Code Table 12, page 17	Code punched in Column 57, Column 58 was left blank. Period prior to 1 Jan 68.
				Code Table 12A, page 17	Code Table 12A, 1968 WMO Code 3155, effective 1 Jan 68; code is punched in Column 58 and Column 57 is left blank.
59-60	Height of Swell Waves	H_wH_w	00, 01-80	Code Columns 53-54 and Remarks	
61-62	Country Number		00-35 X/Col. 62	Code Table 14, page 18 Not of U. S. origin (for cards received prior to Aug 67)	Number of country which has recruited the ship. Country number is not punched for Ocean Station Vessels. Prior to 1 Aug 67, card codes 00-37 and 46-87 (use discontinued) were punched for sub-octant (file copy) numbers in these columns. Prior to 1 Oct 67, 00 was punched for special ships.
	Ocean Weather Station Number		38-45, 90-99 X/Col. 62	Code Table 15, page 18 Auxiliary Ships	 X overpunch in Column 62 for auxiliary ships began Jan 1968.
63	Code Indicator		0	Punched according to WMO codes effective in the year punched in Columns 2-3.	If other than 0 or X/0 is punched in Column 63, this indicates that the card has been punched according to supplementary punching procedures.
			X/0	United States origin	
			1		Data with deviating codes or additional groups as indicated in Columns 64-68; Columns 78-80 are left blank.

CARD CONTENT					
COLUMN	ITEM OR ELEMENT	SYMBOLIC LETTER	CARD CODE	CARD CODE DEFINITION	REMARKS
63	Code Indicator (continued)		2		Data with deviating codes or additional groups as indicated in Columns 64-68; ship or log number punched in Columns 78-80, (or 77-80 when Column 77 was not used for Beaufort Force).
			3		Data with deviating codes or additional groups as indicated in Columns 64-68; Columns 74-80 are left blank for special purposes (Indian Ocean Survey).
			4		Data with deviating codes or additional groups as indicated in Columns 64-67, indicator in Column 68 must be 4, Columns 52, 54, 58, and 60 must not be used for punching wave data. Columns 78-80 are left blank. (Beaufort weather see Column 68, codes 4 and 5.)
			5		Data with deviating codes as indicated in Column 1, otherwise punched according to WMO codes effective in the year punched in Columns 2-3, Columns 64-73 and 78-80 are left blank.
64	Ocean Station Vessel (OSV) or Indicator for Ship Location		0		$QL_aL_aL_aL_oL_oL_o$ punched in Columns 8-14. 0 punched in all United States cards except OSV's.
			1		10° Marsden square in Columns 8-10, 1° unit of latitude in Column 11, 1° unit of longitude in Column 12, 0.1° unit of latitude in Column 13, and 0.1° unit of longitude in Column 14.
			2 X/2	OSV off station OSV on station	Prior to Jan 1968 "4" was punched for light ships. Ocean station vessel, $QL_aL_aL_aL_oL_oL_o$ in Columns 8-14; an ocean station vessel occupying an ocean weather station to be indicated by an X overpunch in Column 64.
			3		Ocean station vessel, location in marsden squares in Columns 8-14; an ocean station vessel occupying an ocean weather station to be indicated by an X overpunch in Column 64.
			4		Anchored. $QL_aL_aL_aL_oL_oL_o$
			5		Anchored, location in marsden squares in Columns 8-14.
			6		10° marsden square in Column 8-10, 1° unit of latitude in Column 11, 1° unit of longitude in Column 12, 1/6° unit of latitude in Column 13, and 1/6° unit of longitude in Column 14. (Card code 6 effective 1 Jan 66.)

CARD CONTENT					
COLUMN	ITEM OR ELEMENT	SYMBOLIC LETTER	CARD CODE	CARD CODE DEFINITION	REMARKS
65	Wind Indicator	i_w	0	U.S. origin, prior Jan 68 36 points knots	Prior to Jan 1968 an X overpunch in Column 18 indicated measured.
				Effective Jan 1968 dd ff	Prior to Jan 1968 Code dd ff
			0	36 points knots estimated	0 36 points knots
			1	32 points knots estimated	1 32 points knots
			2	36 points Beaufort estimated	2 36 points Beaufort Note: Code 25, Beaufort Scale is
			3	32 points Beaufort estimated	3 32 points Beaufort on page 22.
			4	36 points mps estimated	4 36 points meters per second (mps)
			5	32 points mps estimated	5 32 points mps
			6	36 points knots measured	
			7	32 points knots measured	
			8	36 points mps measured	
			9	32 points mps measured	
66	Indicator for Visibility	VV	0	Card Codes 90-99	1955 WMO Code 4377
			1	Card Codes 00-89	1955 WMO Code 4377, formerly 1949 WMO Code 84.
67	Wave Code		0	Punched according to the punching procedures for waves as defined in Columns 49-60	Cards prepared under instructions pertaining to the period prior to Jan 1968, but containing 1968 data, will be punched with an X in Column 67. The X will have the same meaning as Code 0. 1968 data prepared in accordance with 1968 codes and instructions will have an 0 in Column 67.
			1		WMO Code 75 (1964) WMO Code 75 (Nov 1957) code renumbered 3700 effective 1960, in Column 53; wave direction according to 00-36 scale in Columns 49-50.
			2		Sea Code (Douglas or Copenhagen 1929 scales) in Column 53; sea direction according to 00-32 scale in Columns 49-50. Swell Code (Douglas or Copenhagen 1929, Berlin 1939 scales) in Column 59; swell direction according to 00-32 scale in Columns 55-56.
			3		Sea Code (Paris 1919 scale) in Column 53; sea direction according to 00-32 scale in Columns 49-50. Swell Code (Douglas or Copenhaven 1929, Berlin 1939 scales) in Column 59; swell direction according to 00-32 scale in Columns 55-56.
			4		WMO Code 1555; 50 has been added to $d_w d_w$ to indicate H_w greater than 9 half-meters (4 1/2 m).

CARD CONTENT					
COLUMN	ITEM OR ELEMENT	SYMBOLIC LETTER	CARD CODE	CARD CODE DEFINITION	REMARKS
68-73	Indicator and Additional Data Group		1 2 3 4 5 6 7 8 9	Ice Accretion Ice field description Unassigned Beaufort weather German system Beaufort weather British system Ships course, speed and pressure tendency Precipitation Significant clouds Special phenomenon	The indicator for the appropriate group as listed below is punched in Column 68. See Code 34, page 25. See Code 35, page 25.
68	Indicator		0	No additional data	Column 68 is often left blank when there is no additional data.
68	Indicator		1	Ice accretion on ships	$I_sE_sE_sR_s$ group is punched in Columns 69-72. Element seldom punched.
69	Type of Ice Accretion	I_s	1-5	Code 18, page 19	
70-71	Ice Thickness	E_sE_s	00-99	0 thru 99 centimeters	
72	Rate of Accretion	R_s	0, 1-4	Code 19, page 19	
68	Indicator		2	Ice distance and bearing	c_2KD_ire group is punched in Columns 69-73.
69	Description of Kind of Ice	c_2	0, 1-9	Code 26, page 23	
70	Effect of Ice on Navigation	K	0, 1-9	Code 27, page 23	
71	Bearing of Ice Edge	D_i	0, 1-9	Code 28, page 23	
72	Distance to Ice Edge from Ship	r	0, 1-9	Code 29, page 23	
73	Orientation of Ice Edge	e	0, 1-9	Code 30, page 23	
68	Indicator		3	Unassigned	
68	Indicator		4	Beaufort Weather Notation in Columns 52, 54, 58, 60, and 69-71	These data are rarely punched. When punched a 4 must be in Column 63. The special codes for German System Beaufort Weather Notation are given in Code 34, page 25.

CARD CONTENT

COLUMN	ITEM OR ELEMENT	SYMBOLIC LETTER	CARD CODE	CARD CODE DEFINITION	REMARKS
68	Indicator		5	Beaufort Weather Notation (British System)	These data are rarely punched. When punched, they are in Columns 69-72. See Code 35, page 25.
68	Indicator		6	Ship's Course and Speed, and Pressure Tendency	$D_s v_s$app group is punched in Columns 69-73.
69	Ship's Course	D_s	0, 1-9	Code 16, page 19	
70	Ship's Speed	v_s	0, 1-9	Code 17, page 19 Code 17A, page 19	Discontinued 31 Dec 67. Effective 1 Jan 68. v_s - Ship's average speed made good during 3 hours preceding the time of observation.
71	Characteristic of Pressure Tendency	a	0, 1-8	Code 21, page 19	a - Characteristic of Pressure Tendency during the 3 hours preceding the time of observation.
72-73	Amount of Pressure Change	pp	00-99 X/Col. 72 X/Col. 73	0 thru 9.9 mb to tenths 10.0 thru 19.9 mbs 20.0 thru 29.9 mbs	For 3 hours preceding time of observation.
68	Indicator		7	Precipitation Data	RRt_Rt_R group is punched in Columns 69-72.
69-70	Precipitation Amount	RR	00-99	Code 22, page 20	Element seldom punched.
71-72	Duration of Precipitation	t_Rt_R	00-94, 99	Code 24, page 21	
68	Indicator		8	Significant Cloud Data	$N_sCh_sh_s$ group is punched in Columns 69-72.
69	Cloud Amount	N_s	0, 1-9	Code 2, page 12	Element seldom punched.
70	Significant Type Cloud (Genus)	C	0, 1-9	Code 20, page 19	Column 70 is left blank when Code X or / reported.
71-72	Cloud Height	h_sh_s	00-50, 56-99	Code 23, page 20	Punching of Significant Cloud data discontinued by U.S. 1 Jan 68.
68	Indicator		9	Special Phenomena	These data, $S_pS_ps_ps_p$, are rarely punched in Columns 69-72. The regional codes indicated below are given WMO publication, Weather Reports, Volume B, Codes, WMO No. 9 TP. 4 (available in NWRC). Element seldom punched. Region 1 WMO Code 169 — Regions 4 & 5 WMO Code 483 Region 2 WMO Code 268 — Region 6 WMO Code 668 Region 3 WMO Code 383 — Antarctica WMO Code 768

CARD CONTENT					
COLUMN	ITEM OR ELEMENT	SYMBOLIC LETTER	CARD CODE	CARD CODE DEFINITION	REMARKS
73	Responsible Member		0 1 2 3 4 5 6 7 8 9	Canada Great Britain United States U.S.S.R. Japan Netherlands India Hong Kong Germany, Federal Republic of South Africa, Republic of	Beginning Jan 1966, Column 73 was punched in cards sent from NWRC. Column 73 may be used for additional data (2 or 6 in Column 68) when not used for Responsible Member Number. In cards from Canada, 2 is punched in Column 73 beginning Aug 1965. Note: This punch is used to separate cards to be sent to Responsible Members. It is based on the position of the report in accordance with the areas of responsibility delineated in WMO Resolution 35 (Cg-IV).
73	Indicator		12(Y)/Col.73	c_2KD_ire on original record	Ice Distance and Bearing group on original record (not punched).
74-76	Dew Point	$T_dT_dT_d$	000-999 X/Col. 74	0.0°C through 99.9°C Degrees Celsius and tenths Negative temperature	Dew point temperatures are punched through December 1964. Beginning January 1965, they are computed and punched for international exchange only by the U. S.
77	Beaufort Scale Wind Force		0, 1-9, 10-12 X/Col. 77	Code 25, page 22 10,11,12 (X over 0, 1, 2)	A few observations in Beaufort Scale were received from foreign sources. The mid-values in knots were punched in Columns 20-21 for some. When conversion to magnetic tape was made, all values were converted to knots. Columns 77-80 left blank when Beaufort Scale is punched.
78-80	Not used				
77-80	Ship Number				Not used when Beaufort Scale is punched.

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

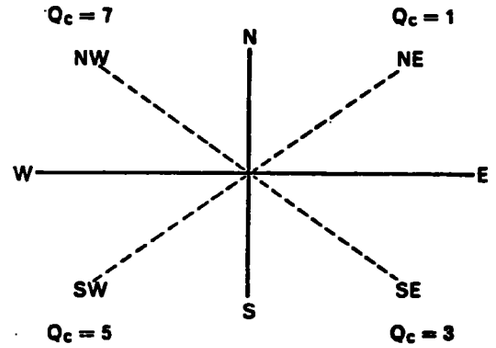
Q Octant of Globe	Q_c Quadrant of Globe
0,1	7
2,3	1
5,6	5
7,8	3

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 4A

Conversion Table of Visibility for Nautical Miles from the 00-89 code to 90-99 decade

1949 00-89 Code	1949 & 1955 Decade 90-99	1955 & 1960 00-89 Code	Code 90-99 Nautical Mile Values
X0-X2	90	00	< 50 yards or meters
X3-X9, 00	91	01	50 yards or meters
01	92	02-04	200 yards or meters
02-03	93	05-08	1/4 or 500 meters
04-08	94	09-17	1/2
09-17	95	18-36	1.0
18-45	96	37-58	2.0
46-80	97	59-68	5.0
81	98	69-82	10.0
82-89	99	83-89	≥25.0

When distances are between two of the distances assigned to the above codes the code figure for the smaller distance are reported and punched.

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, not deeper than about 2 metres on land or 10 metres at sea
- 12 (More or less continuous) shallow fog or ice fog at the station, whether on land or sea, 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	Slight or moderate duststorm or sandstorm	has decreased during the preceding hour
31		no appreciable change during the preceding hour
32		has begun or has increased during the preceding hour
33	Severe duststorm or sandstorm	has decreased during the preceding hour
34		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 obscrvation	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
X /	* Stratocumulus, Stratus, Cumulus and Cumulonimbus invisible owing to darkness, fog, blowing dust or sand, or other similar phenomena

* punch of code generally discontinued Nov 63.

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

* X punch of code generally discontinued Nov 63.

Code 11

(1960 WMO Code 0885)
(1968 WMO Code 0877)

$d_w d_w$ - 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 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 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 14

NUMBER OF COUNTRY WHICH HAS RECRUITED THE SHIP

00	Netherlands	20	Sweden
01	Norway	21	Germany, Federal Republic of
02	United States of America	22	Iceland
03	United Kingdom	23	Israel
04	France	24	Malaysia
05	Denmark	25	Union of Soviet Socialist Republics
06	Italy	26	Finland
07	India	27	Korea
08	Hong Kong	28	New Caledonia
09	New Zealand	29	Portugal
10	Ireland	30	Spain
11	Philippines	31	Thailand
12	United Arab Republic	32	Yugoslavia
13	Canada	33	Poland
14	Belgium	34	Brazil
15	South Africa	35	Singapore
16	Australia	36	Kenya
17	Japan	37	Tanzania
18	Pakistan	38	Uganda
19	Argentina		

Code 15

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	59° 00'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

Code 16

(1949 WMO Code 20)
(1960 WMO Code 0700)

D_s Ships Course (true)

Direction toward which ship is moving

Code Figure	Direction	Code Figure	Direction
0	Ship hove to	5	SW
1	NE	6	W
2	E	7	NW
3	SE	8	N
4	S	9	All directions or unknown

Code 17

(1949 WMO Code 88)
(1960 WMO Code 4451)

V_s Ship's speed (In Nautical Miles per hour)

Code Figure	Speed	Code Figure	Speed
0	0	5	13-15
1	1-3	6	16-18
2	4-6	7	19-21
3	7-9	8	22-24
4	10-12	9	over 24

Code 17 A

1968 WMO Code 4451

V_s — *Ship's average speed made good during the three hours preceding the time of observation*

Code figure		
0	0 knot	0 kilometre per hour
1	1 - 5 knots	1 - 10 kilometres per hour
2	6 - 10 knots	11 - 19 kilometres per hour
3	11 - 15 knots	20 - 28 kilometres per hour
4	16 - 20 knots	29 - 37 kilometres per hour
5	21 - 25 knots	38 - 47 kilometres per hour
6	26 - 30 knots	48 - 56 kilometres per hour
7	31 - 35 knots	57 - 65 kilometres per hour
8	36 - 40 knots	66 - 75 kilometres per hour
9	Over 40 knots	Over 75 kilometres per hour

Code 18

(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 19

(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 20

(1955 WMO Code 10)
(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 21

(1955 WMO Code 02)
(1960 WMO Code 0200)

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

Code figure		
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;	

Code 22
(1960 WMO Code 3577)

RR - Amount of precipitation

Code figure	mm	Code figure	mm	Code figure	mm
00	0	37	37	74	240
01	1	38	38	75	250
02	2	39	39	76	260
03	3	40	40	77	270
04	4	41	41	78	280
05	5	42	42	79	290
06	6	43	43	80	300
07	7	44	44	81	310
08	8	45	45	82	320
09	9	46	46	83	330
10	10	47	47	84	340
11	11	48	48	85	350
12	12	49	49	86	360
13	13	50	50	87	370
14	14	51	51	88	380
15	15	52	52	89	390
16	16	53	53	90	400
17	17	54	54	91	0.1
18	18	55	55	92	0.2
19	19	56	60	93	0.3
20	20	57	70	94	0.4
21	21	58	80	95	0.5
22	22	59	90	96	0.6
23	23	60	100	97	A little precipitation, non-measurable
24	24	61	110		
25	25	62	120		
26	26	63	130		
27	27	64	140		
28	28	65	150	98	More than 400 mm
29	29	66	160		
30	30	67	170		
31	31	68	180	99	Measurement impossible or inaccurate
32	32	69	190		
33	33	70	200		
34	34	71	210		
35	35	72	220		
36	36	73	230		

Note: Code 99 "or inaccurate" discontinued 1968 code.

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

Code 24

WMO Code 4080

t_Rt_R — *Observational period for* RR *and duration of precipitation*

OBSERVATIONAL PERIOD							
6 hours		12 hours		18 hours		24 hours	
Code figure	Total precipitation	Code figure	Total precipitation	Code figure	Total precipitation	Code figure	Total precipitation
00	None	20	None	50	None	70	None
01	Less than 15 minutes	21	Less than 15 minutes	51	Less than 1 hour	71	Less than 1 hour
02	15 min or more but less than 30 min	22	15 min or more but less than 30 min	52	1 hour or more but less than 2 hours	72	1 hour or more but less than 2 hours
03	30 min or more but less than 45 min	23	30 min or more but less than 45 min	53	2 hours or more but less than 3 hours	73	2 hours or more but less than 3 hours
04	45 min or more but less than 1 hour	24	45 min or more but less than 1 hour	54	3 hours or more but less than 4 hours	74	3 hours or more but less than 4 hours
05	1 hour or more but less than 1 hour 15 min	25	1 hour or more but less than 1 hour 15 min	55	4 hours or more but less than 5 hours	75	4 hours or more but less than 5 hours
06	1 hour 15 min or more but less than 1 hour 30 min	26	1 hour 15 min or more but less than 1 hour 30 min	56	5 hours or more but less than 6 hours	76	5 hours or more but less than 6 hours
07	1 hour 30 min or more but less than 1 hour 45 min	27	1 hour 30 min or more but less than 1 hour 45 min	57	6 hours or more but less than 7 hours	77	6 hours or more but less than 7 hours
08	1 hour 45 min or more but less than 2 hours	28	1 hour 45 min or more but less than 2 hours	58	7 hours or more but less than 8 hours	78	7 hours or more but less than 8 hours
09	2 hours or more but less than 2 hours 15 min	29	2 hours or more but less than 2 hours 15 min	59	8 hours or more but less than 9 hours	79	8 hours or more but less than 9 hours
10	2 hours 15 min or more but less than 2 hours 30 min	30	2 hours 15 min or more but less than 2 hours 30 min	60	9 hours or more but less than 10 hours	80	9 hours or more but less than 10 hours
11	2 hours 30 min or more but less than 2 hours 45 min	31	2 hours 30 min or more but less than 2 hours 45 min	61	10 hours or more but less than 11 hours	81	10 hours or more but less than 11 hours
12	2 hours 45 min or more but less than 3 hours	32	2 hours 45 min or more but less than 3 hours	62	11 hours or more but less than 12 hours	82	11 hours or more but less than 12 hours
13	3 hours or more but less than 3 hours 30 min	33	3 hours or more but less than 3 hours 30 min	63	12 hours or more but less than 13 hours	83	12 hours or more but less than 13 hours
14	3 hours 30 min or more but less than 4 hours	34	3 hours 30 min or more but less than 4 hours	64	13 hours or more but less than 14 hours	84	13 hours or more but less than 14 hours
15	4 hours or more but less than 4 hours 30 min	35	4 hours or more but less than 4 hours 30 min	65	14 hours or more but less than 15 hours	85	14 hours or more but less than 15 hours
16	4 hours 30 min or more but less than 5 hours	36	4 hours 30 min or more but less than 5 hours	66	15 hours or more but less than 16 hours	86	15 hours or more but less than 16 hours
17	5 hours or more but less than 5 hours 30 min	37	5 hours or more but less than 5 hours 30 min	67	16 hours or more but less than 17 hours	87	16 hours or more but less than 17 hours
18	5 hours 30 min to 6 hours	38	5 hours 30 min or more but less than 6 hours	68	17 hours to 18 hours	88	17 hours or more but less than 18 hours
19	Duration not specified	39	Not used	69	Duration not specified	89	18 hours or more but less than 19 hours
		40				90	19 hours or more but less than 20 hours
		41	6 hours or more but less than 7 hours			91	20 hours or more but less than 21 hours
		42	7 hours or more but less than 8 hours			92	21 hours or more but less than 22 hours
		43	8 hours or more but less than 9 hours			93	22 hours or more but less than 23 hours
		44	9 hours or more but less than 10 hours			94	23 hours to 24 hours
		45	10 hours or more but less than 11 hours			95	Not used
		46	11 hours to 12 hours			96	
		47	Not used			97	
		48				98	
		49	Duration not specified			99	Duration not specified

Code 25 (1968 WMO Code 1100)

F — *Force of surface wind*

BEAUFORT SCALE OF WIND

(For a standard height of 10 metres above open flat ground)

BEAUFORT NUMBER	DESCRIPTIVE TERM	VELOCITY EQUIVALENT AT A STANDARD HEIGHT OF 10 METRES ABOVE OPEN FLAT GROUND				SPECIFICATIONS			Probable wave height* in metres	Probable wave height* in feet
		Mean velocity in knots	metres/sec	km/h	m.p.h.	Land	Sea	Coast		
0	Calm	< 1	0 – 0·2	< 1	< 1	Calm; smoke rises vertically	Sea like a mirror	Calm	—	—
1	Light air	1 – 3	0·3 – 1·5	1 – 5	1 – 3	Direction of wind shown by smoke drift but not by windvanes	Ripples with the appearance of scales are formed, but without foam crests	Fishing smack just has steerage way	0·1 (0·1)	¼ (¼)
2	Light breeze	4 – 6	1·6 – 3·3	6 – 11	4 – 7	Wind felt on face; leaves rustle; ordinary vanes moved by wind	Small wavelets, still short but more pronounced; crests have a glassy appearance and do not break	Wind fills the sails of smacks which then travel at about 1–2 knots	0·2 (0·3)	½ (1)
3	Gentle breeze	7 – 10	3·4 – 5·4	12 – 19	8 – 12	Leaves and small twigs in constant motion; wind extends light flag	Large wavelets; crests begin to break; foam of glassy appearance; perhaps scattered white horses	Smacks begin to careen and travel about 3–4 knots	0·6 (1)	2 (3)
4	Moderate breeze	11 – 16	5·5 – 7·9	20 – 28	13 – 18	Raises dust and loose paper; small branches are moved	Small waves, becoming longer; fairly frequent white horses	Good working breeze, smacks carry all canvas with good list	1 (1·5)	3½ (5)
5	Fresh breeze	17 – 21	8·0 – 10·7	29 – 38	19 – 24	Small trees in leaf begin to sway; crested wavelets form on inland waters	Moderate waves, taking a more pronounced long form; many white horses are formed (chance of some spray)	Smacks shorten sail	2 (2·5)	6 (8½)
6	Strong breeze	22 – 27	10·8 – 13·8	39 – 49	25 – 31	Large branches in motion; whistling heard in telegraph wires; umbrellas used with difficulty	Large waves begin to form; the white foam crests are more extensive everywhere (probably some spray)	Smacks have double reef in mainsail; care required when fishing	3 (4)	9½ (13)
7	Near gale	28 – 33	13·9 – 17·1	50 – 61	32 – 38	Whole trees in motion; inconvenience felt when walking against wind	Sea heaps up and white foam from breaking waves begins to be blown in streaks along the direction of the wind	Smacks remain in harbour and those at sea lie-to	4 (5·5)	13½ (19)
8	Gale	34 – 40	17·2 – 20·7	62 – 74	39 – 46	Breaks twigs off trees; generally impedes progress	Moderately high waves of greater length; edges of crests begin to break into the spindrift; the foam is blown in well-marked streaks along the direction of the wind	All smacks make for harbour, if near	5·5 (7·5)	18 (25)
9	Strong gale	41 – 47	20·8 – 24·4	75 – 88	47 – 54	Slight structural damage occurs (chimney pots and slates removed)	High waves; dense streaks of foam along the direction of the wind; crests of waves begin to topple, tumble and roll over; spray may affect visibility	—	7 (10)	23 (32)
10	Storm	48 – 55	24·5 – 28·4	89 – 102	55 – 63	Seldom experienced inland; trees uprooted; considerable structural damage occurs	Very high waves with long overhanging crests; the resulting foam, in great patches, is blown in dense white streaks along the direction of the wind; on the whole, the surface of the sea takes a white appearance; the tumbling of the sea becomes heavy and shock-like; visibility affected	—	9 (12·5)	29 (41)
11	Violent storm	56 – 63	28·5 – 32·6	103 – 117	64 – 72	Very rarely experienced; accompanied by widespread damage	Exceptionally high waves (small and medium-sized ships might be for a time lost to view behind the waves); the sea is completely covered with long white patches of foam lying along the direction of the wind; everywhere the edges of the wave crests are blown into froth; visibility affected	—	11·5 (16)	37 (52)
12	Hurricane	64 and over	32·7 and over	118 and over	73 and over	—	The air is filled with foam and spray; sea completely white with driving spray; visibility very seriously affected	—	14 (—)	45 (—)

* This table is only intended as a guide to show roughly what may be expected in the open sea, remote from land. It should never be used in the reverse way; i. e., for logging or reporting the state of the sea. In enclosed waters, or when near land, with an off-shore wind, wave heights will be smaller and the waves steeper. Figures in brackets indicate the probable maximum height of waves.

Code 26
(1960 WMO Code 0663)

c_2 — *Description of kind of ice*

Code figure	
0	No ice (0 may be used to report *ice blink* and then a direction must be reported)
1	New ice
2	Fast ice
3	Pack ice/drift ice
4	Packed (compact) slush or sludge
5	Shore lead
6	Heavy fast ice
7	Heavy pack ice/drift ice
8	Hummocked ice
9	Icebergs *

* Icebergs can also be reported in plain language.

Code 27
(1960 WMO Code 2100)

K — *Effect of the ice on navigation*

Code figure	
0	Navigation unobstructed
1	Navigation unobstructed for steamers, difficult for sailing ships
2	Navigation difficult for low-powered steamers, closed to sailing ships
3	Navigation possible only for powerful steamers
4	Navigation possible only for steamers constructed to withstand ice pressure
5	Navigation possible with the assistance of ice-breakers
6	Channel open in the solid ice
7	Navigation temporarily closed
8	Navigation closed
9	Navigation conditions unknown (e.g., owing to bad weather)

Code 28
(1960 WMO Code 0739)

D_i — *Bearing of ice edge*

Code figure	
0	No ice edge can be stated
1	Ice edge towards NE
2	Ice edge towards E
3	Ice edge towards SE
4	Ice edge towards S
5	Ice edge towards SW
6	Ice edge towards W
7	Ice edge towards NW
8	Ice edge towards N
9	Ice edge in several directions

Note: If more than one ice edge can be stated, the nearest or most important should be reported.

Code 29
(1960 WMO Code 3600)

r — *Distance to ice edge from reporting ship*

Code figure		
0	Up to 1 mile	Up to 2 kilometres
1	1 – 2 miles	2 – 4 kilometres
2	2 – 4 miles	4 – 7 kilometres
3	4 – 6 miles	7 – 11 kilometres
4	6 – 8 miles	11 – 15 kilometres
5	8 – 12 miles	15 – 22 kilometres
6	12 – 16 miles	22 – 30 kilometres
7	16 – 20 miles	30 – 37 kilometres
8	More than 20 miles	More than 37 kilometres
9	Unspecified, or no observation	Unspecified, or no observation

Note: The exact bounding distance is to be assigned to the lower code figure in each case; e.g., a distance of 8 miles or 15 kilometres is coded as 4.

Code 30
(1960 WMO Code 1000)

e — *Orientation of ice edge*

Code figure	
0	Orientation of ice edge impossible to estimate — ship *outside* the ice
1	Ice edge lying in a direction NE to SW with ice situated to the NW
2	Ice edge lying in a direction E to W with ice situated to the N
3	Ice edge lying in a direction SE to NW with ice situated to the NE
4	Ice edge lying in a direction S to N with ice situated to the E
5	Ice edge lying in a direction SW to NE with ice situated to the SE
6	Ice edge lying in a direction W to E with ice situated to the S
7	Ice edge lying in a direction NW to SE with ice situated to the SW
8	Ice edge lying in a direction N to S with ice situated to the W
9	Orientation of ice edge impossible to estimate — ship *inside* the ice

Code 31

Code Definition and Remarks

16 of 36 pts.

Code Figure	Arrow	Direction	Degrees (16 points)	Degrees (8 points)
00	C	Calm	-	-
36	↓↓	N (North)	349-011	338-022
02	↓↙	NNE	012-033	
05	↙↙	NE	034-056	023-067
07	↙←	ENE	057-078	
09	←←	E (East)	079-101	068-112
11	←↖	ESE	102-123	
14	↖↖	SE	124-146	113-157
16	↑↖	SSE	147-168	
18	↑↑	S (South)	169-191	158-202
20	↑↗	SSW	192-213	
23	↗↗	SW	214-236	203-247
25	→↗	WSW	237-258	
27	→→	W (West)	259-281	248-292
29	→↘	WNW	282-303	
32	↘↘	NW	304-326	293-337
34	↓↘	NNW	327-348	

Code 32

16 of 32 pts.

00	Calm
02	NNE
04	NE
06	ENE
08	E
10	ESE
12	SE
14	SSE
16	S
18	SSW
20	SW
22	WSW
24	W
26	WNW
28	NW
30	NNW
32	N

Code 33

Limits in Whole Degrees

Code	32 Points	Direction	
00	Calm	C	(0)
01	06-16	N/E	(8)
02	17-28	NNE	
03	29-39	NE/N	(1)
04	40-50	NE	
05	51-61	NE/E	
06	62-73	ENE	
07	74-84	E/N	
08	85-95	E	
09	96-106	E/S	(2)
10	107-118	ESE	
11	119-129	SE/E	
12	130-140	SE	
13	141-151	SE/S	(3)
14	152-163	SSE	
15	164-174	S/E	
16	175-185	S	
17	186-196	S/W	(4)
18	197-208	SSW	
19	209-219	SW/S	
20	220-230	SW	
21	231-241	SW/W	(5)
22	242-253	WSW	
23	254-264	W/S	
24	265-275	W	
25	276-286	W/N	(6)
26	287-298	WNW	
27	299-309	NW/W	
28	310-320	NW	
29	321-331	NW/N	(7)
30	332-343	NNW	
31	344-354	N/W	
32	355-005	N	(8)

Code 34

Beaufort Weather Notation (German system) according to the following code:

Column 52

0 Cloud amount < 2/8
1 2/8 < cloud amount < 6/8
2 Cloud amount > 6/8
3 Overcast and cloud amount > 6/8 combined
4 Overcast
5 No data concerning cloudiness
6 Unassigned
7 Unassigned
8 Unassigned
9 No data concerning the weather

Column 54

0 Fog
1 Thick fog
2 Slight mist
3 Mist
4 Abnormal visibility
5 Very abnormal visibility
6 Dust haze
7 Gloom
8 Ugly sky
9 Unassigned

Column 58

0 Drizzle
1 Thick drizzle
2 Rain
3 Heavy rain
4 Rain squalls or showers of rain
5 Heavy rain squalls or heavy showers of rain
6 Unassigned
7 Snow squalls or showers of snow
8 Heavy snow squalls or heavy showers of snow
9 Squalls of drizzle

Column 60

0 Snow
1 Heavy snow
2 Hail
3 Heavy hail
4 Snow and hail
5 Heavy snow and hail together
6 Snow and rain together
7 Heavy snow and rain together
8 Unassigned
9 Unassigned

Column 69

0 Lightning
1 Intense lightning
2 Thunder
3 Heavy thunder
4 Thunderstorm
5 Heavy thunderstorm
6 Drizzle and rain together
7 Heavy drizzle and rain together
8 Rain and hail together
9 Heavy rain and hail together

Column 70

0 Squalls
1 Heavy squalls
2 Ground fog
3 Fog in patches
4 Wet fog
5 Fog on shore
6 Solar halo
7 Solar halo complex
8 Lunar halo
9 Lunar halo complex
x or 11 Waterspout (tornado)

Column 71

0 Dew
1 Heavy dew
2 Sandstorm
3 Hoar-frost
4 Soft rime
5 Glazed frost
6 Ice, pack ice
7 Icebergs
8 Aurora
9 Mirage
x or 11 Saint Elmo's fire
r or 12 Sudden increase of wind

Code 35

Beaufort Weather Notation (British system) according to the following code (used from the 1 January 1949 to the 31 March 1953):

Column 69

0 No visibility observation
1 Abnormal visibility
2 Unassigned
3 Mist or haze (visibility 1–2 km)
4 Fog (visibility less than 1 km)
5 Unassigned
6 Unassigned
7 Unassigned
8 Unassigned
9 Visibility greater than 2 km

Columns 70-72

000 No observation of weather
1 Snow
2 Squalls
3 Rain
4 Showers
5 Drizzle
6 Thunder
7 Hail
8 Lightning
999 None of above reported

Overpunches

x/ x or 11 overpunch in column specified
r/ r or 12 overpunch in column specified

x/ in column 2 Observations from nineteenth century
x/ in column 64 Ocean weather station
x/ in column 72 pp = 10 mb + value punched
x/ in column 73 pp = 20 mb + value punched
x/ in column 70 Waterspout (tornado)
x/ in column 71 Saint Elmo's fire
r/ in column 71 Sudden increase of wind