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NATIONAL CLIMATIC DATA CENTER

(2 of 3)

TD-1100

MARINE SRFC. OBS

Documentation Manual

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration

TDF11 DBA (McNab)

Series - refers to

October 22, 1980 0531 (17778)

TO: Ward Seguin, [illegible]

FROM: Joe Elms & Bill Brower, ACR

SUBJECT: Marine Data Rehabilitation

ACR has reviewed one marsden square (325) of the 70's rehab-data and has found a number of problems. A more thorough review by [illegible] is needed before any corrective action is taken. The following is a list of problems that were noted:

1. Decks 927 and 886 are in the modified TDF-11 format while deck 926 was left in the original TDF-11 format. There was not a large enough sample of deck 889 data to determine its format, but we suspect it was also left in the original TDF-11 format. Other decks (such as 891) would also have to be looked at. Since these formats differ from column 80 on, this causes some minor problems with the Q.C. since it was designed for the modified TDF-11 format. All the pressure tendencies in deck 926 are being flagged erroneous since the Q.C. is looking at a different element. The modified TDF-11 format is going to cause problems with most of the older decks. Not from their being in the original TDF-11 format, but due to the amount of supplemental data not allowing room for the Q.C. flags within a 140 character format.

2. Because of the limited number of country codes in the later years we suspect that sup-c data were not included. Also, after August 79 there appears to be no 927 data.

3. If both the pressure tendency and pressure change are blank, the error flag should be an 'S' not an 'R' as it is currently being flagged.

4. Due to the solidus not being punched or converted in the cloud field many observations are being flagged (A) when the only error is due to in-house procedure. A closer look at all the cloud flags is needed.

5. In conversion of 926 to TDF-11 the program automatically moves the wind direction into the sea field even when there is no height or period reported. Also, in the early 1973 deck 888 data, an inconsistency was found in the way the wind direction was being moved into the sea direction.

Once the rehab-data is corrected enough for general release, NCC needs to produce a good set of specifications. Including such items as source history, call sign problems, code changes and problems, Q.C. flags, etc.

The Q.C. routine for wave data prior to 1968 has never been thoroughly checked out. This will need to be done before the 60's rehab begins. Additional items to be considered are the expected code changes in the near future and the gridded one degree data that ACB is trying to generate.

cc:
NOCD (Wallace)
CSB (Johnson/Ertzberger)
ACB (Quayle)
DBA (McRab)
DPS (Doty)
CLIP
D531:JElms/WBrower:344/266:scl 10/22/80

[illegible] proposal because Spectra [illegible] in Dec (tape need p. 6).

Return to Marine Rehab.

Report of Activities

TASK: Marine Data Rehabilitation

Prepared by: Brian Wallace, Meteorologist

Data Operations Division

National Climatic Center

JOBS: 73009 - Navy

17638 - Climate Analysis Center, National Weather Service

October 1, 1979

15 Jan 80 Meeting [Mitchell, Gus, Quinlan, Quayle, Wallace, McNab, Elms, Williams]

- Do not change any data - only flag data
[meaning of flags A, B, + C changed to reflect above policy]

1.0 Introduction

There has always been considerable interest in surface meteorological marine data, derived from ships at sea. The Navy has prepared climatic atlases from these data for both commercial and military purposes. With the increased concern over climatic variations and the realization that the oceans play a very important role in climate fluctuations, marine data have taken on a new significance.

Unfortunately, the marine data are among the most complicated and least organized files in the NCC Library because of the numerous sources and because funding or marine processing has varied from year to year. The observations are often taken by untrained observers making the level of quality vary tremendously. The data are acquired by the NCC on manuscript and magnetic tape from national as well as international sources. Because the data arrive from many varied sources, their are numerous duplicate observations.

Processing marine data is expensive because of the random manner in which they arrive. Observations require editing before they can be merged and the duplicates eliminated. The hundreds of thousands of observations require sorting, both for processing purposes and permanent library files.

The Center has initiated a long range program to rehabilitate the files and arrange them in a synoptic and time series sort. It was decided that the first step should be the editing, validation, and sorting of the decade of marine data starting with 1970 and ending with 1979. This period was chosen because certain atlas work files stored at the Center do offer a relatively clean set of observations for the period prior to 1970.

The NCC is presently automatically editing, flagging, and eliminating duplicates in the surface marine data for 1978 and 1979 as part of the First GARP Global Experiment (FGGE). Specifications for these programs were prepared by the CAD of NCC and coding was done by ADPSD. Reference documents are:

1. Multiplicate Observations - Elimination and Selection by Joe Elms; and

2. Program specifications for the systematic automated editing of marine surface observations.

These are sophisticated programs which will enable DOD to process the decade of data without extensive software development.

In preparation for the processing of the marine data we performed the following subtasks under Navy and National Weather Service, Climate Analysis Center support.

Subtask A: Extracted marine data from GWC, NMC and Autodin files for the available periods in the years from 1971-78 and placed them in files 888, 890 and 889, respectively. These data were then selected by month and sorted in a ship-year-month-day-hour sort in preparation for input into the automated edit and validation processing and placed in a temporary output file.

Subtask B: Reformatted and sorted the merchant and Navy backlog data, CD128 data, and four reels of TDF11/128. These are also held in temporary files for input into the edit and validation process.

Subtask C: Thoroughly tested and evaluated the QC and duplication elimination software we propose to use. This included detailed flowcharts, checking the software against original specifications, insuring that the meteorological checks and flagging schemes are correct and making some changes.

2.0 The automated FGGE marine data editing system

The FGGE computer programs used to edit and flag the marine data are designed to do so automatically and without a second level human review. Each observation is checked for internal consistency, extreme values, legal codes, and time sequence changes for serially complete observations when the interval between observations is less than 24 hours. The following variables are used in the editing and validation.

ship position	dry bulb
wind velocity	dew point
visibility	wet bulb
present weather	sea temperature
past weather	clouds
pressure	sea waves
pressure tendency	swell waves

Depending on the nature of the discrepancy and its severity, the program will either change the value of the element and assign a flag to indicate the change, assign a flag if the variable appears questionable (suspect), or assign a flag to indicate the value is in error. In checking of an element for exceeding a reasonable value, climatic data were derived by using 5° squares of latitude and longitude which contain 25 observations or more. The climatic data consists of means and standard deviations. If an element value lies outside $\bar{X} \pm 4.8\sigma$, it is considered suspect. If it lies outside $\bar{X} \pm 5.8_{\sigma}$, it is considered in error. Correct elements are flagged with an R and missing elements are flagged with an S.

If a parameter contains a flag and is flagged again as a result of a second test, the flag indicating the greatest error severity is retained. Also, a flagged element is not used in determining if another element should be flagged. Other flags are defined in Table 1.

Table 1: Definitions of flags used in the FGGE software

Error type	Observation has been changed	Suspect	Erroneous
Illegal code	A		M
Failed internal consistency check	B	J	N
Failed time continuity check	C	K	
Exceeded reasonable value (extreme value)		L	Q

The need for marine data to undergo comprehensive editing is obvious. The results of the editing are passed to the user in the form of quality indicators (flags). These flags reveal the reason, if any, that the data are regarded as incorrect. Table II lists the specific tests that are performed and and the flags that are assigned.

3.0 Tests not performed by the FGGE software

One of the objectives in reviewing the FGGE software was to identify those checks and tests that were not performed as well as those that were performed. Both the checks that are being performed as well as those that are not being performed will be reviewed in light of the processing requirements for the 1970-79 data.

1. The cloud field examination does not include cloud types. No check is made on significant cloud groups.

2. Present weather and cloud are not used in visibility check.

3. No check made on ship direction and speed.

4. No check on air-sea temperature difference.

5. No check on sea-ice.

6. No check on precipitation amount.

7. If no statistical data exists, dry bulb temperature and sea surface temperature (upper limit) receive no extremes check.

4.0 The elimination of duplicate observations.

This program identifies duplicate observations and passes the best observation for retention.

Duplicates can be identified on the basis of either 1° or .1° latitude/longitude, year, month, day and hour in combination with an equivalence option which defines multiplicates in terms of equivalence of certain parameters. These are: wind direction and speed, visibility, tens digit of weather, past weather, pressure, air temperature and sea-surface temperature. Duplication is based on the number of checked elements in two or more observations and differences between these elements.

Once multiplicates have been identified, retention is based on quality code. This code is computed by QC program by summing up the assigned number value (0-3) of each flag. Flagged values A-C equal 1, J-L, 2, M-S, 3, and R, 0. The best observation has the smallest numerical error. The best observation is retained. In the case of equal flags, the observation with the most reported fields is selected.

A fill-in option can be employed. When elements are missing from an observation that is to be retained, but data are available in one of the duplicate observations, the appropriate field is moved into the observation for retention. Only those elements flagged correct (R), or changed (A-C) can be inserted. They are inserted for those flagged blank (S), suspect (J-L) or erroneous (M-Q).

Whenever a field of the retained observations contains a flagged element, a substitution is made with an unflagged element from a multiplicate, if available. In cases of flags in all observations for a field, select the field with least serious flag. In case of equivalence in flags, no alteration is made in retained observation.

The flag code changes for inserted values are; A to E, B to F, C to G and R to T.

5.0 Objectives for FY 1980

The three subtasks listed in the introduction have been completed. We have completed our review of the FGGE software and must now decide what changes, if any, must be made to meet our requirements for processing the 1970-1979 data. We have reformatted and sorted the GWC, NMC, and Autodin files as well as the merchant and Navy backlog data, the CD128 data, and the four reels of TDF 11/128. All of these data are being held in temporary files for input into the edit and validation process.

The remaining steps are as follows:

1. Convert buoy and main files to common format.

2. Examine NODC and Monterey data for possible inclusion, and convert with buoy and main files.

3. Process telecommunications and other sources through QC separately, then merge for duplicate elimination.

4. Sort into time and area files.

These will serve as the nucleus for the revised marine data files.

A flowchart of this processing is shown in Fig. 1.

FIGURE I: PROCESSING FLOW

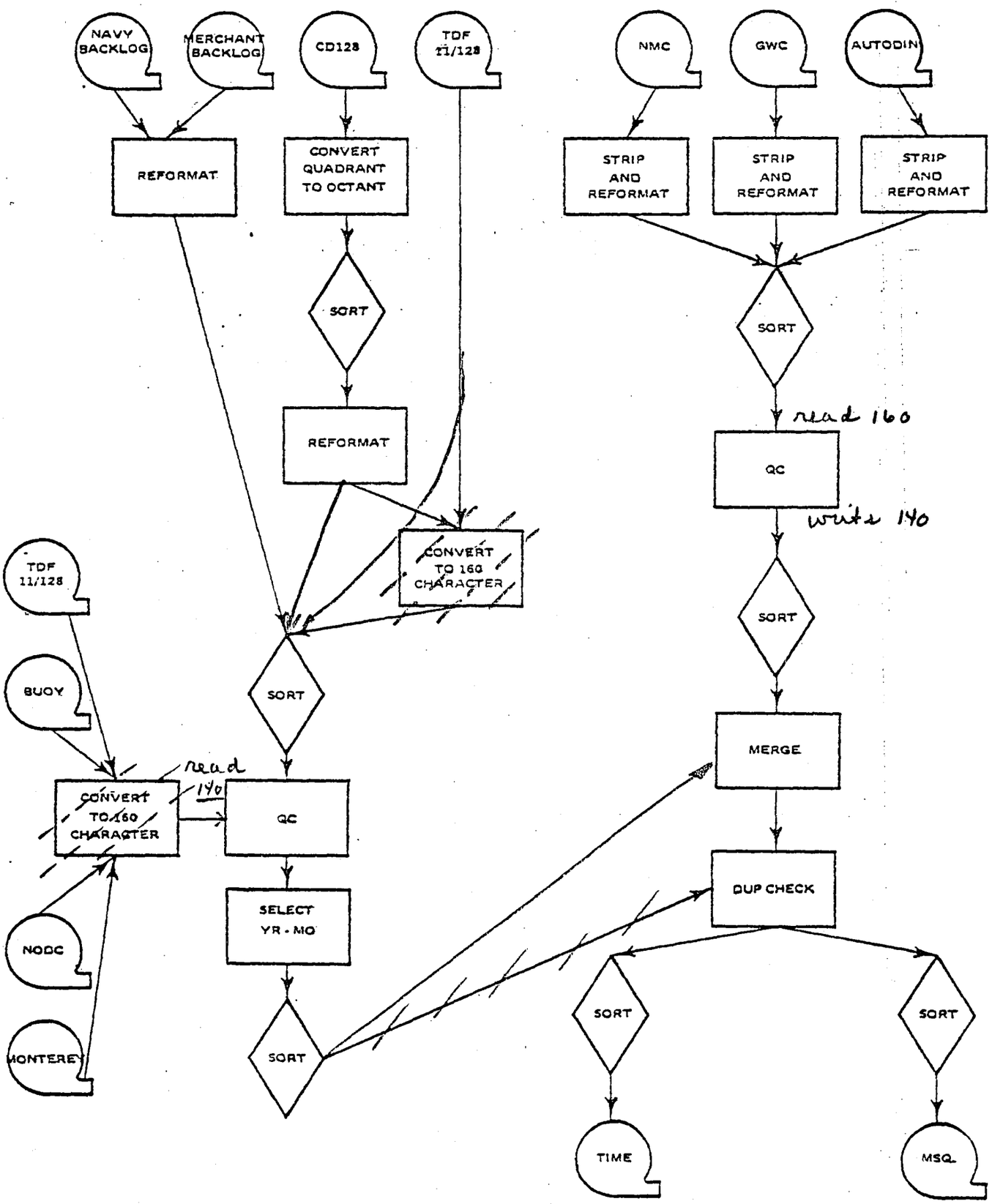


TABLE II

TESTS PERFORMED BY FGGE QUALITY CONTROL PROGRAM

TABLE II: TESTS PERFORMED BY FGGE QUALITY CONTROL PROGRAM

SHIP POSITION (ONE FLAG SHARED BY MARSDEN SQUARE, LATITUDE, LONGITUDE, QUADRANT, MONTH, DAY, & HOUR)

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
C	TWO OR MORE OBSERVATIONS WITHIN .5 DEGREE BOTH LATITUDE & LONGITUDE BEST OB BY CODE
K	WORST OBSERVATION OF ABOVE
	LATITUDE CHANGE > 0.7 DEGREES PER HOUR
	LONGITUDE CHANGES (DEGREES/HR) — WITHIN LATITUDE BANDS
	0.7 — 00-39.9
	OR 1.0 — 40-49.9
	OR 1.4 — 50-59.9
	OR 2.0 — 60-69.9
	OR 2.7 — 70-75.0
	TWO OR MORE OBSERVATIONS SAME SHIP AT SAME TIME, BUT DIFFERENT MARSDEN SQUARE
M	QUADRANT NOT = 1 - 4
	LATITUDE > 90.0
	LONGITUDE > 180.0
	LATITUDE NOT NUMERIC
	LONGITUDE NOT NUMERIC
	YEAR MONTH DAY HOUR NOT NUMERIC
	MONTH NOT > 00 AND < 13
	DAY NOT > 00 AND < 32
	HOUR > 24
	LAND-LOCKED MARSDEN SQUARE
	NO EXTREMES - DATA

WIND (SHARED BY WIND INDICATOR, DIRECTION & SPEED)

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
A	DIRECTION = SPACES AND SPEED = 000, SET DIRECTION TO 00
	DIRECTION > 00 AND < 37 AND SPEED = 000, SET DIRECTION TO 00
	DIRECTION = 00 AND SPEED ≠SPACES, OR 000, OR NOT >006 SET DIRECTION TO 99
	DIRECTION = 00 AND SPEED = SPACES, SET SPEED TO 000
	DIRECTION = 99 AND SPEED = 000, SET DIRECTION TO 00
	DIRECTION = SPACES AND SPEED > 000 AND < 007, SET DIRECTION TO 99
	DIRECTION = 00 AND SPEED >006 SET DIRECTION TO 36, ALSO IF SEA HEIGHT >00 SET SEA DIRECTION TO 36 AND SET SEA FLAG TO "A".
J	DIRECTION = 99 AND SPEED > 006
	SEE SWELL AND WAVE
M	DIRECTION = SPACES AND SPEED NOT = 000 OR SPEED NOT > 000 and < 007
	DIRECTION > 00 AND < 37 AND SPEED = SPACES
	DIRECTION >00 AND <37 AND SPEED = 000 AND SEA HEIGHT >00
Q	SPEED > 200
S	WIND INDICATOR, DIRECTON & SPEED = SPACES, OR WIND DIRECTION & SPEED = SPACES

VISIBILITY

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
M	VISIBILITY NOT NUMERIC
	VISIBILITY < 90
S	VISIBILITY = SPACES

PAST WEATHER

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
M	PAST WEATHER NOT NUMERIC
S	PAST WEATHER = SPACES
J	DRY BULB $\geq$ 14.1 AND PAST WEATHER = 7 (SNOW OR RAIN AND SNOW MIXED)

PRESSURE

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
K	PRESSURE CHANGE > 5.0 MBS/HR
L	PRESSURE LIES OUTSIDE $\bar{X} \pm 4.80$
Q	PRESSURE LIES OUTSIDE $\bar{X} \pm 5.80$
	PRESSURE NOT > 919.0 AND < 1061.0
S	PRESSURE = SPACES

DRY BULB

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAGS
J	DRY BULB NOT> 2.2 AND NOT> - 2.3 AND PRESENT WEATHER 80-82 OR > 88 FLAG DRY BULB, WET BULB, AND DEW POINT
	DRY BULB $\geq$ 8.0°C AND PRESENT WEATHER 70-75, FLAG DRY BULB, WET BULB, AND DEW POINT
K	DRY BULB CHANGE > 5.0°C/HR, FLAG DRY BULB, WET BULB, AND DEW POINT
L	DRY BULB OUTSIDE $\bar{X} \pm 4.80$, FLAG DRY BULB, WET BULB, AND DEW POINT

N	DEW POINT NOT> DRY BULB AND DRY BULB NOT <WET BULB AND WET BULB < DEW POINT FLAG DRY BULB, WET BULB AND DEW POINT
	DRY BULB < DEW POINT OR WET BULB BY MORE THAN 0.5°C, FLAG DRY BULB, WET BULB, AND DEW POINT
Q	DRY BULB OUTSIDE $\bar{X} \pm 5.80$, FLAG DRY BULB, WET BULB AND DEW POINT
S	DRY BULB = SPACES. all temperature fields ~~TEMP FIELD = SPACES~~

SEA TEMPERATURE

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
K	SEA-TEMPERATURE CHANGE > 3.0°C/HR
L	SEA-TEMPERATURE OUTSIDE $\bar{X} \pm 4.80$
Q	SEA-TEMPERATURE OUTSIDE $\bar{X} \pm 5.80$
	SEA-TEMPERATURE < -2.8°C
S	SEA-TEMPERATURE = SPACES

PRESSURE TENDENCY (SHARED BY TENDENCY, AMOUNT PRESSURE CHANGE)

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
K	PRESSURE CHANGE > 15.0 MB
M	PRESSURE TENDENCY NOT 0-8
	PRESSURE TENDENCY = 4 AND PRESSURE CHANGE NOT = 000
S	PRESSURE CHANGE = SPACES OR NOT NUMERIC

PRESENT WEATHER

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG	
B	VISIBILITY = 97 OR 98 AND	
	PRESENT WEATHER	CHANGE TO
	52, 54	50
	OR 53, 55	51
	OR 59	58
	OR 62	60

OR 63, 65	61
OR 69	68
OR 72, 74	70
OR 73, 75	71

TOTAL CLOUD = 9, PRESENT WEATHER = 42, 44, 46, 48, ADD 1 TO PRES. WEATHER

VISIBILITY > 94 AND < 99 AND PRESENT WEATHER > 41 AND < 50, SET PRESENT WEATHER TO 10

TOTAL CLOUD = 1-8, PRESENT WEATHER = 43, 45, 47, 49, SUB 1 FROM PRESENT WEATHER

DRY BULB NOT > -2.3°C AND NOT > 2.2

PRESENT WEATHER	CHANGE TO
50, 51, 58	56
OR 52-55, 59	57
OR 60, 61	66
OR 62-65	67
OR 83	85
OR 84	86

DRY BULB > 2.2°C AND

PRESENT WEATHER	CHANGE TO
48	46
OR 49	47
OR 56	51
OR 57	55
OR 66	61
OR 67	65

DRY BULB > 8.0°C AND

PRESENT WEATHER	CHANGE TO
83, 85	80
OR 84, 86	81
OR 68	58
OR 69	59

J VISIBILITY < 97 AND PRESENT WEATHER $\leq$ 03

VISIBILITY = 99, PRESENT WEATHER 4-10 OR 30-99

VISIBILITY 95 OR 96 AND WIND SPEED <009 AND PRESENT WEATHER = 33 - 37

VISIBILITY = 90-94 AND WIND SPEED <9 AND PRESENT WEATHER = 07, 30-35, 38 or 39

TOTAL CLOUD = LOW CLOUD = 0, PRESENT WEATHER = 43, 45, 47, 49-99, SET HEIGHT TO " 9" IF ≠ 9

	TOTAL CLOUD = LOW CLOUD = 9, PRESENT WEATHER ≠ SPACES, 4-9, 30-39, 41, 43, 45, 47, 49-99
	VISIBILITY = 90-93 AND PRESENT WEATHER = 10
	DRY BULB > 8.0°C PRESENT WEATHER = 36-39
L	LATITUDE < 20.0 AND PRESENT WEATHER = 22-24, 26, 36-39, 48, 49, 56, 57, 66-79, 83-88, 93-95, OR 97
M	PRESENT WEATHER NOT NUMERIC
S	PRESENT WEATHER = SPACES

DEW POINT * (SHARED WITH WET BULB)

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
B	DEW POINT > DRY BULB BY ≤ 0.5°C SET DEW POINT = DRY BULB AND COMPUTE WET BULB
J	SEE DRY BULB
K	SEE DRY BULB
	DEW POINT CHANGE > 5.0°C/HR
L	DRY BULB OUTSIDE $\bar{X} \pm 4.80$
	DEW POINT OUTSIDE $\bar{X} \pm 4.80$
N	SEE DRY BULB
Q	SEE DRY BULB
	DEW POINT OUTSIDE $\bar{X} \pm 5.80$
S	ALL TEMPERATURE FIELDS = SPACES
	IF DEW POINT = SPACES AND EITHER DRY BULB OR WET BULB = SPACES
	DEW POINT = SPACES AFTER ATTEMPTED COMPUTATION

WET BULB *

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
B	WET BULB > DRY BULB BY ≤ 0.5°C SET WET BULB = DRY BULB, COMPUTE DEW POINT
J	SEE DRY BULB

K	SEE DRY BULB
L	WET BULB OUTSIDE $\bar{X} \pm 4.80$
	SEE DRY BULB
N	SEE DRY BULB
Q	SEE DRY BULB
	WET BULB OUTSIDE $\bar{X} \pm 5.80$
S	ALL TEMPERATURE FIELDS = SPACES
	IF WET BULB = SPACES AND EITHER DRY BULB OR DEW POINT = SPACES
	WET BULB = SPACES AFTER ATTEMPTED COMPUTATION

* *IF DEW POINT FLAG = 'R' THEN USE WET BULB FLAG, OTHERWISE USE DEW POINT FLAG.*

CLOUDS

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
B	TOTAL CLOUD = 0 AND LOW CLOUD = 8 OR 9, SET TOTAL CLOUD TO LOW CLOUD
	TOTAL CLOUD < 8 AND LOW CLOUD = 8, SET TOTAL CLOUD TO LOW CLOUD
	TOTAL CLOUD < 8 AND LOW CLOUD = 9 AND PRESENT WEATHER ≠ SPACES, 04-12, 30-99, SET LOW CLOUD TO SPACES
	TOTAL CLOUD < 8 AND LOW CLOUD = 9 AND PRESENT WEATHER = SPACES, 04-12, 30-99, SET TOTAL CLOUD TO LOW CLOUD
	TOTAL CLOUD = 8 AND LOW CLOUD = 9 AND PRESENT WEATHER = SPACES, 41, 43, 45, 47, > 48, 30-39, 04-12, SET TOTAL CLOUD TO 9. ALSO, IF HEIGHT ≠ SPACES OR 0 OR '-' SET HEIGHT TO '-'.
	TOTAL CLOUD = 8 AND LOW CLOUD = 9, PRESENT WEATHER ≠ ABOVE, SET LOW CLOUD TO 8.
	TOTAL CLOUD = 9 AND LOW CLOUD = 8, PRESENT WEATHER ≠ SPACES, 4-12, 30-39, 41, 43, 45, 47, 49, 50-99, SET TOTAL CLOUD TO LOW CLOUD
	TOTAL CLOUD = 9 AND LOW CLOUD ≠ 9 OR SPACE, PRESENT WEATHER = SPACES, 4-12, 30-39, 41, 43, 45,

47, 49-99, SET LOW CLOUD TO 9. ALSO, IF HEIGHT ≠ SPACES OR 0 OR '-', SET HEIGHT TO '-'.

TOTAL CLOUD = LOW CLOUD = 9 AND PRESENT WEATHER SPACES, 4-12, 30-39, 41, 43, 45, 47, 49-99 AND IF HEIGHT ≠ SPACES, OR 0 OR '-', THEN SET HEIGHT TO '-'.

TOTAL CLOUD = LOW CLOUD = 0 AND IF HEIGHT ≠ 9 AND PRESENT WEATHER = 43, 45, 47 OR 49-99, SET HEIGHT TO 9.

TOTAL CLOUD = LOW CLOUD = 9 AND PRESENT WEATHER ≠ SPACES, 4-19, 30-39, 41, 43, 45, 47, 49-99 AND HEIGHT ≠ SPACES, 0, '-', THEN SET HEIGHT TO '-'.

J — TOTAL CLOUD = SPACES OR '-' AND LOW CLOUD < 8

TOTAL CLOUD = 0 AND LOW CLOUD > 0 AND < 8

TOTAL CLOUD < 8 AND LOW CLOUD ≠ 8 OR 9 AND > TOTAL CLOUD

S — CLOUD FIELD = SPACES, OR '--------', OR '--- ---', OR '- '

SEA WAVES

(YEAR IS ≥ 1968 UNLESS STATED OTHERWISE)

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
A	WIND DIRECTION = 00 AND WIND SPEED > 006, MOVE 36 TO WIND DIRECTION AND WAVE HEIGHT > 00, SET WAVE DIRECTION TO 36.
B	WAVE DIRECTION > 00 AND < 37, OR = 99 AND WAVE HEIGHT > 00, WAVE PERIOD = ' ', SET PERIOD TO '-' (SEE J FLAG)

WAVE DIRECTION > 00 AND < 37, OR = 99 AND WAVE HEIGHT > 00 AND WAVE PERIOD ≠ ' ' OR '-' THEN IF

WAVE HEIGHT		WAVE PERIOD
> 54	AND	≤ 6 AND ≥ 2
OR > 40	AND	≤ 5 AND ≥ 2
OR > 29	AND	≤ 4 AND ≥ 2
OR > 20	AND	= 2 OR 3
OR > 12	AND	= 2
OR > 05	AND	= 1
OR = 05	AND	< 2

OR = 04	AND	< 2 OR = 9
OR = 03	AND	< 2 OR = 8 OR 9
OR = 02	AND	< 2 OR > 6
OR = 01	AND	< 2 OR > 5

SET WAVE PERIOD '-', SEE J FLAG *

WAVE DIRECTION = 00 AND WAVE HEIGHT = 00 AND WAVE PERIOD = ' ' OR '-' OR '2', SET WAVE DIRECTION, PERIOD, AND HEIGHT TO '00-00'.

WAVE DIRECTION = 99 AND WAVE HEIGHT = 00, SET WAVE DIRECTION, PERIOD, HEIGHT TO '00-00'.

WAVE DIRECTION > 00 AND < 37 AND WAVE HEIGHT = 00 AND PERIOD = ' ', SET PERIOD TO '-'.

DATE = JAN-JUN 1963 AND DIRECTION > 50 AND < 87, SUBTRACT 50 FROM DIRECTION, ADD 10 TO HEIGHT

YEAR < 1968 AND > 1964, OR ≠ 1963, OR > JUNE 1963;
DIRECTION NOT > 36 AND < 49, HEIGHT > 00 AND
DIRECTION ≠ 00 AND PERIOD ≠ SPACE OR
DIRECTION NOT > 36 AND < 49 AND HEIGHT NOT > 00 OR = 00 OR ≠ SPACES OR
DIRECTION NOT > 36 AND < 49 AND HEIGHT > 00 AND ≠ SPACES OR
DIRECTION NOT > 36 AND < 49 AND HEIGHT = 00 AND DIRECTION ≠ SPACES, 49 OR 99, OR NOT > 00 AND < 37 OR
DIRECTION NOT > 36 AND < 49 AND HEIGHT = SPACES AND DIRECTION ≠ 00 OR
HEIGHT = 00 AND DIRECTION = 49, 99 OR > 00 AND < 37 AND PERIOD ≠ 0 OR 1 AND NOT < 5

THEN IF

HEIGHT	AND	PERIOD	
> 54		> 1 AND < 7	*
OR > 40		> 1 AND < 6	*
OR > 29		> 1 AND < 5	*
OR > 20		= 2 OR 3	*
OR > 12		= 2	*
OR > 05		= 1	*
OR = 04		= 9	*
OR = 03		= 8 OR 9	*
OR = 02		> 6	*
OR = 01		> 5	*

* SET PERIOD TO '-'

= 05	AND	= 0 OR 1	**
OR = 04		= 0 OR 1	**
OR = 03		= 0 OR 1	**

	OR = 02	= 0 OR 1	**
	OR = 01	= 0 OR 1	**

** SET PERIOD TO 2 SEE 'J' FLAG **

YEAR < 1968 AND ≥ 1964, OR ≠ 1963, OR > JUN 1963 AND DIRECTION NOT > 36 AND < 49 AND HEIGHT > 00 AND DIRECTION ≠ 00 AND PERIOD = SPACE, SET PERIOD TO '-'.

YEAR < 1968 AND ≥ 1964, OR ≠ 1963, OR > JUN 1963, AND HEIGHT = 00 AND DIRECTION = SPACES AND PERIOD < 3, SET DIRECTION, PERIOD, & HEIGHT TO '00-00'

YEAR < 1968 AND ≥ 1964, OR ≠ 1963, OR > JUN 1963, HEIGHT = 00 AND DIRECTION = 49, 99 OR > 00 AND < 37 AND PERIOD = 0 OR 1, SET PERIOD TO Z.

YEAR < 1968 AND ≥ 1964, OR ≠ 1963, OR > JUN 1963, HEIGHT = SPACES AND DIRECTION = 00 AND PERIOD < 3, SET DIRECTION, PERIOD, HEIGHT TO '00-00'.

J DIRECTION > 00 AND < 37, HEIGHT = 00, PERIOD = '-' OR '2' OR '3' OR '4' AND SEA TEMPERATURE > 019 AND WIND SPEED > 013 SET FLAG AND IF WIND FLAG = 0 OR < J, FLAG IT 'J'.

* IF WIND FLAG AND SEA TEMPERATURE FLAG = 0 AND SEA TEMPERATURE > 019 AND

HEIGHT	AND	PERIOD
01		> 21
OR 02		> 33
OR 03		> 47

OR IF WIND FLAG AND SEA TEMPERATURE FLAG = 0 AND SEA TEMPERATURE NOT > 019 AND

HEIGHT	AND	PERIOD
> 36		< 048
OR > 24		< 034
OR > 15		< 022
OR > 11		< 011
OR > 09		< 004

SET FLAG AND IF WIND FLAG = 0 OR < J, SET WIND FLAG 'J'.

** YR ≥ 1963 AND WIND FLAG AND DRY BULB FLAG = 0 AND DRY BULB NOT > 019 AND

	PERIOD	AND	HEIGHT
	> 047		< 04
	OR > 033		< 03
	OR > 021		< 02
	OR > 013		< 01

M — WAVE HEIGHT AND PERIOD = SPACES

DIRECTION NOT > 00 AND < 37, OR ≠ 99, SPACES, OR 00

DIRECTION = 00 AND HEIGHT ≠ 00

DIRECTION = SPACES AND HEIGHT ≠ 00

DIRECTION > 00 AND < 37 OR = 99 AND HEIGHT NOT NUMERIC

HEIGHT OR DIRECTION = SPACES

N — DIRECTION = HEIGHT = 00 AND PERIOD ≠ ' ' OR '-' OR '2'

DIRECTION > 00 AND < 37 AND HEIGHT = 00 AND PERIOD ≠ ' ' OR '-' OR '2' OR '3' OR '4'

YEAR < 1968 AND ≥ 1964, OR ≠ 1963, OR > JUN 1963 AND DIRECTION > 36 AND < 49, OR
HEIGHT = 00 AND DIRECTION = SPACES AND PERIOD ≥ 3, OR
HEIGHT = 00 AND DIRECTION = 49 OR 99, OR > 00 AND < 37 AND PERIOD ≠ 0 OR 1 AND < 5

Q — HEIGHT > 70

S — SEA WAVE DIR, PERIOD AND HEIGHT = SPACES

SWELL WAVES (YEAR IS ≥ 1968 UNLESS STATED OTHERWISE)

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAGS
B	SWELL DIRECTION = 00 AND SWELL HEIGHT = 00, THEN SET SWELL PERIOD TO '-'.
	SWELL DIRECTION = 99 AND HEIGHT = 00, THEN SET DIRECTION, PERIOD, AND HEIGHT TO '00-00'.
	DIRECTION = SPACES AND HEIGHT = 00 AND PERIOD = SPACES, OR '-' OR '0', OR > '0' AND < '6', THEN SET SWELL DIRECTION, PERIOD, HEIGHT TO '00-00'.

DIRECTION =00 AND HEIGHT = SPACES, ZEROES OR '--' AND PERIOD = SPACES OR '-' OR '0', OR > '0' AND < '6', SET SWELL DIRECTION, PERIOD AND HEIGHT TO '00-00'.

DIRECTION > 00 AND < 37, OR = 99 AND HEIGHT = 02, PERIOD = '3' OR '4', SET PERIOD TO 5.

DIRECTION > 00 AND < 37, OR = 99 AND HEIGHT = 01 AND PERIOD = '2' OR '3', OR '4', SET PERIOD TO 5.

YEAR > 1963, OR > JUN 1963, THEN: DIRECTION NOT > 36 AND < 49, HEIGHT > 00, DIRECTION ≠ 00 AND PERIOD ≠ SPACES, OR > 00 AND ≠ SPACE, DIRECTION = 00 OR HEIGHT = 00 AND DIRECTION ≠ SPACES, OR 49, 99 AND NOT > 00 AND < 37, OR DIRECTION ≠ 00 AND HEIGHT = SPACES

THEN, IF

HEIGHT	AND	PERIOD
= 05		= 0 OR 1
OR = 04		= 0 OR 1
OR = 03		= 0 OR 1
OR = 02		= 0 OR 1
OR = 01		= 0 OR 1

THEN SET PERIOD TO 2, OR IF

HEIGHT	AND	PERIOD
> 54		> 1 AND < 7
OR > 40		> 1 AND < 6
OR > 29		> 1 AND < 5
OR > 20		= 2 OR 3
OR > 12		= 2
OR > 05		= 1
OR = 04		= 9
OR = 03		= 8
OR = 02		> 6
OR = 01		> 5

THEN SET PERIOD TO '-'.

DATE JAN-JUN 1963, THEN SUBTRACT 50 FROM WAVE DIRECTION AND ADD 10 TO WAVE HEIGHT

YEAR > 1963, OR ≠ 1963, OR > JUN 1963 THEN: DIRECTION NOT > 36 AND < 49 AND HEIGHT > 00 AND DIRECTION ≠ 00 AND PERIOD = SPACE, MOVE '-' TO PERIOD, OR HEIGHT = 00 AND DIRECTION = SPACES AND PERIOD < 3, MOVE '00-00' TO SWELL DIRECTION, PERIOD, AND HEIGHT, OR HEIGHT = 00 AND DIRECTION =

49 OR 99 OR > 00 AND < 37 AND PERIOD = 0 OR 1, MOVE 2 TO PERIOD, OR HEIGHT = 00 AND DIRECTION = 49 OR 99 OR > 00 AND < 37 AND PERIOD NOT < 5, OR HEIGHT = SPACES AND DIRECTION = 00 AND PERIOD < 3, MOVE '00-00' TO SWELL DIRECTION, PERIOD, HEIGHT.

J DIRECTION > 00 AND < 37, OR = 99 AND

HEIGHT	AND	PERIOD
> 54		≠ 4
OR > 40		≠ '2' OR '3' OR '4'
OR > 29		> 4
OR > 20		= '5' OR '6' OR '7'
OR > 12		= '5'

YEAR > 1963, OR ≠ 1963 OR > JUN 1963 THEN: DIRECTION NOT > 36 AND < 49 OR ≠ 00 AND HEIGHT > 00 AND PERIOD ≠ SPACE, OR HEIGHT NOT > 00 AND ≠ 00 OR SPACES, OR HEIGHT = SPACES AND DIRECTION ≠ 00, OR HEIGHT = 00 AND DIRECTION = 00,

THEN, IF

HEIGHT	AND	PERIOD
> 54		NOT > 1 AND < 7
OR > 40		NOT > 1 AND < 6
OR > 29		NOT > 1 AND < 5
OR > 20		≠ 2 OR 3
OR > 12		≠ 2
OR > 05		≠ 1
OR = 05		≠ 0 OR 1

ALSO, IF WIND FLAG = 0 AND DRY BULB FLAG = 0 AND DRY BULB TEMPERATURE NOT > 019, THEN IF

WIND SPEED	AND	WAVE HEIGHT
> 047		< 04
OR > 033		< 03
OR > 021		< 02
OR > 013		< 01

M	SWELL DIRECTION > 36 AND < 99
	SWELL DIRECTION NOT > 36 AND <99, OR NOT > 00 AND < 37, OR ≠ 99, SPACES, 00
	SWELL DIRECTION > 00 AND < 37, OR = 99 AND HEIGHT NOT NUMERIC
	SWELL DIRECTION = 00 AND HEIGHT ≠ SPACES OR ZEROES OR '--'
	SWELL DIRECTION = SPACES AND HEIGHT ≠ 00
	SWELL DIRECTION = SPACES OR HEIGHT = SPACES
N	SWELL DIRECTION, PERIOD, AND HEIGHT = '11111' OR '99111'
	SWELL DIRECTION > 00 AND < 37 AND HEIGHT NOT > 00 AND PERIOD = '9'
	WAVE DIRECTION = 00 AND HEIGHT = SPACES OR ZEROES OR '--' AND PERIOD ≠ SPACES, '-', OR '0' AND NOT > 0 AND < '6'
	YEAR > 1963, OR ≠ 1963, OR > JUN 1963, THEN DIRECTION > 36 AND < 49, OR HEIGHT = 00 AND DIRECTION = SPACES AND PERIOD NOT < 3, OR HEIGHT = 00 AND DIRECTION = 49, 99 OR > 00 AND < 37 AND PERIOD ≠ 0 OR 1 AND < 5, OR DIRECTION =00 AND HEIGHT = SPACES AND PERIOD NOT < 3
Q	SWELL HEIGHT > 70

S	SWELL DIRECTION, PERIOD, AND HEIGHT = SPACES
	SWELL DIRECTION, PERIOD, AND HEIGHT = '-----'

MARINE DATA

TD1100

2.0 The automated ~~TDCE~~ marine data editing system

The ~~TDCE~~ computer programs used to edit and flag the marine data are designed to do so automatically and without a second level human review. Each observation is checked for internal consistency, extreme values, legal codes, and time sequence changes for serially complete observations when the interval between observations is less than 24 hours. The following variables are used in the editing and validation.

ship position	dry bulb
wind velocity	dew point
visibility	wet bulb
present weather	sea temperature
past weather	clouds
pressure	sea waves
pressure tendency	swell waves

Depending on the nature of the discrepancy and its severity, the program will either ~~change~~ DETERMINE the value of the element COULD BE CHANGED and assign a flag to indicate this ~~change~~, assign a flag if the variable appears questionable (suspect), or assign a flag to indicate the value is in error. In checking of an element for exceeding a reasonable value, climatic data were derived by using 5° squares of latitude and longitude which contain 25 observations or more. The climatic data consists of means and standard deviations. If an element value lies outside $\bar{X} \pm 4.8\sigma$, it is considered suspect. If it lies outside $\bar{X} \pm 5.8\sigma$, it is considered in error. Correct elements are flagged with an R and missing elements are flagged with an S.

If a parameter contains a flag and is flagged again as a result of a second test, the flag indicating the greatest error severity is retained. Also, a flagged element is not used in determining if another element should be flagged. Other flags are defined in Table 1.

Table 1: Definitions of flags used in the ~~NODC~~ software

Error type	Observation COULD BE ~~has been~~ changed	Suspect	Erroneous
Illegal code	A*		M
Failed internal consistency check	B	J	N
Failed time continuity check	C	K	
Exceeded reasonable value (extreme value)		L	Q

*FOR CLOUD FLAGS 'A' MEANS CLOUD TYPES, TOTAL CLOUD AND/OR LOW CLOUD AMOUNT HAVE FAILED INTERNAL CONSISTENCE CHECK. HOWEVER, NO CHANGE HAS BEEN MADE.

The need for marine data to undergo comprehensive editing is obvious. The results of the editing are passed to the user in the form of quality indicators (flags). These flags reveal the reason, if any, that the data are regarded as incorrect. Table II lists the specific tests that are performed and and the flags that are assigned.

TABLE II

TESTS PERFORMED BY ~~FGGE~~ QUALITY CONTROL PROGRAM

TABLE II:- TESTS PERFORMED BY ~~FOCI~~ QUALITY CONTROL PROGRAM

SHIP POSITION (ONE FLAG SHARED BY MARSDEN SQUARE, LATITUDE, LONGITUDE, QUADRANT, MONTH, DAY, & HOUR)

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
C	TWO OR MORE OBSERVATIONS WITHIN .5 DEGREE BOTH LATITUDE & LONGITUDE BEST OB BY CODE
K	WORST OBSERVATION OF ABOVE
	LATITUDE CHANGE > 0.7 DEGREES PER HOUR

LONGITUDE CHANGES (DEGREES/HR)		WITHIN LATITUDE BANDS
	0.7	00-39.9
OR	1.0	40-49.9
OR	1.4	50-59.9
OR	2.0	60-69.9
OR	2.7	70-75.0

	TWO OR MORE OBSERVATIONS SAME SHIP AT SAME TIME, BUT DIFFERENT MARSDEN SQUARE
M	QUADRANT NOT = 1 - 4
	LATITUDE > 90.0
	LONGITUDE > 180.0
	LATITUDE NOT NUMERIC
	LONGITUDE NOT NUMERIC
	YEAR MONTH DAY HOUR NOT NUMERIC
	MONTH NOT > 00 AND < 13
	DAY NOT > 00 AND < 32
	HOUR > 24
	LAND-LOCKED MARSDEN SQUARE
	NO EXTREMES - DATA

any year acceptable?

PRESSURE

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
K	PRESSURE CHANGE > 5.0 MBS/HR
L	PRESSURE LIES OUTSIDE $\bar{X} \pm 4.80$
Q	PRESSURE LIES OUTSIDE $\bar{X} \pm 5.80$
	PRESSURE NOT > 919.0 AND < 1061.0
S	PRESSURE = SPACES

PRESSURE TENDENCY (SHARED BY TENDENCY, AMOUNT PRESSURE CHANGE)

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
K	PRESSURE CHANGE > 15.0 MB
M	PRESSURE TENDENCY NOT 0-8
	PRESSURE TENDENCY = 4 AND PRESSURE CHANGE NOT = 000
S	PRESSURE CHANGE = SPACES OR NOT NUMERIC

CLOUDS

FLAGGED VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
A	TOTAL CLOUD OR LOW CLOUD OR LOW TYPE OR HEIGHT OR MIDDLE TYPE OR HIGH TYPE = SPACE.
	TOTAL CLOUD OR LOW CLOUD = '–'.
	TOTAL CLOUD = 9 AND LOW TYPE NOT = '–'.
	TOTAL CLOUD = 9 AND MIDDLE TYPE NOT = '–'.
	TOTAL CLOUD = 9 AND HEIGHT NOT = '–' AND NOT = Ø.
	TOTAL CLOUD = 8 AND (LOW TYPE NOT = '–' AND NOT = Ø) AND (MIDDLE TYPE NOT = '–' AND NOT = Ø) AND (HIGH TYPE NOT = '–' AND > 2 AND < 7)

TOTAL CLOUD = 8 AND (LOW TYPE NOT = '–' AND NOT = ∅) AND (MIDDLE TYPE NOT = '–' AND NOT = ∅) AND (HIGH TYPE NOT = '–' AND = 8 OR = 9).

LOW TYPE = '–' OR NOT = ∅ AND HEIGHT NOT = '–' AND = 9.

TOTAL CLOUD < 7 AND (HIGH TYPE NOT = '–' AND = 7.

TOTAL CLOUD = 9 AND HIGH TYPE NOT = '–'.

TOTAL CLOUD = ∅ AND LOW TYPE = '–' OR > ∅.

TOTAL CLOUD = ∅ AND MIDDLE TYPE = '–' OR > ∅.

TOTAL CLOUD = ∅ AND HIGH TYPE = '–' OR > ∅.

TOTAL CLOUD = ∅ AND HEIGHT = '–' OR < 9.

TOTAL CLOUD > LOW CLOUD AND (LOW TYPE NOT = '–' AND = ∅) AND (HIGH TYPE NOT = '–' AND = ∅).

TOTAL CLOUD > LOW CLOUD AND (MIDDLE TYPE NOT = '–' AND = ∅) AND (HIGH TYPE NOT = '–' AND = ∅).

TOTAL CLOUD > ∅ AND (LOW TYPE NOT = '–' AND = ∅) AND (MIDDLE TYPE NOT = '–' AND = ∅) AND (HIGH TYPE NOT = '–' AND = ∅).

TOTAL CLOUD > ϕ AND LOW CLOUD = ϕ AND (HIGH TYPE NOT = '–' AND = ϕ).

TOTAL CLOUD > ϕ AND LOW CLOUD = ϕ AND (HIGH TYPE NOT = '–' AND NOT = ϕ) AND (HEIGHT NOT = '–' AND NOT = ϕ).

LOW CLOUD = ϕ OR 9 AND (HEIGHT NOT = '–' AND > ϕ AND < 9).

LOW CLOUD = 8 AND (LOW TYPE NOT = '–' AND > ϕ) AND (MIDDLE TYPE NOT = '–').

LOW CLOUD = ϕ AND (LOW TYPE = '–' OR > ϕ).

LOW CLOUD = ϕ AND (MIDDLE TYPE = '–' OR > ϕ).

LOW CLOUD = 8 OR 9 AND HIGH TYPE NOT = '–'

LOW CLOUD = 9 AND MIDDLE TYPE NOT = '–'

LOW CLOUD = 9 AND LOW TYPE NOT = '–'.

LOW CLOUD > ϕ AND (LOW TYPE NOT = '–' AND = ϕ) AND (MIDDLE TYPE NOT = '–' AND = ϕ).

LOW TYPE NOT = '–' AND > ϕ AND < 6 AND (HEIGHT NOT = '–' AND < 2).

LOW TYPE NOT = '–' AND = 8 OR 9 AND HEIGHT NOT = '–' AND < 2.

LOW TYPE NOT = '–' AND = ϕ AND (MIDDLE TYPE NOT = '–' AND > ϕ) AND (HEIGHT NOT = '–' AND < 7).

~~CLOUDS~~

See Present Wx

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
B	TOTAL CLOUD = 0 AND LOW CLOUD = 8 OR 9, ~~SET TOTAL CLOUD TO LOW CLOUD~~
	TOTAL CLOUD < 8 AND LOW CLOUD = 8, ~~SET TOTAL CLOUD TO LOW CLOUD~~
	TOTAL CLOUD < 8 AND LOW CLOUD = 9 AND PRESENT WEATHER ≠ SPACES, 04-12, 30-99, ~~SET LOW CLOUD TO SPACES~~
	TOTAL CLOUD < 8 AND LOW CLOUD = 9 AND PRESENT WEATHER = SPACES, 04-12, 30-99, ~~SET TOTAL CLOUD TO LOW CLOUD~~
	TOTAL CLOUD = 8 AND LOW CLOUD = 9 AND PRESENT WEATHER = SPACES, 41, 43, 45, 47, > 48, 30-39, 04-12, ~~SET TOTAL CLOUD TO 9.~~ ALSO, IF HEIGHT ≠ SPACES OR 0 OR '-' ~~SET HEIGHT TO '-'.~~
	TOTAL CLOUD = 8 AND LOW CLOUD = 9, PRESENT WEATHER ≠ ABOVE, ~~SET LOW CLOUD TO 8.~~
	TOTAL CLOUD = 9 AND LOW CLOUD = 8, PRESENT WEATHER ≠ SPACES, 4-12, 30-39, 41, 43, 45, 47, 49, 50-99, ~~SET TOTAL CLOUD TO LOW CLOUD~~
	TOTAL CLOUD = 9 AND LOW CLOUD ≠ 9 OR SPACE, PRESENT WEATHER = SPACES, 4-12, 30-39, 41, 43, 45, 47, 49-99, ~~SET LOW CLOUD TO 9.~~ ALSO, IF HEIGHT ≠ SPACES OR 0 OR '-', ~~SET HEIGHT TO ' '.~~
	TOTAL CLOUD = LOW CLOUD = 9 AND PRESENT WEATHER SPACES, 4-12, 30-39, 41, 43, 45, 47, 49-99 AND IF HEIGHT ≠ SPACES, OR 0 OR '-', ~~THEN SET HEIGHT TO ' '.~~
	(2) TOTAL CLOUD = LOW CLOUD = 0 AND IF HEIGHT ≠ 9 AND PRESENT WEATHER = 43, 45, 47 OR 49-99, ~~SET HEIGHT TO 9.~~ FLAG PRESENT WEATHER 'J'.
	TOTAL CLOUD = LOW CLOUD = 9 AND PRESENT WEATHER ≠ SPACES, 4-19, 30-39, 41, 43, 45, 47, 49-99 AND HEIGHT ≠ SPACES, 0, '-', ~~THEN SET HEIGHT TO '-'.~~
J	✓TOTAL CLOUD = SPACES OR '-' AND LOW CLOUD < 8
	(3) ✓TOTAL CLOUD = 0 AND LOW CLOUD > 0 AND < 8
	✓TOTAL CLOUD < 8 AND LOW CLOUD ≠ 8 OR 9 AND > TOTAL CLOUD
S	* SEE PRESENT WEATHER * CLOUD FIELD = SPACES, OR '--------', OR '--- ---', OR '- '

DRY BULB

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAGS
J	DRY BULB ~~NOT> 2.2 AND NOT> -2.3~~ < -2.2 AND PRESENT WEATHER 80-82 OR > 88 FLAG DRY BULB, WET BULB, AND DEW POINT
	DRY BULB ≥ 8.0°C AND PRESENT WEATHER 70-75, FLAG DRY BULB, WET BULB, AND DEW POINT
K	DRY BULB CHANGE > 5.0°C/HR, FLAG DRY BULB, WET BULB, AND DEW POINT
L	DRY BULB OUTSIDE $\bar{X} \pm 4.80$, FLAG DRY BULB, WET BULB, AND DEW POINT
N	DRY BULB ≥ DEW POINT AND WET BULB ~~DEW POINT NOT> DRY BULB AND DRY BULB NOT <WET BULB~~ AND WET BULB < DEW POINT FLAG DRY BULB, WET BULB AND DEW POINT
	DRY BULB < DEW POINT OR WET BULB BY MORE THAN 0.5°C, FLAG DRY BULB, WET BULB, AND DEW POINT
Q	DRY BULB OUTSIDE $\bar{X} \pm 5.80$, FLAG DRY BULB, WET BULB AND DEW POINT
S	DRY BULB = SPACES
ALL	TEMPERATURE FIELDS = SPACES

DEW POINT * (SHARED WITH WET BULB)

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
B	DEW POINT > DRY BULB BY ≤ 0.5°C ~~SET DEW POINT = DRY BULB AND COMPUTE WET BULB~~
J	SEE DRY BULB
K	SEE DRY BULB
	DEW POINT CHANGE > 5.0°C/HR
L	DRY BULB OUTSIDE $\bar{X} \pm 4.80$
	DEW POINT OUTSIDE $\bar{X} \pm 4.80$
N	SEE DRY BULB
Q	SEE DRY BULB
	DEW POINT OUTSIDE $\bar{X} \pm 5.80$

S	ALL TEMPERATURE FIELDS = SPACES IF DEW POINT = SPACES AND EITHER DRY BULB OR WET BULB = SPACES DEW POINT = SPACES AFTER ATTEMPTED COMPUTATION

WET BULB *

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
B	WET BULB > DRY BULB BY $\leq$ 0.5°C ~~SET WET BULB = DRY BULB, COMPUTE DEW POINT~~
J	SEE DRY BULB
K	SEE DRY BULB
L	WET BULB OUTSIDE $\bar{X} \pm 4.80$ SEE DRY BULB
N	SEE DRY BULB
Q	SEE DRY BULB WET BULB OUTSIDE $\bar{X} \pm 5.80$
S	ALL TEMPERATURE FIELDS = SPACES IF WET BULB = SPACES AND EITHER DRY BULB OR DEW POINT = SPACES WET BULB = SPACES AFTER ATTEMPTED COMPUTATION

* IF DEW POINT FLAG = 'R' THEN USE WET BULB FLAG, OTHERWISE USE DEW POINT FLAG.

PRESENT WEATHER

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
B	VISIBILITY = 97 OR 98 AND

PRESENT WEATHER	~~CHANGE TO~~
52, 54	50
OR 53, 55	51
OR 59	58
OR 62	60

OR 63, 65 ~~CHANGE TO~~ 61
OR 69 68
OR 72, 74 70
OR 73, 75 71

TOTAL CLOUD = 9, PRESENT WEATHER = 42, 44, 46, 48, ~~ADD 1 TO PRES. WEATHER~~

VISIBILITY > 93 AND < 99 AND PRESENT WEATHER > 41 AND < 50. ~~SET PRESENT WEATHER TO 10~~

TOTAL CLOUD = 1-8, PRESENT WEATHER = 43, 45, 47, 49, ~~SUB 1 FROM PRESENT WEATHER~~

DRY BULB ~~NOT > -2.3°C AND NOT > -2.2~~ < -2.2°C

PRESENT WEATHER	~~CHANGE TO~~
50, 51, 58	56
OR 52-55, 59	57
OR 60, 61	65
OR 62-65	67
OR 83	85
OR 84	85

DRY BULB > 2.2°C AND

PRESENT WEATHER	~~CHANGE TO~~
48	46
OR 49	47
OR 56	51
OR 57	55
OR 66	64
OR 67	65

DRY BULB > 8.0°C AND

PRESENT WEATHER	~~CHANGE TO~~
83, 85	80
OR 84, 86	81
OR 68	58
OR 69	59

J + VISIBILITY < 97 AND PRESENT WEATHER ≤ 03 ~~SET~~ IF VISIBILITY FLAG = 0 OR < '5' SET IT TO '5',

* VISIBILITY = 99, PRESENT WEATHER 4-10 OR 30-99 AND IF VISIB. FLAG = 0 OR < '5' SET IT TO '5'.
VISIBILITY 95 OR 96 AND WIND SPEED <009 AND
PRESENT WEATHER = 33 - 37 ~~AND~~ IF VISIBILITY FLAG = 0 < '5' ~~AND SET PRESENT WEATHER~~ SET IT TO '5'
VISIBILITY = 90-94 AND WIND SPEED <9 AND PRESENT
WEATHER = 07, 30-35, 38 or 39 AND IF VISIBILITY FLAG = 0 OR < '5' SET IT TO '5'
TOTAL CLOUD = LOW CLOUD = 0, PRESENT WEATHER = 43,
* 45, 47, 49-99, ~~SET HEIGHT TO "9" IF < 9~~ SET CLOUD FLAG TO B.

	TOTAL CLOUD = LOW CLOUD = 9, PRESENT WEATHER ≠ SPACES, 4-9, 30-39, 41, 43, 45, 47, 49-99 AND IF CLOUD FLAG = Ø OR < 'J' SET IT TO 'J'.
	VISIBILITY = 90-93 AND PRESENT WEATHER = 10 AND IF VISIBILITY FLAG = Ø OR < 'J' SET IT TO 'J'.
	DRY BULB > 8.0°C PRESENT WEATHER = 36-39
L	LATITUDE < 20.0 AND PRESENT WEATHER = 22-24, 26, 36-39, 48, 49, 56, 57, 66-79, 83-88, 93-95, ~~96-97~~
M	PRESENT WEATHER NOT NUMERIC
S	PRESENT WEATHER = SPACES

SEA TEMPERATURE

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
K	SEA-TEMPERATURE CHANGE > 3.0°C/HR
L	SEA-TEMPERATURE OUTSIDE $\bar{X} \pm 4.80$
Q	SEA-TEMPERATURE OUTSIDE $\bar{X} \pm 5.80$
	SEA-TEMPERATURE < -2.8°C
S	SEA-TEMPERATURE = SPACES

VISIBILITY

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
M	VISIBILITY NOT NUMERIC
J	VISIBILITY < 90 SEE PRESENT WEATHER 'J'.
S	VISIBILITY = SPACES

PAST WEATHER

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
M	PAST WEATHER NOT NUMERIC
S	PAST WEATHER = SPACES
J	DRY BULB > 14.1 AND PAST WEATHER = 7 (SNOW OR RAIN AND SNOW MIXED)

WIND (SHARED BY WIND INDICATOR, DIRECTION & SPEED)

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
A	DIRECTION = SPACES AND SPEED = 000, ~~SET DIRECTION TO 00~~
	DIRECTION > 00 AND < 37 AND SPEED = 000, ~~SET DIRECTION TO 00~~
	DIRECTION = 00 AND SPEED ≠SPACES, OR 000, OR NOT >006 ~~SET DIRECTION TO 99~~
	DIRECTION = 00 AND SPEED = SPACES, ~~SET SPEED TO 000~~
	DIRECTION = 99 AND SPEED = 000, ~~SET DIRECTION TO 00~~
	DIRECTION = SPACES AND SPEED > 000 AND < 007, ~~SET DIRECTION TO 99~~
	DIRECTION = 00 AND SPEED >006 ~~SET DIRECTION TO 36~~, ALSO IF SEA HEIGHT >00 ~~SET SEA DIRECTION TO 36~~ AND SET SEA FLAG TO "A".
J	DIRECTION = 99 AND SPEED > 006
	SEE SWELL AND WAVE
M	DIRECTION = SPACES AND SPEED NOT = 000 OR SPEED NOT > 000 and < 007
	DIRECTION > 00 AND < 37 AND SPEED = SPACES
AND SE	DIRECTION >00 AND <37 AND SPEED = 000 HEIGHT >00
Q	SPEED > 200
S	WIND INDICATOR, DIRECTON & SPEED = SPACES, OR WIND DIRECTION & SPEED = SPACES

SEA WAVES

(YEAR IS ≥ 1968, OR ~~NOT CONTROLLED~~ ALL YEARS UNLESS STATED OTHERWISE)

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
A	WIND DIRECTION = 00 AND WIND SPEED > 006, ~~MOVE 36 TO WIND DIRECTION~~ AND WAVE HEIGHT > 00, ~~SET WAVE DIRECTION TO 36.~~ ~~ALL YEARS~~
B	WAVE DIRECTION > 00 AND < 37, OR = 99 AND WAVE HEIGHT > 00, WAVE PERIOD = ' ', ~~SET PERIOD TO '-'~~ (SEE J FLAG)

WAVE DIRECTION > 00 AND < 37, OR = 99 AND WAVE HEIGHT > 00 AND WAVE PERIOD ≠ ' ' OR '-' THEN IF

WAVE HEIGHT		WAVE PERIOD
> 54	AND	< 6 AND > 2
OR > 40	AND	< 5 AND > 2
OR > 29	AND	< 4 AND > 2
OR > 20	AND	= 2 OR 3
OR > 12	AND	= 2
OR > 05	AND	= 1
OR = 05	AND	< 2

~~ALL YEARS~~

* WE HAVE DISCOVERED A PROBLEM WITH THE HANDLING OF PRE-1970 DATA IN SEA AND SWELL WAVES. THIS WILL BE CORRECTED BEFORE ANY DATA IN THIS PERIOD IS PROCESSED.

OR = 04	AND	< 2 OR = 9
OR = 03	AND	< 2 OR = 8 OR 9
OR = 02	AND	< 2 OR > 6
OR = 01	AND	< 2 OR > 5

~~SET WAVE PERIOD ' ', SEE J FLAG *~~

WAVE DIRECTION = 00 AND WAVE HEIGHT = 00 AND WAVE PERIOD = ' ' OR ~~< 1~~ OR '2', ~~SET WAVE DIRECTION, PERIOD, AND HEIGHT TO '00-00'~~.

WAVE DIRECTION = 99 AND WAVE HEIGHT = 00, ~~SET WAVE DIRECTION, PERIOD, HEIGHT TO '00-00'.~~

WAVE DIRECTION > 00 AND < 37 AND WAVE HEIGHT = 00 AND PERIOD = ' ', ~~SET PERIOD TO ' '~~.

DATE ~~= JAN JUN~~ 1963 AND DIRECTION > 50 AND < 87, SUBTRACT 50 FROM DIRECTION, ~~ADD 10 TO HEIGHT~~

YEAR < 1968 AND > 1964, OR ≠ 1963, OR > JUNE 1963; DIRECTION NOT > 36 AND < 49, HEIGHT > 00 AND DIRECTION ≠ 00 AND PERIOD ≠ SPACE OR
DIRECTION NOT > 36 AND < 49 AND HEIGHT NOT > 00 OR = 00 OR ≠ SPACES OR
DIRECTION NOT > 36 AND < 49 AND HEIGHT > 00 AND ≠ SPACES OR
DIRECTION NOT > 36 AND < 49 AND HEIGHT = 00 AND DIRECTION ≠ SPACES, 49 OR 99, OR NOT > 00 AND < 37 OR
DIRECTION NOT > 36 AND < 49 AND HEIGHT = SPACES AND DIRECTION ≠ 00 OR
HEIGHT = 00 AND DIRECTION = 49, 99 OR > 00 AND < 37 AND PERIOD ≠ 0 OR 1 AND NOT < 5

THEN IF

HEIGHT	AND	PERIOD	
> 54		> 1 AND < 7	*
OR > 40		> 1 AND < 6	*
OR > 29		> 1 AND < 5	*
OR > 20		= 2 OR 3	*
OR > 12		= 2	*
OR > 05		= 1	*
OR = 04		= 9	*
OR = 03		= 8 OR 9	*
OR = 02		> 6	*
OR = 01		> 5	*

~~* SET PERIOD TO ' '~~

= 05	AND	= 0 OR 1	**
OR = 04		= 0 OR 1	**
OR = 03		= 0 OR 1	**

OR = 02	= 0 OR 1	**
OR = 01	= 0 OR 1	**

~~** SET PERIOD TO 2~~ SEE 'J' FLAG **

YEAR < 1968 AND > 1964, OR ≠ 1963, OR > JUN 1963 AND DIRECTION NOT > 36 AND < 49 AND HEIGHT > 00 AND DIRECTION ≠ 00 AND PERIOD = SPACE, ~~SET PERIOD TO '-'.~~

YEAR < 1968 AND > 1964, OR ≠ 1963, OR > JUN 1963, AND HEIGHT = 00 AND DIRECTION = SPACES AND PERIOD < 3, ~~SET DIRECTION, PERIOD, & HEIGHT TO '00=00'~~

YEAR < 1968 AND > 1964, OR ≠ 1963, OR > JUN 1963, HEIGHT = 00 AND DIRECTION = 49, 99 OR > 00 AND < 37 AND PERIOD = 0 OR 1, ~~SET PERIOD TO 2.~~

YEAR < 1968 AND > 1964, OR ≠ 1963, OR > JUN 1963, HEIGHT = SPACES AND DIRECTION = 00 AND PERIOD < 3, ~~SET DIRECTION, PERIOD, HEIGHT TO '00-00'~~.

J

DIRECTION > 00 AND < 37, HEIGHT = 00, PERIOD = '-' OR '2' OR '3' OR '4' AND SEA TEMPERATURE > 019 AND WIND SPEED > 013 SET FLAG AND IF WIND FLAG = 0 OR < J, FLAG IT 'J'.

* IF WIND FLAG AND SEA TEMPERATURE FLAG = 0 AND SEA TEMPERATURE > 019 AND

HEIGHT	AND	PERIOD
01		> 21
OR 02		> 33
OR 03		> 47

OR IF WIND FLAG AND SEA TEMPERATURE FLAG = 0 AND SEA TEMPERATURE NOT > 019 AND

HEIGHT	AND	PERIOD
> 36		< 048
OR > 24		< 034
OR > 15		< 022
OR > 11		< 011
OR > 09		< 004

SET FLAG AND IF WIND FLAG = 0 OR < J, SET WIND FLAG 'J'.

** YR > 1963 AND WIND FLAG AND DRY BULB FLAG = 0 AND DRY BULB NOT > 019 AND

	PERIOD	AND	HEIGHT
	> 047		< 04
	OR > 033		< 03
	OR > 021		< 02
	OR > 013		< 01

M — WAVE HEIGHT AND PERIOD = SPACES

DIRECTION NOT > 00 AND < 37, OR ≠ 99, SPACES, OR 00

DIRECTION = 00 AND HEIGHT ≠ 00

DIRECTION = SPACES AND HEIGHT ≠ 00

DIRECTION > 00 AND < 37 OR = 99 AND HEIGHT NOT NUMERIC

HEIGHT OR DIRECTION = SPACES

N — DIRECTION = HEIGHT = 00 AND PERIOD ≠ ' ' OR '-' OR '2'

DIRECTION > 00 AND < 37 AND HEIGHT = 00 AND PERIOD ≠ ' ' OR '-' OR '2' OR '3' OR '4'

YEAR < 1968 AND ≥ 1964, OR ≠ 1963, OR > JUN 1963 AND DIRECTION > 36 AND < 49, OR
HEIGHT = 00 AND DIRECTION = SPACES AND PERIOD ≥ 3, OR
HEIGHT = 00 AND DIRECTION = 49 OR 99, OR > 00 AND < 37 AND PERIOD ≠ 0 OR 1 AND < 5

Q — HEIGHT > 70

S — SEA WAVE DIR, PERIOD AND HEIGHT = SPACES

OR ALL YEARS

SWELL WAVES (YEAR IS ≥ 1968 UNLESS STATED OTHERWISE)

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAGS
B	SWELL DIRECTION = 00 AND SWELL HEIGHT = 00, ~~THEN SET SWELL PERIOD TO ' '.~~
	SWELL DIRECTION = 99 AND HEIGHT = 00, ~~THEN SET DIRECTION, PERIOD, AND HEIGHT TO '00 00'.~~
	DIRECTION = SPACES AND HEIGHT = 00 AND PERIOD = SPACES, OR '-' OR '0', OR > '0' AND < '6', ~~THEN SET SWELL DIRECTION, PERIOD, HEIGHT TO '00 00'.~~

DIRECTION =00 AND HEIGHT = SPACES, ZEROES OR '--' AND PERIOD = SPACES OR '-' OR '0', OR > '0' AND < '6', ~~SET SWELL DIRECTION, PERIOD AND HEIGHT TO '00-00'~~.

DIRECTION > 00 AND < 37, OR = 99 AND HEIGHT = 02, PERIOD = '3' OR '4', ~~SET PERIOD TO 5.~~

DIRECTION > 00 AND < 37, OR = 99 AND HEIGHT = 01 AND PERIOD = '2' OR '3', OR '4', ~~SET PERIOD TO 5.~~

YEAR > 1963, OR > JUN 1963, THEN: DIRECTION NOT > 36 AND < 49, HEIGHT > 00, DIRECTION ≠ 00 AND PERIOD ≠ SPACES, OR > 00 AND ≠ SPACE, DIRECTION = 00 OR HEIGHT = 00 AND DIRECTION ≠ SPACES, OR 49, 99 AND NOT > 00 AND < 37, OR DIRECTION ≠ 00 AND HEIGHT = SPACES

THEN, IF

HEIGHT	AND	PERIOD
= 05		= 0 OR 1
OR = 04		= 0 OR 1
OR = 03		= 0 OR 1
OR = 02		= 0 OR 1
OR = 01		= 0 OR 1

~~THEN SET PERIOD TO 2~~, OR IF

HEIGHT	AND	PERIOD
> 54		> 1 AND < 7
OR > 40		> 1 AND < 6
OR > 29		> 1 AND < 5
OR > 20		= 2 OR 3
OR > 12		= 2
OR > 05		= 1
OR = 04		= 9
OR = 03		= 8
OR = 02		> 6
OR = 01		> 5

~~THEN SET PERIOD TO '-'~~.

DATE JAN-JUN 1963, ~~THEN SUBTRACT 50 FROM WAVE DIRECTION~~ AND ~~ADD 10 TO WAVE HEIGHT~~

YEAR > 1963, OR ≠ 1963, OR > JUN 1963 THEN: DIRECTION NOT > 36 AND < 49 AND HEIGHT > 00 AND DIRECTION ≠ 00 AND PERIOD = SPACE, MOVE '-' TO PERIOD, OR HEIGHT = 00 AND DIRECTION = SPACES AND PERIOD < 3, ~~MOVE '00-00' TO SWELL DIRECTION, PERIOD, AND HEIGHT~~, OR HEIGHT = 00 AND DIRECTION =

49 OR 99 OR > 00 AND < 37 AND PERIOD = 0 OR 1, MOVE 2 TO PERIOD, OR HEIGHT = 00 AND DIRECTION = 49 OR 99 OR > 00 AND < 37 AND PERIOD NOT < 5, OR HEIGHT = SPACES AND DIRECTION = 00 AND PERIOD < 3, ~~MOVE '00-00' TO SWELL-DIRECTION, PERIOD, HEIGHT~~.

J DIRECTION > 00 AND < 37, OR = 99 AND

HEIGHT	AND	PERIOD
> 54		≠ 4
OR > 40		≠ '2' OR '3' OR '4'
OR > 29		> 4
OR > 20		= '5' OR '6' OR '7'
OR > 12		= '5'

YEAR > 1963, OR ≠ 1963 OR > JUN 1963 THEN: DIRECTION NOT > 36 AND < 49 OR ≠ 00 AND HEIGHT > 00 AND PERIOD ≠ SPACE, OR HEIGHT NOT > 00 AND ≠ 00 OR SPACES, OR HEIGHT = SPACES AND DIRECTION ≠ 00, OR HEIGHT = 00 AND DIRECTION = 00,

THEN, IF

HEIGHT	AND	PERIOD
> 54		NOT > 1 AND < 7
OR > 40		NOT > 1 AND < 6
OR > 29		NOT > 1 AND < 5
OR > 20		≠ 2 OR 3
OR > 12		≠ 2
OR > 05		≠ 1
OR = 05		≠ 0 OR 1

ALSO, IF WIND FLAG = 0 AND DRY BULB FLAG = 0 AND DRY BULB TEMPERATURE NOT > 019, THEN IF

WIND SPEED	AND	WAVE HEIGHT
> 047		< 04
OR > 033		< 03
OR > 021		< 02
OR > 013		< 01

M	SWELL DIRECTION > 36 AND < 99
	SWELL DIRECTION NOT > 36 AND <99, OR NOT > 00 AND < 37, OR ≠ 99, SPACES, 00
	SWELL DIRECTION > 00 AND < 37, OR = 99 AND HEIGHT NOT NUMERIC
	SWELL DIRECTION = 00 AND HEIGHT ≠ SPACES OR ZEROES OR '--'
	SWELL DIRECTION = SPACES AND HEIGHT ≠ 00
	SWELL DIRECTION = SPACES OR HEIGHT = SPACES
N	SWELL DIRECTION, PERIOD, AND HEIGHT = '11111' OR '99111'
	SWELL DIRECTION > 00 AND < 37 AND HEIGHT NOT > 00 AND PERIOD = '9'
	WAVE DIRECTION = 00 AND HEIGHT = SPACES OR ZEROES OR '--' AND PERIOD ≠ SPACES, '-', OR '0' AND NOT > 0 AND < '6'
	YEAR > 1963, OR ≠ 1963, OR > JUN 1963, THEN DIRECTION > 36 AND < 49, OR HEIGHT = 00 AND DIRECTION = SPACES AND PERIOD NOT < 3, OR HEIGHT = 00 AND DIRECTION = 49, 99 OR > 00 AND < 37 AND PERIOD ≠ 0 OR 1 AND < 5, OR DIRECTION =00 AND HEIGHT = SPACES AND PERIOD NOT < 3
Q	SWELL HEIGHT > 70
S	SWELL DIRECTION, PERIOD, AND HEIGHT = SPACES
	SWELL DIRECTION, PERIOD, AND HEIGHT = '-----'

TD1100

September 18, 1981 OA/D531:JE

Mr. Scott Woodruff
Cooperative Institute for Research
in Environmental Sciences
University of Colorado
Campus Box 449
Boulder, CO 80309

Dear Scott,

Attached is a list of all ~~deck~~ (source) numbers that NCC has assigned to marine observations to date. As CIRES gathers additional data sets (German Atlantic USST, English Historical, South African), which NCC does not possess but hopes to acquire through your efforts, then unique source numbers will have to be assigned before converting to TDF-11. To ensure that unique deck numbers are assigned, NCC has set aside a block of numbers for CIRES use only (700-799). This will prevent duplication and allow you to assign numbers as necessary. Then, all NCC will require is the necessary documentation to update our files as we receive this additional information.

Please let us know if we can be of any further help.

Sincerely,

Joe Elms
Applied Climatology Branch

Enclosure

cc: D531 - Quayle
D5x5 - Shumbera
D5x51 - Blankenship
D51 - Seguin
CLIP
ACB Read File
D531:JElms:344:pt:9/18/81

ALL IN TD1100

TAPE DECK LIST all in TD-1100

110 - U.S. Navy Marine Observations
116 - U.S. Merchant Marine
118 - Japanese Ship Observations No. 1
119 - Japanese Ship Observations No. 2
128 - International Marine Observations
281 - U.S. Navy MAR Marine Observations
184 - Great Britain Marine Observations
185 - USSR Marine Synoptic Observations
187 - Japanese Whaling Fleet Observations
188 - Norwegian Whaling Fleet Observations
189 - Netherlands Marine Observations
192 - Deutsche Seewarte Marine Observations
193 - Netherlands Marine Observations
194 - Great Britain Marine Observations
195 - U.S. Navy Ship Logs
196 - Deutsche Sewwarte Marine Observations
197 - Danish Marine Observations (Arctic and Antarctic)
150 - Dutch HSST Observations
151 - German HSST Observations
152 - United Kingdom HSST Observations
186 - USSR Ice Island Observations
902 - Great Britain Marine Observations
901 - Reconstructed Observations from FOSDIC
(eliminated extremes from the library of the following decks:
110, 116, 118, 119, 184, 189, 192, 193, 194, 195, and 281)
890 - NMC Observations
891 - NODC Observations
666 - Tuna Observations
888 - GWC Observations
889 - Autodin Observations
555 - Monterey Observations
999 - ETAC Observations
875-887 - NDBO Buoy Observations
927 - International Marine Observations (Mod TDF-11 Format)
928 - OSV Observations
850 - German FGGE Data

ENVIRONMENTAL DATA BUOY
(TDF-11) EDIT/ARCHIVE

TDF-11 (TD-11ϕϕ) Doc File

Tape Field Number	Tape Positions	Element
001	01-03	Deck Name
002	04-06	Marsden 10 degree square
003	07-08	Marsden 1 degree sub-square
004	09	Quadrant
005	10-12	Latitude
006	13-16	Longitude
007	17-20	Year
008	21-22	Month
009	23-24	Day
010	25-26	Hour-GMT
011	27-29	Wind direction and indicator
012	30-33	Wind speed and indicator
013-014	34-38	BLANK
015	39	Past weather (blank or code 6)
016	40-44	Sea level pressure
017	45-48	Temperature indicator and air temperature (Tenths of Deg. C)
018	49-51	Wet bulb temperature (computed from fields 17 and 19)
019	52-54	Dew point temperature
020	55-57	Sea surface temperature
021	58-60	Air-sea temperature difference (computed from fields (17 and 20)
022-023	61-69	BLANK
024	70	Period of Waves
025	71-72	Wave Height
026-030	73-80	BLANK
031	81	GST or ship indicator (set to 5)
032	82	Additional data indicator (set to 6)
033-034	83-84	BLANK
035	85	Barometric tendency (code 2 or 4 or 7)
036	86-88	Amount of pressure change
037	89	BLANK
038	90-93	Ship number
*039-058	94-140	Supplemental data fields (refer to table 2)

NOTE: Tape positions 34-38, 61-69, 73-80, 83, 84, and 89 will be blank.

Deck No.	Buoy Type	Requires Supplemental Field
876	HCB	YES
877	LCB	NO
878	PEB	NO
879	5 meter Continental Shelf Buoys	NO
880	10 meter Continental Shelf Buoys	NO
881	Offshore Platforms	NO

TABLE 2. SUPPLEMENTAL DATA FIELD

Tape Field No.	Tape Positions	Element	Tape Configuration	Code Definition And Remarks
39	94-96	Rainfall since last valid report	000-999	000= No precipitation 001-999= Millimeters rain
40	97	Solar Radiation Averaging	0-7	0 = Instantaneous Sampling Averaged Samples 1 = 1-5 Min. 2 = 6-10 Min. 3 = 11-15 Min. 4 = 16-20 Min. 5 = 21-30 Min. 6 = 31-40 Min. 7 = 41-50 Min.
41	98-100	Solar Radiation	000-200	0.00-2.00 calories/square centimeter/minute
42	101	Global Radiation Averaging	0-7	Same as Radiation averagin
43	102-103	Global Radiation	00-99	.00-.99 calories/square centimeter/minute
44	104	Current speed and direction, averaging at 2 meter	0-7	Same as radiation averagin
45	105-107	Current speed at 2 meter	001-999	001-999 = 0.01-9.99 Knots
46	108-110	Current direction at 2 meter	000-360	0-360 degrees true North; direction towards which current is traveling
47-58	111-140	Blank		

MARINE DATA

2.0 The automated ~~FGGE~~ marine data editing system

The ~~FGGE~~ computer programs used to edit and flag the marine data are designed to do so automatically and without a second level human review. Each observation is checked for internal consistency, extreme values, legal codes, and time sequence changes for serially complete observations when the interval between observations is less than 24 hours. The following variables are used in the editing and validation.

ship position	dry bulb
wind velocity	dew point
visibility	wet bulb
present weather	sea temperature
past weather	clouds
pressure	sea waves
pressure tendency	swell waves

Depending on the nature of the discrepancy and its severity, the program will either ~~change~~ determine the value of the element and assign a flag to indicate this ~~change~~, assign a flag if the variable appears questionable (suspect), or assign a flag to indicate the value is in error. In checking of an element for exceeding a reasonable value, climatic data were derived by using 5° squares of latitude and longitude which contain 25 observations or more. The climatic data consists of means and standard deviations. If an element value lies outside $\bar{X} \pm 4.8\sigma$, it is considered suspect. If it lies outside $\bar{X} \pm 5.8\sigma$, it is considered in error. Correct elements are flagged with an R and missing elements are flagged with an S.

If a parameter contains a flag and is flagged again as a result of a second test, the flag indicating the greatest error severity is retained. Also, a flagged element is not used in determining if another element should be flagged. Other flags are defined in Table 1.

Table 1: Definitions of flags used in the ~~RGCB~~ software

Error type	Observation ~~has been~~ COULD BE changed	Suspect	Erroneous
Illegal code	A *		M
Failed internal consistency check	B	J	N
Failed time continuity check	C	K	
Exceeded reasonable value (extreme value)		L	Q

* FOR CLOUD FLAG 'A' MEANS CLOUD TYPES, TOTAL CLOUD AND/OR LOW CLOUD AMOUNT HAVE FAILED INTERNAL CONSISTENCE CHECK. HOWEVER NO CHANGE HAS BEEN MADE.

The need for marine data to undergo comprehensive editing is obvious. The results of the editing are passed to the user in the form of quality indicators (flags). These flags reveal the reason, if any, that the data are regarded as incorrect. Table II lists the specific tests that are performed and and the flags that are assigned.

TABLE II

TESTS PERFORMED BY ~~FGGE~~ QUALITY CONTROL PROGRAM

TABLE II:- TESTS PERFORMED BY ~~FGGE~~ QUALITY CONTROL PROGRAM

SHIP POSITION (ONE FLAG SHARED BY MARSDEN SQUARE, LATITUDE, LONGITUDE, QUADRANT, MONTH, DAY, & HOUR)

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
C	TWO OR MORE OBSERVATIONS WITHIN .5 DEGREE BOTH LATITUDE & LONGITUDE BEST OB BY CODE
K	WORST OBSERVATION OF ABOVE
	LATITUDE CHANGE > 0.7 DEGREES PER HOUR
	LONGITUDE CHANGES (DEGREES/HR) WITHIN LATITUDE BANDS
	0.7 00-39.9
	OR 1.0 40-49.9
	OR 1.4 50-59.9
	OR 2.0 60-69.9
	OR 2.7 70-75.0
	TWO OR MORE OBSERVATIONS SAME SHIP AT SAME TIME, BUT DIFFERENT MARSDEN SQUARE
M	QUADRANT NOT = 1 - 4
	LATITUDE > 90.0
	LONGITUDE > 180.0
	LATITUDE NOT NUMERIC
	LONGITUDE NOT NUMERIC
	YEAR MONTH DAY HOUR NOT NUMERIC
	MONTH NOT > 00 AND < 13
	DAY NOT > 00 AND < 32
	HOUR > 24
	LAND-LOCKED MARSDEN SQUARE
	NO EXTREMES - DATA

any year accepted

PRESSURE

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
K	PRESSURE CHANGE > 5.0 MBS/HR
L	PRESSURE LIES OUTSIDE $\bar{X} \pm 4.80$
Q	PRESSURE LIES OUTSIDE $\bar{X} \pm 5.80$
	PRESSURE NOT > 919.0 AND < 1061.0
S	PRESSURE = SPACES

PRESSURE TENDENCY (SHARED BY TENDENCY, AMOUNT PRESSURE CHANGE)

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
K	PRESSURE CHANGE > 15.0 MB
M	PRESSURE TENDENCY NOT 0-8
	PRESSURE TENDENCY = 4 AND PRESSURE CHANGE NOT = 000
S	PRESSURE CHANGE = SPACES OR NOT NUMERIC

CLOUDS

FLAGGED VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
A	TOTAL CLOUD OR LOW CLOUD OR LOW TYPE OR HEIGHT OR MIDDLE TYPE OR HIGH TYPE = SPACE.
	TOTAL CLOUD OR LOW CLOUD = '–'.
	TOTAL CLOUD = 9 AND LOW TYPE NOT = '–'.
	TOTAL CLOUD = 9 AND MIDDLE TYPE NOT = '–'.
	TOTAL CLOUD = 9 AND HEIGHT NOT = '–' AND NOT = Ø.
	TOTAL CLOUD = 8 AND (LOW TYPE NOT = '–' AND NOT = Ø) AND (MIDDLE TYPE NOT = '–' AND NOT = Ø) AND (HIGH TYPE NOT = '–' AND > 2 AND < 7)

TOTAL CLOUD = 8 AND (LOW TYPE NOT = '–' AND NOT = ∅) AND (MIDDLE TYPE NOT = '–' AND NOT = ∅) AND (HIGH TYPE NOT = '–' AND = 8 OR = 9).

LOW TYPE = '–' OR NOT = ∅ AND HEIGHT NOT = '–' AND = 9.

TOTAL CLOUD < 7 AND (HIGH TYPE NOT = '–' AND = 7.

TOTAL CLOUD = 9 AND HIGH TYPE NOT = '–'.

TOTAL CLOUD = ∅ AND LOW TYPE = '–' OR > ∅.

TOTAL CLOUD = ∅ AND MIDDLE TYPE = '–' OR > ∅.

TOTAL CLOUD = ∅ AND HIGH TYPE = '–' OR > ∅.

TOTAL CLOUD = ∅ AND HEIGHT = '–' OR < 9.

TOTAL CLOUD > LOW CLOUD AND (LOW TYPE NOT = '–' AND = ∅) AND (HIGH TYPE NOT = '–' AND = ∅).

TOTAL CLOUD > LOW CLOUD AND (MIDDLE TYPE NOT = '–' AND = ∅) AND (HIGH TYPE NOT = '–' AND = ∅).

TOTAL CLOUD > ∅ AND (LOW TYPE NOT = '–' AND = ∅) AND (MIDDLE TYPE NOT = '–' AND = ∅) AND (HIGH TYPE NOT = '–' AND = ∅).

TOTAL CLOUD > ϕ AND LOW CLOUD = ϕ AND (HIGH TYPE NOT = '–' AND = ϕ).

TOTAL CLOUD > ϕ AND LOW CLOUD = ϕ AND (HIGH TYPE NOT = '–' AND NOT = ϕ) AND (HEIGHT NOT = '–' AND NOT = ϕ).

LOW CLOUD = ϕ OR 9 AND (HEIGHT NOT = '–' AND > ϕ AND < 9).

LOW CLOUD = 8 AND (LOW TYPE NOT = '–' AND > ϕ) AND (MIDDLE TYPE NOT = '–').

LOW CLOUD = ϕ AND (LOW TYPE = '–' OR > ϕ).

LOW CLOUD = ϕ AND (MIDDLE TYPE = '–' OR > ϕ).

LOW CLOUD = 8 OR 9 AND HIGH TYPE NOT = '–'

LOW CLOUD = 9 AND MIDDLE TYPE NOT = '–'

LOW CLOUD = 9 AND LOW TYPE NOT = '–'.

LOW CLOUD > ϕ AND (LOW TYPE NOT = '–' AND = ϕ) AND (MIDDLE TYPE NOT = '–' AND = ϕ).

LOW TYPE NOT = '–' AND > ϕ AND < 6 AND (HEIGHT NOT = '–' AND < 2).

LOW TYPE NOT = '–' AND = 8 OR 9 AND HEIGHT NOT = '–' AND < 2.

LOW TYPE NOT = '–' AND = ϕ AND (MIDDLE TYPE NOT = '–' AND > ϕ) AND (HEIGHT NOT = '–' AND < 7).

TOTAL CLOUD > ϕ AND LOW CLOUD = ϕ AND (HIGH TYPE NOT = '–' AND = ϕ).

TOTAL CLOUD > ϕ AND LOW CLOUD = ϕ AND (HIGH TYPE NOT = '–' AND NOT = ϕ) AND (HEIGHT NOT = '–' AND NOT = ϕ).

LOW CLOUD = ϕ OR 9 AND (HEIGHT NOT = '–' AND > ϕ AND < 9).

LOW CLOUD = 8 AND (LOW TYPE NOT = '–' AND > ϕ) AND (MIDDLE TYPE NOT = '–').

LOW CLOUD = ϕ AND (LOW TYPE = '–' OR > ϕ).

LOW CLOUD = ϕ AND (MIDDLE TYPE = '–' OR > ϕ).

LOW CLOUD = 8 OR 9 AND HIGH TYPE NOT = '–'

LOW CLOUD = 9 AND MIDDLE TYPE NOT = '–'

LOW CLOUD = 9 AND LOW TYPE NOT = '–'.

LOW CLOUD > ϕ AND (LOW TYPE NOT = '–' AND = ϕ) AND (MIDDLE TYPE NOT = '–' AND = ϕ).

LOW TYPE NOT = '–' AND > ϕ AND < 6 AND (HEIGHT NOT = '–' AND < 2).

LOW TYPE NOT = '–' AND = 8 OR 9 AND HEIGHT NOT = '–' AND < 2.

LOW TYPE NOT = '–' AND = ϕ AND (MIDDLE TYPE NOT = '–' AND > ϕ) AND (HEIGHT NOT = '–' AND < 7).

~~C2005S~~

See Present Wx

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
B	TOTAL CLOUD = 0 AND LOW CLOUD = 8 OR 9, ~~SET TOTAL CLOUD TO LOW CLOUD~~
	TOTAL CLOUD < 8 AND LOW CLOUD = 8, ~~SET TOTAL CLOUD TO LOW CLOUD~~
	TOTAL CLOUD < 8 AND LOW CLOUD = 9 AND PRESENT WEATHER ≠ SPACES, 04-12, 30-99, ~~SET LOW CLOUD TO SPACES~~
	TOTAL CLOUD < 8 AND LOW CLOUD = 9 AND PRESENT WEATHER = SPACES, 04-12, 30-99, ~~SET TOTAL CLOUD TO LOW CLOUD~~
	TOTAL CLOUD = 8 AND LOW CLOUD = 9 AND PRESENT WEATHER = SPACES, 41, 43, 45, 47, > 48, 30-39, 04-12, ~~SET TOTAL CLOUD TO 9.~~ ALSO, IF HEIGHT ≠ SPACES OR 0 OR '-' ~~SET HEIGHT TO '-'.~~
	TOTAL CLOUD = 8 AND LOW CLOUD = 9, PRESENT WEATHER ≠ ABOVE, ~~SET LOW CLOUD TO 8.~~
	TOTAL CLOUD = 9 AND LOW CLOUD = 8, PRESENT WEATHER ≠ SPACES, 4-12, 30-39, 41, 43, 45, 47, 49, 50-99, ~~SET TOTAL CLOUD TO LOW CLOUD~~
	TOTAL CLOUD = 9 AND LOW CLOUD ≠ 9 OR SPACE, PRESENT WEATHER = SPACES, 4-12, 30-39, 41, 43, 45, 47, 49-99, ~~SET LOW CLOUD TO 9.~~ ALSO, IF HEIGHT ≠ SPACES OR 0 OR '-', ~~SET HEIGHT TO ' '.~~
	TOTAL CLOUD = LOW CLOUD = 9 AND PRESENT WEATHER SPACES, 4-12, 30-39, 41, 43, 45, 47, 49-99 AND IF HEIGHT ≠ SPACES, OR 0 OR '-', ~~THEN SET HEIGHT TO ' '.~~
	(2) TOTAL CLOUD = LOW CLOUD = 0 AND IF HEIGHT ≠ 9 AND PRESENT WEATHER = 43, 45, 47 OR 49-99, ~~SET HEIGHT TO 9.~~ FLAG PRESENT WEATHER 'J'.
	TOTAL CLOUD = LOW CLOUD = 9 AND PRESENT WEATHER ≠ SPACES, 4-19, 30-39, 41, 43, 45, 47, 49-99 AND HEIGHT ≠ SPACES, 0, '-', ~~THEN SET HEIGHT TO '-'.~~
J	✓TOTAL CLOUD = SPACES OR '-' AND LOW CLOUD < 8
	(3) ✓TOTAL CLOUD = 0 AND LOW CLOUD > 0 AND < 8
	✓TOTAL CLOUD < 8 AND LOW CLOUD ≠ 8 OR 9 AND > TOTAL CLOUD
	* SEE PRESENT WEATHER *
S	CLOUD FIELD = SPACES, OR '--------', OR '--- ---', OR '- '

DRY BULB

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAGS
J	DRY BULB ~~NOT> 2.2 AND NOT> 2.3~~ < -2.2 AND PRESENT WEATHER 80-82 OR > 88 FLAG DRY BULB, WET BULB, AND DEW POINT
	DRY BULB ≥ 8.0°C AND PRESENT WEATHER 70-75, FLAG DRY BULB, WET BULB, AND DEW POINT
K	DRY BULB CHANGE > 5.0°C/HR, FLAG DRY BULB, WET BULB, AND DEW POINT
L	DRY BULB OUTSIDE $\bar{X} \pm 4.80$, FLAG DRY BULB, WET BULB, AND DEW POINT
N	DRY BULB ≥ DEW POINT AND WET BULB ~~DEW POINT NOT> DRY BULB AND DRY BULB NOT <WET BULB~~ AND WET BULB < DEW POINT FLAG DRY BULB, WET BULB AND DEW POINT
	DRY BULB < DEW POINT OR WET BULB BY MORE THAN 0.5°C, FLAG DRY BULB, WET BULB, AND DEW POINT
Q	DRY BULB OUTSIDE $\bar{X} \pm 5.80$, FLAG DRY BULB, WET BULB AND DEW POINT
S	DRY BULB = SPACES
ALL	TEMPERATURE FIELDS = SPACES

DEW POINT * (SHARED WITH WET BULB)

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
B	DEW POINT > DRY BULB BY ≤ 0.5°C ~~SET DEW POINT = DRY BULB AND COMPUTE WET BULB~~
J	SEE DRY BULB
K	SEE DRY BULB
	DEW POINT CHANGE > 5.0°C/HR
L	DRY BULB OUTSIDE $\bar{X} \pm 4.80$
	DEW POINT OUTSIDE $\bar{X} \pm 4.80$
N	SEE DRY BULB
Q	SEE DRY BULB
	DEW POINT OUTSIDE $\bar{X} \pm 5.80$

S	ALL TEMPERATURE FIELDS = SPACES IF DEW POINT = SPACES AND EITHER DRY BULB OR WET BULB = SPACES DEW POINT = SPACES AFTER ATTEMPTED COMPUTATION

WET BULB *

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
B	WET BULB > DRY BULB BY $\leq$ 0.5°C ~~SET WET BULB = DRY BULB, COMPUTE DEW POINT~~
J	SEE DRY BULB
K	SEE DRY BULB
L	WET BULB OUTSIDE $\bar{X} \pm 4.80$ SEE DRY BULB
N	SEE DRY BULB
Q	SEE DRY BULB WET BULB OUTSIDE $\bar{X} \pm 5.80$
S	ALL TEMPERATURE FIELDS = SPACES IF WET BULB = SPACES AND EITHER DRY BULB OR DEW POINT = SPACES WET BULB = SPACES AFTER ATTEMPTED COMPUTATION

* IF DEW POINT FLAG = 'R' THEN USE WET BULB FLAG, OTHERWISE USE DEW POINT FLAG.

(i) PRESENT WEATHER

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
B	VISIBILITY = 97 OR 98 AND PRESENT WEATHER ~~CHANGE TO~~ 52, 54 50 OR 53, 55 51 OR 59 58 OR 62 60

OR 63, 65	~~61~~
OR 69	~~68~~
OR 72, 74	~~70~~
OR 73, 75	~~71~~

TOTAL CLOUD = 9, PRESENT WEATHER = 42, 44, 46, 48, ~~ADD 1 TO PRES. WEATHER~~

VISIBILITY > 9~~4~~7 AND < 99 AND PRESENT WEATHER > 41 AND < 50. ~~SET PRESENT WEATHER TO 10~~

TOTAL CLOUD = 1-8, PRESENT WEATHER = 43, 45, 47, 49, ~~SUB 1 FROM PRESENT WEATHER~~

DRY BULB ~~NOT > -2.2°C AND NOT > 2.2~~ < -2.2°C

PRESENT WEATHER	~~CHANGE TO~~
50, 51, 58	~~56~~
OR 52-55, 59	~~57~~
OR 60, 61	~~65~~
OR 62-65	~~67~~
OR 83	~~85~~
OR 84	~~85~~

DRY BULB > 2.2°C AND

PRESENT WEATHER	~~CHANGE TO~~
48	~~46~~
OR 49	~~47~~
OR 56	~~51~~
OR 57	~~55~~
OR 66	~~61~~
OR 67	~~63~~

DRY BULB > 8.0°C AND

PRESENT WEATHER	~~CHANGE TO~~
83, 85	~~80~~
OR 84, 86	~~81~~
OR 68	~~58~~
OR 69	~~59~~

J

VISIBILITY < 97 AND PRESENT WEATHER ≤ 03 AND IF VISIBILITY FLAG = ∅ OR < '5' SET IT TO '5',

VISIBILITY = 99, PRESENT WEATHER 4-10 OR 30-99 AND IF VIS. FLAG = ∅ OR < '5' SET IT TO '5'.

VISIBILITY 95 OR 96 AND WIND SPEED <009 AND PRESENT WEATHER = 33 - 37 AND IF VISIBILITY FLAG = ∅ < '5' ~~[illegible]~~ SET IT TO '5'

VISIBILITY = 90-94 AND WIND SPEED <9 AND PRESENT WEATHER = 07, 30-35, 38 or 39 AND IF VISIBILITY FLAG = ∅ OR < '5' SET IT TO '5'

TOTAL CLOUD = LOW CLOUD = 0, PRESENT WEATHER = 43, 45, 47, 49-99, ~~SET HEIGHT TO "9" IF ≠ 9~~ SET CLOUD FLAG TO B.

	TOTAL CLOUD = LOW CLOUD = 9, PRESENT WEATHER ≠ SPACES, 4-8, 30-39, 41, 43, 45, 47, 49-99 AND IF CLOUD = 0 OR < 'J' SET IT TO 'J'.
	VISIBILITY = 90-93 AND PRESENT WEATHER = 10 AND IF VIS. FLAG = 0 OR < 'J' SET IT TO 'J'.
	DRY BULB > 8.0°C PRESENT WEATHER = 36-39
L	LATITUDE < 20.0 AND PRESENT WEATHER = 22-24, 26, 36-39, 48, 49, 56, 57, 66-79, 83-88, 93-95, ~~97~~
M	PRESENT WEATHER NOT NUMERIC.
S	PRESENT WEATHER = SPACES

SEA TEMPERATURE

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
K	SEA-TEMPERATURE CHANGE > 3.0°C/HR
L	SEA-TEMPERATURE OUTSIDE $\bar{X} \pm 4.80$
Q	SEA-TEMPERATURE OUTSIDE $\bar{X} \pm 5.80$
	SEA-TEMPERATURE < -2.8°C
S	SEA-TEMPERATURE = SPACES

VISIBILITY

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
M	VISIBILITY NOT NUMERIC
J	VISIBILITY < 90 SEE PRESENT WEATHER 'J'.
S	VISIBILITY = SPACES

PAST WEATHER

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
M	PAST WEATHER NOT NUMERIC
S	PAST WEATHER = SPACES
J	DRY BULB > 14.1 AND PAST WEATHER = 7 (SNOW OR RAIN AND SNOW MIXED)

WIND (SHARED BY WIND INDICATOR, DIRECTION & SPEED)

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
A	DIRECTION = SPACES AND SPEED = 000, ~~SET DIRECTION TO 00~~
	DIRECTION > 00 AND < 37 AND SPEED = 000, ~~SET DIRECTION TO 00~~
	DIRECTION = 00 AND SPEED ≠SPACES, OR 000, OR NOT >006 ~~SET DIRECTION TO 99~~
	DIRECTION = 00 AND SPEED = SPACES, ~~SET SPEED TO 000~~
	DIRECTION = 99 AND SPEED = 000, ~~SET DIRECTION TO 00~~
	DIRECTION = SPACES AND SPEED > 000 AND < 007, ~~SET DIRECTION TO 99~~
	DIRECTION = 00 AND SPEED >006 ~~SET DIRECTION TO 36~~, ALSO IF SEA HEIGHT >00 ~~SET SEA DIRECTION TO 36~~ AND SET SEA FLAG TO "A".
J	DIRECTION = 99 AND SPEED > 006
	SEE SWELL AND WAVE
M	DIRECTION = SPACES AND SPEED NOT = 000 OR SPEED NOT > 000 and < 007
	DIRECTION > 00 AND < 37 AND SPEED = SPACES
AND SET	DIRECTION >00 AND <37 AND SPEED = 000 HEIGHT >00
Q	SPEED > 200
S	WIND INDICATOR, DIRECTON & SPEED = SPACES, OR WIND DIRECTION & SPEED = SPACES

SEA WAVES

(YEAR IS ≥ 1968, UNLESS STATED OTHERWISE)

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAG
A	WIND DIRECTION = 00 AND WIND SPEED > 006, ~~MOVE 36 TO WIND DIRECTION~~ AND WAVE HEIGHT > 00, ~~SET WAVE DIRECTION TO 36.~~
B	WAVE DIRECTION > 00 AND < 37, OR = 99 AND WAVE HEIGHT > 00, WAVE PERIOD = ' ', ~~SET PERIOD TO '-'~~ (SEE J FLAG)

WAVE DIRECTION > 00 AND < 37, OR = 99 AND WAVE HEIGHT > 00 AND WAVE PERIOD ≠ ' ' OR '-' THEN IF

WAVE HEIGHT		WAVE PERIOD
> 54	AND	≤ 6 AND ≥ 2
OR > 40	AND	≤ 5 AND ≥ 2
OR > 29	AND	≤ 4 AND ≥ 2
OR > 20	AND	= 2 OR 3
OR > 12	AND	= 2
OR > 05	AND	= 1
OR = 05	AND	< 2

* WE HAVE DISCOVERED A PROBLEM WITH THE HANDLING OF PRE-1970 DATA IN SEA AND SWELL WAVES. THIS WILL BE CORRECTED BEFORE ANY DATA IN THIS PERIOD IS PROCESSED.

OR = 04	AND	< 2 OR = 9
OR = 03	AND	< 2 OR = 8 OR 9
OR = 02	AND	< 2 OR > 6
OR = 01	AND	< 2 OR > 5

~~SET WAVE PERIOD ' ', SEE J FLAG *~~

WAVE DIRECTION = 00 AND WAVE HEIGHT = 00 AND WAVE PERIOD = ' ' OR '1' OR '2', ~~SET WAVE DIRECTION, PERIOD, AND HEIGHT TO '00-00'~~.

WAVE DIRECTION = 99 AND WAVE HEIGHT = 00, ~~SET WAVE DIRECTION, PERIOD, HEIGHT TO '00-00'.~~

WAVE DIRECTION > 00 AND < 37 AND WAVE HEIGHT = 00 AND PERIOD = ' ', ~~SET PERIOD TO '1'~~.

DATE ~~= JAN-JUN~~ 1963 AND DIRECTION > 50 AND < 87, SUBTRACT 50 FROM DIRECTION, ~~ADD 10 TO HEIGHT~~

YEAR < 1968 AND > 1964, OR ≠ 1963, OR > JUNE 1963; DIRECTION NOT > 36 AND < 49, HEIGHT > 00 AND DIRECTION ≠ 00 AND PERIOD ≠ SPACE OR
DIRECTION NOT > 36 AND < 49 AND HEIGHT NOT > 00 OR = 00 OR ≠ SPACES OR
DIRECTION NOT > 36 AND < 49 AND HEIGHT > 00 AND ≠ SPACES OR
DIRECTION NOT > 36 AND < 49 AND HEIGHT = 00 AND DIRECTION ≠ SPACES, 49 OR 99, OR NOT > 00 AND < 37 OR
DIRECTION NOT > 36 AND < 49 AND HEIGHT = SPACES AND DIRECTION ≠ 00 OR
HEIGHT = 00 AND DIRECTION = 49, 99 OR > 00 AND < 37 AND PERIOD ≠ 0 OR 1 AND NOT < 5

THEN IF

HEIGHT	AND	PERIOD	
> 54		> 1 AND < 7	*
OR > 40		> 1 AND < 6	*
OR > 29		> 1 AND < 5	*
OR > 20		= 2 OR 3	*
OR > 12		= 2	*
OR > 05		= 1	*
OR = 04		= 9	*
OR = 03		= 8 OR 9	*
OR = 02		> 6	*
OR = 01		> 5	*

~~* SET PERIOD TO '1'~~

= 05	AND	= 0 OR 1	**
OR = 04		= 0 OR 1	**
OR = 03		= 0 OR 1	**

OR = 02	= 0 OR 1	**
OR = 01	= 0 OR 1	**

~~** SET PERIOD TO 2~~ SEE 'J' FLAG **

YEAR < 1968 AND > 1964, OR ≠ 1963, OR > JUN 1963 AND DIRECTION NOT > 36 AND < 49 AND HEIGHT > 00 AND DIRECTION ≠ 00 AND PERIOD = SPACE, ~~SET PERIOD TO '-'.~~

YEAR < 1968 AND > 1964, OR ≠ 1963, OR > JUN 1963, AND HEIGHT = 00 AND DIRECTION = SPACES AND PERIOD < 3, ~~SET DIRECTION, PERIOD, & HEIGHT TO '00-00'~~

YEAR < 1968 AND > 1964, OR ≠ 1963, OR > JUN 1963, HEIGHT = 00 AND DIRECTION = 49, 99 OR > 00 AND < 37 AND PERIOD = 0 OR 1, ~~SET PERIOD TO 3.~~

YEAR < 1968 AND > 1964, OR ≠ 1963, OR > JUN 1963, HEIGHT = SPACES AND DIRECTION = 00 AND PERIOD < 3, ~~SET DIRECTION, PERIOD, HEIGHT TO '00-00'~~.

J DIRECTION > 00 AND < 37, HEIGHT = 00, PERIOD = '-' OR '2' OR '3' OR '4' AND SEA TEMPERATURE > 019 AND WIND SPEED > 013 SET FLAG AND IF WIND FLAG = 0 OR < J, FLAG IT 'J'.

* IF WIND FLAG AND SEA TEMPERATURE FLAG = 0 AND SEA TEMPERATURE > 019 AND

HEIGHT	AND	PERIOD
01		> 21
OR 02		> 33
OR 03		> 47

OR IF WIND FLAG AND SEA TEMPERATURE FLAG = 0 AND SEA TEMPERATURE NOT > 019 AND

HEIGHT	AND	PERIOD
> 36		< 048
OR > 24		< 034
OR > 15		< 022
OR > 11		< 011
OR > 09		< 004

SET FLAG AND IF WIND FLAG = 0 OR < J, SET WIND FLAG 'J'.

** YR > 1963 AND WIND FLAG AND DRY BULB FLAG = 0 AND DRY BULB NOT > 019 AND

	PERIOD	AND	HEIGHT
	> 047		< 04
	OR > 033		< 03
	OR > 021		< 02
	OR > 013		< 01

M — WAVE HEIGHT AND PERIOD = SPACES

DIRECTION NOT > 00 AND < 37, OR ≠ 99, SPACES, OR 00

DIRECTION = 00 AND HEIGHT ≠ 00

DIRECTION = SPACES AND HEIGHT ≠ 00

DIRECTION > 00 AND < 37 OR = 99 AND HEIGHT NOT NUMERIC

HEIGHT OR DIRECTION = SPACES

N — DIRECTION = HEIGHT = 00 AND PERIOD ≠ ' ' OR '-' OR '2'

DIRECTION > 00 AND < 37 AND HEIGHT = 00 AND PERIOD ≠ ' ' OR '-' OR '2' OR '3' OR '4'

YEAR < 1968 AND ≥ 1964, OR ≠ 1963, OR > JUN 1963 AND DIRECTION > 36 AND < 49, OR
HEIGHT = 00 AND DIRECTION = SPACES AND PERIOD ≥ 3, OR
HEIGHT = 00 AND DIRECTION = 49 OR 99, OR > 00 AND < 37 AND PERIOD ≠ 0 OR 1 AND < 5

Q — HEIGHT > 70

S — SEA WAVE DIR, PERIOD AND HEIGHT = SPACES

All Years

SWELL WAVES (YEAR IS ≥ 1968 UNLESS STATED OTHERWISE)

FLAG VALUE ASSIGNED	CONDITIONS FOR SETTING FLAGS
B	SWELL DIRECTION = 00 AND SWELL HEIGHT = 00, ~~THEN SET SWELL PERIOD TO ' '~~.
	SWELL DIRECTION = 99 AND HEIGHT = 00, ~~THEN SET DIRECTION, PERIOD, AND HEIGHT TO '00 00'~~.
	DIRECTION = SPACES AND HEIGHT = 00 AND PERIOD = SPACES, OR '-' OR '0', OR > '0' AND < '6', ~~THEN SET SWELL DIRECTION, PERIOD, HEIGHT TO '00 00'~~.

DIRECTION =00 AND HEIGHT = SPACES, ZEROES OR '--' AND PERIOD = SPACES OR '-' OR '0', OR > '0' AND < '6', ~~SET SWELL DIRECTION, PERIOD AND HEIGHT TO '00-00'~~.

DIRECTION > 00 AND < 37, OR = 99 AND HEIGHT = 02, PERIOD = '3' OR '4', ~~SET PERIOD TO 5.~~

DIRECTION > 00 AND < 37, OR = 99 AND HEIGHT = 01 AND PERIOD = '2' OR '3', OR '4', ~~SET PERIOD TO 5.~~

YEAR > 1963, OR > JUN 1963, THEN: DIRECTION NOT > 36 AND < 49, HEIGHT > 00, DIRECTION ≠ 00 AND PERIOD ≠ SPACES, OR > 00 AND ≠ SPACE, DIRECTION = 00 OR HEIGHT = 00 AND DIRECTION ≠ SPACES, OR 49, 99 AND NOT > 00 AND < 37, OR DIRECTION ≠ 00 AND HEIGHT = SPACES

THEN, IF

HEIGHT	AND	PERIOD
= 05		= 0 OR 1
OR = 04		= 0 OR 1
OR = 03		= 0 OR 1
OR = 02		= 0 OR 1
OR = 01		= 0 OR 1

~~THEN SET PERIOD TO 2~~, OR IF

HEIGHT	AND	PERIOD
> 54		> 1 AND < 7
OR > 40		> 1 AND < 6
OR > 29		> 1 AND < 5
OR > 20		= 2 OR 3
OR > 12		= 2
OR > 05		= 1
OR = 04		= 9
OR = 03		= 8
OR = 02		> 6
OR = 01		> 5

~~THEN SET PERIOD TO '-'~~.

DATE JAN-JUN 1963, ~~THEN SUBTRACT 50 FROM WAVE DIRECTION~~ AND ~~ADD 10 TO WAVE HEIGHT~~

YEAR > 1963, OR ≠ 1963, OR > JUN 1963 THEN: DIRECTION NOT > 36 AND < 49 AND HEIGHT > 00 AND DIRECTION ≠ 00 AND PERIOD = SPACE, MOVE '-' TO PERIOD, OR HEIGHT = 00 AND DIRECTION = SPACES AND PERIOD < 3, ~~MOVE '00-00' TO SWELL DIRECTION, PERIOD, AND HEIGHT~~, OR HEIGHT = 00 AND DIRECTION =

49 OR 99 OR > 00 AND < 37 AND PERIOD = 0 OR 1, MOVE 2 TO PERIOD, OR HEIGHT = 00 AND DIRECTION = 49 OR 99 OR > 00 AND < 37 AND PERIOD NOT < 5, OR HEIGHT = SPACES AND DIRECTION = 00 AND PERIOD < 3, ~~MOVE '00-00' TO SWELL-DIRECTION, PERIOD, HEIGHT.~~

J DIRECTION > 00 AND < 37, OR = 99 AND

HEIGHT	AND	PERIOD
> 54		≠ 4
OR > 40		≠ '2' OR '3' OR '4'
OR > 29		> 4
OR > 20		= '5' OR '6' OR '7'
OR > 12		= '5'

YEAR > 1963, OR ≠ 1963 OR > JUN 1963 THEN: DIRECTION NOT > 36 AND < 49 OR ≠ 00 AND HEIGHT > 00 AND PERIOD ≠ SPACE, OR HEIGHT NOT > 00 AND ≠ 00 OR SPACES, OR HEIGHT = SPACES AND DIRECTION ≠ 00, OR HEIGHT = 00 AND DIRECTION = 00,

THEN, IF

HEIGHT	AND	PERIOD
> 54		NOT > 1 AND < 7
OR > 40		NOT > 1 AND < 6
OR > 29		NOT > 1 AND < 5
OR > 20		≠ 2 OR 3
OR > 12		≠ 2
OR > 05		≠ 1
OR = 05		≠ 0 OR 1

ALSO, IF WIND FLAG = 0 AND DRY BULB FLAG = 0 AND DRY BULB TEMPERATURE NOT > 019, THEN IF

WIND SPEED	AND	WAVE HEIGHT
> 047		< 04
OR > 033		< 03
OR > 021		< 02
OR > 013		< 01

M	SWELL DIRECTION > 36 AND < 99
	SWELL DIRECTION NOT > 36 AND <99, OR NOT > 00 AND < 37, OR ≠ 99, SPACES, 00
	SWELL DIRECTION > 00 AND < 37, OR = 99 AND HEIGHT NOT NUMERIC
	SWELL DIRECTION = 00 AND HEIGHT ≠ SPACES OR ZEROES OR '--'
	SWELL DIRECTION = SPACES AND HEIGHT ≠ 00
	SWELL DIRECTION = SPACES OR HEIGHT = SPACES
N	SWELL DIRECTION, PERIOD, AND HEIGHT = '11111' OR '99111'
	SWELL DIRECTION > 00 AND < 37 AND HEIGHT NOT > 00 AND PERIOD = '9'
	WAVE DIRECTION = 00 AND HEIGHT = SPACES OR ZEROES OR '--' AND PERIOD ≠ SPACES, '-', OR '0' AND NOT > 0 AND < '6'
	YEAR > 1963, OR ≠ 1963, OR > JUN 1963, THEN DIRECTION > 36 AND < 49, OR HEIGHT = 00 AND DIRECTION = SPACES AND PERIOD NOT < 3, OR HEIGHT = 00 AND DIRECTION = 49, 99 OR > 00 AND < 37 AND PERIOD ≠ 0 OR 1 AND < 5, OR DIRECTION =00 AND HEIGHT = SPACES AND PERIOD NOT < 3
Q	SWELL HEIGHT > 70
S	SWELL DIRECTION, PERIOD, AND HEIGHT = SPACES
	SWELL DIRECTION, PERIOD, AND HEIGHT = '-----'

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
ENVIRONMENTAL DATA AND INFORMATION SERVICE
National Climatic Center
Federal Building
Asheville, N. C. 28801

June 30, 1981 D5113:VC

TO: D5x51 - Alan McNab

FROM: D5113 - Vincent Cinquemani

SUBJECT: Ocean Station Vessel (OSV) 1970s Marine Rehabilitation Data

OSV surface marine data is one data set in the 1970s marine rehabilitation project of DOD/PDB. These data are available in the NCC tape library both in "synoptic hours" and "all hours" data sets.

We can either include just the synoptic hour set or a combination of both sets. The latter choice will provide more observations, but will mean additional processing to fill customer requests for synoptic hours data.

Please provide DOD/PDB with your preference by July 2, 1981.

cc:
Chief, DOD

1 July 81

Gus

Recommend rehab set contain "all hours" (not just synoptic) for OSV's, because one of the goals of the rehab project is to build a consolidated data set.

Alan

(AS)

2 July 81

Vince (ref your 30 Jun 81 memo)

Put "all hours" in rehab set

Alan

ENVIRONMENTAL DATA BUOY
(TDF-11) EDIT/ARCHIVE

TDF-11 (TD-1140) Doc File

Tape Field Number	Tape Positions	Element
001	01-03	Deck Name
002	04-06	Marsden 10 degree square
003	07-08	Marsden 1 degree sub-square
004	09	Quadrant
005	10-12	Latitude
006	13-16	Longitude
007	17-20	Year
008	21-22	Month
009	23-24	Day
010	25-26	Hour-GMT
011	27-29	Wind direction and indicator
012	30-33	Wind speed and indicator
013-014	34-38	BLANK
015	39	Past weather (blank or code 6)
016	40-44	Sea level pressure
017	45-48	Temperature indicator and air temperature (Tenths of Deg. C)
018	49-51	Wet bulb temperature (computed from fields 17 and 19)
019	52-54	Dew point temperature
020	55-57	Sea surface temperature
021	58-60	Air-sea temperature difference (computed from fields (17 and 20)
022-023	61-69	BLANK
024	70	Period of Waves
025	71-72	Wave Height
026-030	73-80	BLANK
031	81	OST or ship indicator (set to 5)
032	82	Additional data indicator (set to 6)
033-034	83-84	BLANK
035	85	Barometric tendency (code 2 or 4 or 7)
036	86-88	Amount of pressure change
037	89	BLANK
038	90-93	Ship number
*039-058	94-140	Supplemental data fields (refer to table 2)

NOTE: Tape positions 34-38, 61-69, 73-80, 83, 84, and 89 will be blank.

Deck No.	Buoy Type	Requires Supplemental Field
876	HCB	YES
877	LCB	NO
878	PEB	NO
879	5 meter Continental Shelf Buoys	NO
880	10 meter Continental Shelf Buoys	NO
881	Offshore Platforms	NO

TABLE 2. SUPPLEMENTAL DATA FIELD

Tape Field No.	Tape Positions	Element	Tape Configuration	Code Definition And Remarks
39	94-96	Rainfall since last valid report	000-999	000= No precipitation 001-999= Millimeters rain
40	97	Solar Radiation Averaging	0-7	0 = Instantaneous Sampling Averaged Samples 1 = 1-5 Min. 2 = 6-10 Min. 3 = 11-15 Min. 4 = 16-20 Min. 5 = 21-30 Min. 6 = 31-40 Min. 7 = 41-50 Min.
41	98-100	Solar Radiation	000-200	0.00-2.00 calories/square centimeter/minute
42	101	Global Radiation Averaging	0-7	Same as Radiation averaging
43	102-103	Global Radiation	00-99	.00-.99 calories/square centimeter/minute
44	104	Current speed and direction, averaging at 2 meter	0-7	Same as radiation averaging
45	105-107	Current speed at 2 meter	001-999	001-999 = 0.01-9.99 Knots
46	108-110	Current direction at 2 meter	000-360	0-360 degrees true North; direction towards which current is traveling
47-58	111-140	Blank		

Chuck — Modified 1127 Marine Rehab.

TDF 1127

FYI

PROJECT DESIGN

SURFACE MARINE PROCESSING SYSTEM

PROJECT MANAGER:	Theodore Terpstra
PROJECT LEADER:	Marc Plantico
PROJECT MEMBERS:	Dan Fulbright Dan Manns
USER REPRESENTATIVES:	Gus Shumbera, DO Ken Davidson, DO Frank Quinlan, CAD Ward Sequin, DOD

July 14, 1981

Table 1. TDF-1127 Format

TAPE POSITIONS	ELEMENT AND ELEMENT SYMBOL
01-03	CARD DECK NUMBER
04-06	MARSDEN 10° SQUARE (MMM)
07-08	MARSDEN 1° SUB-SQUARE
09	QUADRANT (Q_c)
10-12	LATITUDE ($L_aL_aL_a$)
13-16	LONGITUDE ($L_oL_oL_oL_o$)
17-20	YEAR - GMT (AAAA)
21-22	MONTH - GMT (MM)
23-24	DAY - GMT (YY)
25-26	HOUR - GMT (GG)
27-29	WIND SCALE INDICATOR AND WIND DIRECTION (idd)
30-33	INDICATOR AND WIND SPEED (iff)
34-36	INDICATOR AND VISIBILITY (iVV)
37-38	PRESENT WEATHER (ww)
39	PAST WEATHER (W)
40-44	SEA LEVEL PRESSURE (PPPPP)
45-48	TEMPERATURES INDICATOR AND AIR TEMPERATURES (iTTT)
49-51	WET BULB TEMPERATURE
52-54	DEW POINT TEMPERATURE ($T_dT_dT_d$)
55-57	SEA SURFACE TEMPERATURE ($T_wT_wT_w$)
58-60	AIR-SEA TEMPERATURE DIFFERENCE ($T_sT_sT_s$)
61	TOTAL CLOUD AMOUNT (N)
62	LOWER CLOUD AMOUNT (N_h)
63	TYPE OF LOW CLOUD (C_L)
64	CLOUD HEIGHT INDICATOR (i)
65	CLOUD HEIGHT (h)
66	TYPE OF MIDDLE CLOUD (C_M)
67	TYPE OF HIGH CLOUD (C_H)
68-69	DIRECTION OF WAVES (d_wd_w)
70	PERIOD OF WAVES (P_w)
71-72	HEIGHT OF WAVES (H_wH_w)
73-74	DIRECTION OF SWELL (d_wd_w)
75	PERIOD OF SWELL (P_w)
76-77	HEIGHT OF SWELL (H_wH_w)
78-79	COUNTRY INDICATOR (see table 3A)
80	SHIP DIRECTION (D_s)
81	SHIP SPEED (V_s)
82	BAROMETRIC TENDENCY (a)
83-85	AMOUNT OF PRESSURE CHANGE (ppp)
86	TYPE OF ICE ACCRETION ON SHIPS (I_s)
87-88	THICKNESS OF ICE ON SHIPS (E_sE_s)
89	RATE OF ICE ACCRETION (R_s)
90-96	SHIP, BUOY, OR OSV CALL SIGN

Table 1 (continued)

TAPE POSITIONS	ELEMENT AND ELEMENT SYMBOL
97	ORIGINAL WIND SPEED UNITS INDICATOR (i_w)
98	ORIGINAL TEMPERATURE UNITS INDICATOR (table 3B)
99	SEA TEMPERATURE (BUCKET OR INTAKE) Began 1968
100-101	WAVE PERIOD (SEA) SECONDS (Began 1968)
102	DESCRIPTION OF ICE TYPE (C_z)
103	EFFECT OF ICE ON NAVIGATION (K)
104	BEARING OF PRINCIPAL ICE EDGE (D_i)
105	DISTANCE TO ICE EDGE FROM SHIP (r)
106	ORIENTATION OF ICE EDGE (e)
107-108	AMOUNT OF PRECIPITATION (RR)
109-110	TIME PERIOD FOR PRECIPITATION AMOUNT (jj)
111	SIGNIFICANT CLOUD AMOUNT (N_s)
112	SIGNIFICANT CLOUD TYPE (C_s)
113-114	SIGNIFICANT CLOUD HEIGHT (h_sh_s)
115	SHIP POSITION (LAT, LON) - flag
116	WIND - flag
117	VISIBILITY - flag
118	PRESENT WEATHER - flag
119	PAST WEATHER - flag
120	PRESSURE - flag
121	DRY BULB - flag
122	DEW POINT/WET BULB - flag
123	SEA TEMPERATURE - flag
124	CLOUDS - flag
125	SEA WAVES - flag
126	SWELL WAVES - flag
127	ppp (Pressure Tendency) - flag
128-129	QUALITY CODE
130-134	JULIAN DATE (YRDAY)
135-136	BLANK
137-140	AREA (for NCC use only)

INTRODUCTION

SOURCE

Tape Data Family - 11 was derived from a variety of punched card decks. Observations were obtained from Ship Logs, Ship Weather Reporting Forms, published Ship Observations, Automatic Observing Bouys, Teletype Reports, and on cards purchased from several foreign Meteorological Services.

The quality of instruments ranges from those found aboard a 19th century whaling Ship to the most sophisticated electronic equipment used on today's Ocean Weather Ships. Observer qualifications vary from Deck Hand to trained Meteorologist.

From this conglomeration, an effort was made to bring to the researcher of oceanic weather patterns and sea conditions, a common observational format, designed for use with modern electronic data processing equipment. The International Marine punched card (Deck 128), established in 1963, was used as the basic input format to Tape Data Family - 11. Some modifications were made so that previously recorded observations could become an integral part of this Family.

QUALITY CONTROL AND CODE CONVERSIONS

The starting point for programming was the individual card deck. No attempt was made to "second guess" conversion or coding procedures employed in punching each of the various decks. This did lead to instances of double conversions. ie: Elements converted from the 1929 to the 1942 codes for punching, were then converted to the current codes for inclusion in the tape.

All conversion procedures used were devised or reviewed by professional meteorologists. Occasionally it was necessary to resort to subjective conversions based on observational experience as well as knowledge of instruments and observing techniques.

In cases where it was felt that elements were acceptable for conversion without significant loss of resolution, the new values were placed in the common portion of the observation. Elements or meteorological phenomena which did not lend themselves to conversion were retained in the supplemental portion of the observation.

During the taping, additional quality control checks were made. These checks flagged or rejected observations that did not meet specified conditions or limits. Extreme temperatures were established for each Marsden Square and individual observations were compared against these limits. Pressures were also checked against a set of extreme values. Ship positions had to be in ocean, sea, or lake areas. Wind directions, visibility, weather, sea conditions etc. had to be valid punches as defined by each card deck.

USE OF THE MANUAL

This manual was designed so that recourse to additional reference material should be unnecessary. Occasionally, however, the researcher may wish to obtain a copy of the original Card Deck reference manual. This may be done by writing to the Director, National Weather Records Center, Asheville, North Carolina.

Care should be taken to read carefully the statements pertaining to observational quality, general tape notations, common coding practices and conversion procedures used for the individual decks.

THE DATA FILE

Over 31 million Surface Marine observations are currently in Tape Data Family - 11. They are filed by 10° Marsden Square, Year, Month without regard to individual deck number. ie: All observations for January 1962 in Marsden Square 051 would be found together, followed by all observations for February 1962 etc. The period 1800- June,1968 is held on 293 reels of 9 channel, 800 bpi tape. It is not anticipated that future acquisitions will be merged into this group, but will be placed on tape in the TDF-11 format and retained as a separate file.

Observations from Ocean Weather Staions were placed in the TDF-11 format but not merged into the common file mentioned above. Currently operating Weather Ships are kept, individually, by station number (See Tape Field 029), while those ships no longer actively reporting have been filed together. Observations are filed by Ocean Weather Station number, Year, Month. These reports were also taken from a variety of card decks.

Funding for the development of TDF-11 was provided jointly by the Naval Weather Service Command, the Environmental Science Services Administration, and the Department of Defense.

SPECIAL NOTE

Although every effort was made to assure conformity, the user is cautioned that discrepencies in original punching procedures and conversion schemes occasionally occurred. Validity checks should be applied to all elements as they are used.

Reporting practices for individual decks sometimes varied during the applicable period. It must not be assumed that all elements are available for each observation. For example: A specific deck may report Present Weather for only 15 years out of a 40 year period of record. Documentation of these vagaries was not sufficient enough to allow us to include such items in this manual.

Not all ships changed their reporting practices to conform to the codes effective January 1, 1968, on that date. In many cases it was impossible to determine whether the new or old codes were being reported. This situation continued for the first few months of 1968. The Wave and Swell groups, in particular, should be examined closely during this period.

MANUAL AND TAPE NOTATIONS

FORMAT

Each observation is 140 characters in length. Positions 001-082 and 89-93 are common to all decks. Positions 083-088 vary according to the indicator found in position 082. Positions 094-140 are reserved for Supplemental Data and may be different for each deck. Because of the wide variety of elements and coding vagaries inherent in the Supplemental Data Fields, it is expected that most users will restrict themselves to working with the common portion of the observations.

For quick reference, each element or group of similar elements is identified by a Field Number. Thus, Fields 001-032 and 037-038 are common to all decks, Fields 033-036 vary according to the indicator found in Field 032, and Fields 039-onward are reserved for Supplemental Data.

The manual consists of five basic parts:

1. General Information
2. The Standard Format with definitions of Tape Fields and Positions
3. The basic codes used for all elements in the common portion of the observations
4. Explanations of Unique Characteristics, Conversion Procedures and Supplemental Data Fields by individual deck
5. General coding practices, conversions and formulae used during the conversion from cards to tape. (Section 4).

When an element is shown as being available but no conversion procedure is noted - the codes were deemed compatible and the punched values transferred directly to the tape.

TAPE

The following notations are used throughout the manual:

x = any numeric digit or alpha numeric character

i = same as x but used to show that the character is an indicator rather than part of the recorded element

\- = an "11" punch in the card or the equivalent tape configuration

\+ = a "12" punch in the card or the equivalent tape configuration. Both the - and + may appear by themselves or in combination with a numeric digit to indicate an overpunch or signed tape field.

Δ = Blank - no card punch or blank configuration on tape

Low order = Rightmost position of a field

High order = Leftmost position of a field

When elements were not reported, not readily convertible to the common portion, or did not pass the various quality control checks, the respective tape positions in the common portion appear as blanks.

STANDARD FORMAT

	CARD DECK	MAR SQ	SUB SQ	Q	LAT	LONG.	YEAR	MO	DA	HR	WIND DIR	WIND SPD	VIS	WX	W	PRESS	T I	AIR TMP	WET BLB	DEW PT	SEA TMP	A-S DIF
	xxx	xxx	xx	x	xxx	xxxx	xxxx	xx	xx	xx	ixx	ixxx	ixx	xx	x	xxxxx	i	xxx	xxx	xxx	xxx	xxx
FIELD NUMBER	001	002	003	004	005	006	007	008	009	010	011	012	013	014	015	016		017	018	019	020	021

	CLOUDS							WAVE DIR	PER	WAVE HGT	SWL DIR	PER	SWL HGT	OSV NO.	CD	SHP	ADD	ICE	ICE THK	ACC		ADD	DIR	SPD	a	ppp	ADD	SIG N	SIG T	SIG HGT			ICE	SHIP NO.
	N	N_h	C_L	I	h	C_M	C_H																											
	x	x	x	i	x	x	x	xx	x	xx	xx	x	xx	xx	x	x	1	x	xx	x	ΔΔ	6	x	x	x	xxx	8	x	x	xx	Δ	Δ	x	xxxx
FIELD NUMBER								022	023	024	025	026	027	028	029	030	031	032	033	034	035	036	032	033	034	035	036	032	033	034	035	036	037	038

SUPPLEMENTAL DATA FIELDS

FIELD NUMBER

TAPE FIELD NUMBER	TAPE POSITIONS	ELEMENT
001	01-03	CARD DECK NUMBER
002	04-06	MARSDEN 10° SQUARE
003	07-08	MARSDEN 1° SUB-SQUARE
004	09	QUADRANT
005	10-12	LATITUDE
006	13-16	LONGITUDE
007	17-20	YEAR
008	21-22	MONTH
009	23-24	DAY
010	25-26	HOUR-GMT
011	27-29	WIND DIRECTION AND INDICATOR
012	30-33	WIND SPEED AND INDICATOR
013	34-36	VISIBILITY AND INDICATOR
014	37-38	PRESENT WEATHER
015	39	PAST WEATHER
016	40-44	SEA LEVEL PRESSURE
017	45-48	TEMPERATURES INDICATOR AND AIR TEMPERATURE
018	49-51	WET BULB TEMPERATURE
019	52-54	DEW POINT TEMPERATURE
020	55-57	SEA SURFACE TEMPERATURE
021	58-60	AIR-SEA TEMPERATURE DIFFERENCE

TAPE FIELD NUMBER	TAPE POSITIONS	ELEMENT
022	61	TOTAL CLOUD AMOUNT
022	62	LOWER CLOUD AMOUNT
022	63	TYPE OF LOW CLOUD
022	64	CLOUD HEIGHT INDICATOR
022	65	CLOUD HEIGHT
022	66	TYPE OF MIDDLE CLOUD
022	67	TYPE OF HIGH CLOUD
023	68-69	DIRECTION OF WAVES
024	70	PERIOD OF WAVES
025	71-72	HEIGHT OF WAVES
026	73-74	DIRECTION OF SWELL
027	75	PERIOD OF SWELL
028	76-77	HEIGHT OF SWELL
029	78-79	OCEAN WEATHER STATION NUMBER
030	80	CARD INDICATOR
031	81	OSV OR SHIP INDICATOR
032	82	ADDITIONAL DATA INDICATOR
WHEN ADDITIONAL DATA INDICATOR = 0		
033-036	83-88	BLANK
WHEN ADDITIONAL DATA INDICATOR = 1		
033	83	TYPE OF ICE
034	84-85	THICKNESS OF ICE
035	86	RATE OF ICE ACCRETION
036	87-88	BLANK
WHEN ADDITIONAL DATA INDICATOR = 6		
033	83	SHIP DIRECTION
034	84	SHIP SPEED
035	85	BAROMETRIC TENDENCY
036	86-88	AMOUNT OF PRESSURE CHANGE
WHEN ADDITIONAL DATA INDICATOR = 8		
033	83	SIGNIFICANT CLOUD AMOUNT
034	84	SIGNIFICANT CLOUD TYPE
035	85-86	SIGNIFICANT CLOUD HEIGHT
036	87-88	BLANK
037	89	ICE INDICATOR
038	90-93	SHIP NUMBER
039 -	94-140	SUPPLEMENTAL DATA FIELDS

STANDARD FORMAT CODES

TAPE FIELD NUMBER	TAPE POSITIONS	ELEMENT	TAPE CONFIGURATION	CODE DEFINITION AND REMARKS
001	01-03	CARD DECK NUMBER	000-999	Number of the punched card deck from which the observation came.
002	04-06	10° MARSDEN SQUARE	001-936	See explanation of Marsden Square system in the Introduction.
003	07-08	1° MARSDEN SUB-SQUARE	00-99	See explanation of Marsden Square system in the Introduction.
004	09	QUADRANT	1-4	1 = N Latitude and W Longitude 2 = N Latitude and E Longitude 3 = S Latitude and W Longitude 4 = S Latitude and E Longitude
005	10-12	LATITUDE	000-900	00.0° - 90.0° North or South
006	13-16	LONGITUDE	0000-1800	000.0° - 180.0° East or West
007	17-20	YEAR	18xx-19xx	xx = Any number.
008	21-22	MONTH	01-12	01 = January, 02 = February, 03 = March, 04 = April, 05 = May, 06 = June, 07 = July, 08 = August, 09 = September, 10 = October, 11 = November, 12 = December
009	23-24	DAY	01-31	Day of the month
010	25-26	HOUR - GMT	00-23	0000 GMT - 2300 GMT
011 i	27	WIND DIRECTION INDICATOR	Δ,0,1,2	Δ = 36 point scale 0 = 32 point scale 1 = 16 of 36 point scale 2 = 16 of 32 point scale
011	28-29	WIND DIRECTION	00-36,99	Direction from which the wind is blowing.

	36Pt	32Pt	16of36Pt.	16of32Pt
00 =	Calm	Calm	Calm	Calm
01 =	005-014°	006-016°		
02 =	015-024°	017-028°	012-033°	012-034°
03 =	025-034°	029-039°		
04 =	035-044°	040-050°		035-056°
05 =	045-054°	051-061°	034-056°	
06 =	055-064°	062-073°		057-079°
07 =	065-074°	074-084°	057-078°	
08 =	075-084°	085-095°		080-101
09 =	085-094°	096-106°	079-101°	
10 =	095-104°	107-118°		102-124°
11 =	105-114°	119-129°	102-123°	
12 =	115-124°	130-140°		125-146°
13 =	125-134°	141-151°		
14 =	135-144°	152-163°	124-146°	147-169°
15 =	145-154°	164-174°		
16 =	155-164°	175-185°	147-168°	170-191°
17 =	165-174°	186-196°		
18 =	175-184°	197-208°	169-191°	192-214°

TAPE FIELD NUMBER	TAPE POSITIONS	ELEMENT	TAPE CONFIGURATION	CODE DEFINITION AND REMARKS
022 1	64	CLOUD HEIGHT INDICATOR	A, 0	A = Height not measured 0 = Height measured
022	65	CLOUD HEIGHT (h)	0-9	Height above sea surface of the base of the lowest cloud or fragment thereof.
022	66	MIDDLE CLOUD TYPE (C_M)	0-9, -	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. - = 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.

	Approximate 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 =	1000-1999	300-599
5 =	2000-3499	600-999
6 =	3500-4999	1000-1499
7 =	5000-6499	1500-1999
8 =	6500-7999	2000-2499
9 =	> 8000 or no clouds	> 2500 or no clouds

TD-1100 Stop 34

December 3, 1980 D51:WRS

TO: D51 - Marc Plantico

FROM: D51 - Ward R. Seguin

SUBJECT: Rehabilitated Surface Marine Files

The attached memo to me indicates there is a problem with some of the tapes that were generated as part of the marine rehabilitation effort of last summer. I would appreciate your researching the problem and suggesting possible solutions to correct these problems. We have had similar difficulties in the past where we have had more than thirty days per month. I would like to know why this happened in the marine processing this past summer and what features of the processing permit thirty-one days to be included in a month of only thirty days. After you have researched the problem, let's get together and discuss the proposed solutions and how this can be prevented in the future.

cc:
~~DBA~~

D51:WRSeguin:733:jas 12-3-80

Fantastic!

I have been ranting W. on info copy so that he is aware of what needs to be done by DOD

Bill
This should be filed with marine documentation.

(Rev. 5-75)

NCC
ROUTING AND
TRANSMITTAL SLIP

OFFICE OR DIVISION

DATE

TO		STOP NO	ROOM	FR
	Director	30	301 D	
	Secretary	30	301 C	
	Deputy Director	30	301 A	
	Executive Officer	30	301 F	
	Data Admin	30	301-E	
	Data Base Admin	34	310	✓
	Digital Systems Adv	30	308	
	WDC A	23	272	
	Info Mgt Ctr	43	311	
	Admin & Tech Svcs	30	301-H	
	Asst Admin & IS	30	302 A	
	Admin Oper Br	30	301 G	
	Fiscal	30	302	
	Proc & Supply	M1	118	
	Supply Room	01	Bsm	
	Personnel Br	10	66	
	Classification	10	70	
	Emp & Utilization	10	67	
	Health Unit	10	63	
	Tech Svcs Br	11	76	
	Printing	02	Bsm	
	Photo Lab	11	82	
	Microfilm	11	78	
	Pubs Dist	11	81	
	Mail Unit	11	14	
	Audiovisual Svcs	11	73	
✓	Data Oper Div	21	258	
	Progr Dev Staff	21	218	
	Primary Data Br	21	264 A	
	Solar Rad	21	264-A	
	Surface	21	260	
	Upper Air	21	260	
	Coop Data Br	21	257	
	Pubs Contr	21	257	
	Climat Proc	21	257	
	HPD Proc	21	257	

TO		STOP NO	ROOM	FR
	ADP Svcs Div	20	216	
	Data Transl Br	20	217	
	Data Digitizing	20	286	
	Data Entry	11	102	
	Computer Spt Br	20	218	
	Programming	20	208	
	Operations	20	61	
	Clim Analysis Div	12	107 A	
	Applied Clim Br	10	103	
	Scientific Svcs	10	105	
	Tech Applications	10	101	
	Stat Clim Br	12	107	
	Info Svcs Div	M2	101	
	Spec Proj	M2	103	
	Word Proc	M2	105	
	Archival Svcs Br	M2	100 A	
	Manu & Auto Rec	M2	102	
	Filmed Records	M2	119	
	Publications	M2	133-A	
	User Svcs Br	M2	103	
	Reference Library	M2	112	
	Clim Svcs	M2	103	
	Tech Data	M2	111	
	Digital Products	M2	108	
	Sat Data Svcs Div			
	Data Svcs			
	Applications			
	GCB Air Wea Svcs	31	305	
	" " " "	22	265	
	Naval Wea Svc	32	304	
	GSA		77	

- ☐ FOR YOUR INFORMATION
- ☐ FOR YOUR APPROVAL (INITIAL)
- ☐ ACTION
- ☐ REPLY
- ☐ DISCARD
- ☐ PER YOUR REQUEST
- ☐ PER CONVERSATION
- ☐ PASS ON AS INDICATED
- ☐ SEE ME
- ☐ FILE
- ☐ SIGNATURE
- ☐ FOR COMMENT
- ☐
- ☐

REMARKS

Ward,

These tapes are NOT ACCEPTED!

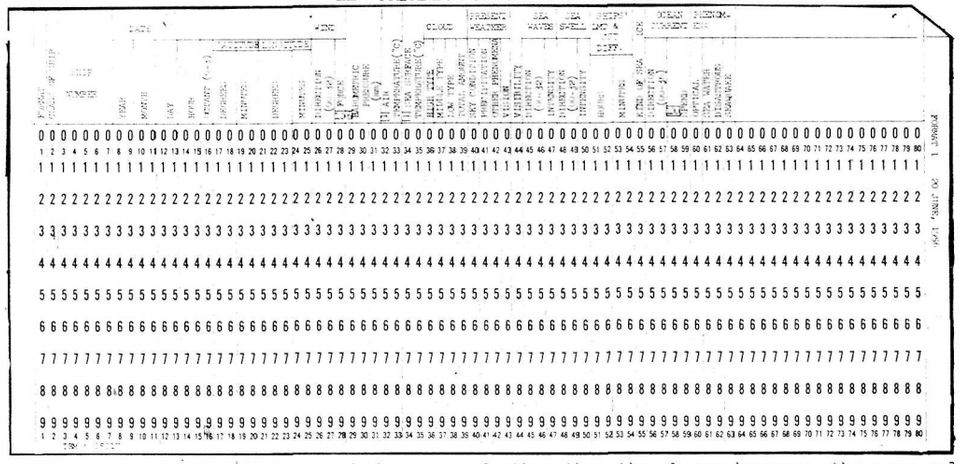
tape 1 appears OK
tape 2 indicates 31 days of data for June!
Since these tapes were created from the area sort I assume they are bad also. Pls ck & correct
12-3-80
Klmit

SFC MARINE OBS.

MAY-JUN 1973

Time Sort

118 JAPANESE MARINE SURFACE OBSERVATIONS



NOTE: Period 1939-1943 was punched on a card other than the above; however, the same columnar alignment as the above sample.

AREA COVERAGE

The ocean areas wherever Japanese Ships operated, except observations made at Ocean Weather Stations (OSV's) "X" and "T", and Japanese Antarctic Whaling Ships (see Deck 187 for the latter), and the Japanese Antarctic Research Ship "Soya" are not punched in this deck. A card inventory by ten degree squares are maintained at the National Weather Records Center (NWRC), Asheville, North Carolina.

PERIOD OF RECORD

Part of 1937 through part of 1953. (See Deck 119 for period beginning part of 1953-part of 1960. These data are punched on Format 2 and differ in codes and columnar alignment.)

OBSERVATION TIME

The hours 00, 12, 18, 24 Local Mean Time (LMT). (24 is midnight of day ending.) However, special observations were taken between these hours at the discretion of the observer.

The difference between Ship's LMT and Japanese Standard Time (JST) is punched in columns 51-54. JST is the 135 E. Meridian Time and is + 9 hours from GCT.

The ship's LMT was computed once daily as follows: The LMT of the ship changed continuously with the ship's movement. The time used on the ship's log for any given day, however, was the LMT for one of the meridians which the ship was reckoned to cross during that day. The particular meridian selected for the LMT was sometimes the mid-point of the reckoned meridional distance for that day and sometimes the meridian crossed at 00 GMT. The logs do not distinguish which of the methods were used.

CODE

The codes are in special Japanese codes. Any variations of the observation codes were converted prior to punching.

SOURCE

The cards in this deck were punched directly from the Japanese Ships' Logs by the Japanese Meteorological Agency for the U. S. Weather Bureau.

MISSING DATA

If an element(s) was missing within an observation the card columns for that element(s) were left blank. If an entire observation was missing, no identification card was punched.

COLUMNS AND ELEMENTS PUNCHED

Columns 1-64 were punched when data were available for the following elements: (Columns 65-80 are blank.)

Wind Direction and Beaufort Force
Pressure (corrected) in millimeters
Temperature of Air
Temperature of Sea
Cloud Type, High, Middle and Low
Total Cloud Amount
Present Weather
Visibility
Sea Direction and Height
Swell Direction and Height
Ice Description
Ocean Current Direction and Speed
Special Phenomena

ADDITIONAL REMARKS

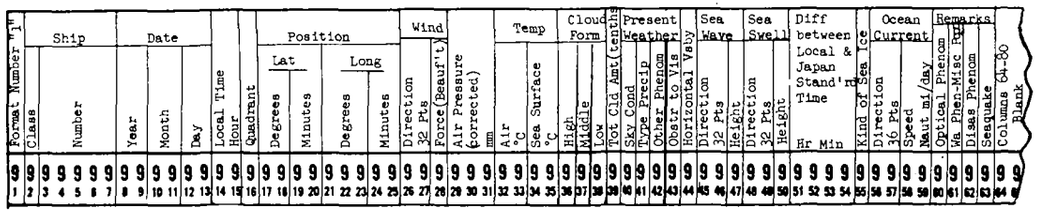
1. The approximate total number of cards in Deck 118, Format 1 is 812,000 cards.

2. It should be noted that Swell Height Codes were changed from 7 point code to a 9 point code in 1953 (Deck 118 Formats 1 to Deck 119 Format 2). The period 1947-1950 the swell was reported with the 9 point Douglas Scale.

3. Occasionally the ship's drift (current speed) was not recorded for a single day, but was included as the total drift on the last day of a two or more day period. When this was done, the total drift distance recorded was converted to a 24 hour period average.

CORRECTIONS

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



CARD CONTENT

Column	Item or Element	Symbolic Letter	Card Code	Card Code Definition	Remarks
1-63	All elements		Blank	Missing Data	Card columns left blank in columns 1-63 indicate missing data unless otherwise indicated in the respective codes. All elements were converted to the described codes and units before punching.
1	Format	S	1	Format Number for Deck 118	
2	Ship class	S	0-5	See Code 1.	
3-7	Ship Number	✓	00000-99999	Indicates ship's name	Arbitrarily assigned number for each ship stamped on the upper left side of record.
8-9	Year	CONV	37-53	1937-1953	
10-11	Month		01-12	January-December	
12-13	Day of Month		01-31		
14-15	Hour LMT		06, 12, 18, 24	JST -9 = GCT	See Page 1, Observation Time.
16	Quadrant	CONV	0-3,	See Code 2.	
17-20	Latitude				North and South indicated in column 16
17-18	Degrees		00-90	degrees and	
19-20	Minutes		00-59	minutes	
21-25	Longitude				East and West indicated in column 16.
21-23	Degrees		000-180	degrees and	
24-25	Minutes		00-59	minutes	
26-27	Wind Direction		00-32	See Code 3.	The 16 points of a 32 point compass is most frequently used.
28	Wind Force	F	0-9	Beaufort Force 0-9	
		CONV	X/0	Beaufort Force 10	
			X/1	Beaufort Force 11	
			X/2	Beaufort Force ≥ 12	Hurricane ≥ 73 m.p.h. or 64 knots
				See Code 4	At standard height 6m. above water
29-31	Barometric Sea Level Pressure (Corrected)	CONV	000-999	700.0 through 799.9mm in 1/10 millimeters	X-overpunch in column 29 indicates the hundreds position value is 6 rather than 7.
			X/000-X/999	600.0 through 699.9mm	

CARD CONTENT

Column	Item or Element	Symbolic Letter	Card Code	Card Code Definition	Remarks
32-33	Air Temperature	TT	00-99	0 through 99 °C	1/10 °C values are dropped and punched in whole °C.
		✓	X/01-X/99	-1 through -99 °C	X-overpunch in tens position equals minus (-) values.
34-35	Sea Surface Temperature		00-99	0 through 99 °C	1/10 °C values were dropped and punched in whole °C.
		✓	X/01-X/99	-1 through -99 °C	X-overpunch in tens position equals minus (-) values.
36-39	Clouds	?			
36	High Type	C_H	0-7	See Code 5.	
37	Middle Type	C_M	0-3	See Code 6.	
38	Low Type	C_L	0-9	See Code 7.	
39	Total Amount	CONV, S	0-9 X	0-9/10 sky covered 10/10, total sky covered or obscured	
40-43	Present Weather				
40	Sky Condition		Blank 0-5	See Code 8.	
41	Type of Precipitation		Blank 0-9 X/0-X/5	See Code 9.	
42	Other Phenomena		Blank 0-9, X	See Code 10.	
43	Obstruction to Vision		Blank 0-3	See Code 11.	
44	Visibility	recode	0-9	See Code 12.	Insert 9 in front of col 44 to code
45-46	Direction of Sea Waves	S	00-32, XX	See Code 3.	See Remarks Columns 26-27.
47	Sea Waves Height	S	0-9, X	See Code 13.	
48-49	Direction of Sea Swell		00-32	See Code 3.	See Remarks Columns 26-27.
50	Swell Height	K	0-7	See Code 14.	See page 1, Additional Remarks, paragraph 2.
51-54	Time Difference between ships and JST		00-21	Ship's time is 00-21 hours slow from JST	See page 1, Observation Time. X in column 51 and Blank in columns 52-54 indicate time difference missing assume JST
51-52	Hours		X0-X3 or 30-33	Ship's time is 0-3 hours fast from JST	
53-54	Minutes		00-59	00-59 Minutes ignore	
55	Kind of Ice	C_2	0-9, X	See Code 15.	Covers the preceeding 6 hours.
56-57	Current Direction	S	00-36	See Code 16.	Direction toward which ocean current is moving Normally reported once daily on the 1200 LMT.

CARD CONTENT

Column	Item or Element	Symbolic Letter	Card Code	Card Code Definition	Remarks
58-59	Current Speed		00 01-99 X/00-X/99	No current 1-99 miles per day 100-199 miles X-overpunch in column 58.	Ship's drift in nautical miles in past 24 hours. Normally punched on the 1200 LMT observation card only. See page 1, Additional Remarks.
60-63	Special Phenomena	S			(a) Covers the past 6 hours. (b) Blank when none occurred. (c) The highest code is given priority when two or more conditions occur in each category
60	Optical Phenomena		1-8	See Code 17.	
61	Sea Water Phenomena or Lithometers		1-9	See Code 18.	
62	Disastrous Phenomena		1-5	See Code 19.	
63	Seaquake		1-9, X	See Code 20.	
64			X	Indicates 65-80 are blank	
65-80	Blank		Blank	Not used	These columns are always blank.

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 for each element.

The codes elaborated to this end, as far as they are in world-wide use, have been adopted by the World Meteorological Organization (WMO) and 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 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

Ships Class

Code	Description
0	Weather Ship
1	University Scientific Expedition Ship
2	Maritime Ship of Government Agency
3	Naval ship
4	Privately owned Merchant or Cargo Ship
5	Privately owned Fishing Boat

Code 2

Quadrant

Code	Description
0	N Latitude and W Longitude
1	N Latitude and E Longitude
2	S Latitude and W Longitude
3	S Latitude and E Longitude

Code 3

dd - Wind Direction

Code	Limits in Whole Degrees 32 Points	Limits in Whole Degrees 16 of 32 Points	Direction	
00	Calm		C	(1)
01	06-16		N/E	(-)
02	17-26	12-33	NNE	
03	29-39		NE/N	(1)
04	40-50	35-56	NE	
05	51-61		NE/E	
06	62-73	57-78	ENE	
07	74-84		E/N	
08	85-95	79-101	E	(2)
09	96-106		E/S	
10	107-118	102-123	ESE	
11	119-129		SE/E	
12	130-140	124-146	SE	(3)
13	141-151		SE/S	
14	152-163	147-168	SSE	
15	164-174		S/E	
16	175-185	169-191	S	(-)
17	186-196		S/W	
18	197-208	192-213	SSW	
19	209-219		SW/S	
20	220-230	214-236	SW	(5)
21	231-241		SW/W	
22	242-253	237-258	WSW	
23	254-264		W/S	
24	265-275	259-281	W	(-)
25	276-286		W/N	
26	287-298	282-303	WNW	
27	299-309		NW/W	
28	310-320	304-326	NW	(7)
29	321-331		NW/N	
30	332-343	327-348	NNW	
31	344-354		N/W	
32	355-005	349-011	N	(-)
XX	Variable or Confused			

Even values of code are used when coding 16 points of 32 point compass which was most frequently used.

/ = by

Value in parenthesis indicates grouping of code between lines are 5 point reduction.

Code 4

F - Force of Surface Wind
BEAUFORT SCALE OF WIND

Beaufort Number	Descriptive Term	Velocity equivalent at a standard height of 6 meters above Sea: Mean Velocity in Knots	Meters/Sec.	km/h	m.p.h.
0	Calm	<1	0-0.2	<1	<1
1	Light Air	1-3	0.3-1.5	1-5	1-3
2	Light Breeze	4-6	1.6-3.3	6-11	4-7
3	Gentle Breeze	7-10	3.4-5.4	12-19	8-12
4	Moderate Breeze	11-16	5.5-7.9	20-28	13-18
5	Fresh Breeze	17-21	8.0-10.7	29-38	19-24
6	Strong Breeze	22-27	10.8-13.8	39-49	25-31
7	Near Gale	28-33	13.9-17.1	50-61	32-38
8	Gale	34-40	17.2-20.7	62-74	39-46
9	Strong Gale	41-47	20.8-24.4	75-88	47-54
10	Storm	48-55	24.5-28.4	89-102	55-63
11	Violent Storm	56-63	28.5-32.6	103-117	64-72
12	Hurricane	64-	32.7-	118-	73-

Code 5

C_H - Type of High Cloud

Code	Symbol	Description
0		No High Clouds
1	CK	Cirrocumulus
2	C	Cirrus
3	CS	Cirrostratus
4	C & CK	Cirrus & Cirrocumulus
5	C & CS	Cirrus & Cirrostratus
6	CK & CS	Cirrocumulus & Cirrostratus
7	CK & CS & C	Cirrocumulus & Cirrostratus & Cirrus

Code 6

C_M - Type of Middle Cloud

Code	Symbol	Description
0		No Middle Clouds
1	SC	Altostratus
2	KC	Altocumulus
3	KC & SC	Altocumulus & Altostratus

Code 7

C_L Type of Low Cloud

Code	Symbol	Description
0		No low clouds
1	KN&N or S	Cumulonimbus & Nimbus or Stratus
2	KN & SK	Cumulonimbus & Stratocumulus
3	KN	Cumulonimbus
4	S.FS	Stratus, Fractostratus
5	N.NS	Nimbus, Nimbostratus
6	K.FK	Cumulus, Fractocumulus
7	K&SK	Cumulus & Stratocumulus
8	SK	Stratocumulus
9	F or ≡	Fog

When two or more low clouds were reported that could not be described by the above code, the lowest code (not "0") was given preference.

between clouds indicate and/or

Code 8 ✓

Total Sky Cover

Code Figure	Symbol	Description	Coverage
0	b	Blue sky	0 to ≤ 3/10
1	bc	Partly cloudy	4/10-7/10
2	c	Cloudy	8/10
3	K or CK	High overcast with high clouds predoninating	8/10-10/10
4	O or OC	Low Overcast	8/10-10/10
5	KO	High overcast with low overcast	8/10-10/10
Blank		Sky obscured or missing obscured sky indicated by column 39 as an X.	

Code 9 ✓

Type of Precipitation

Code	Symbol	Description
0	d	drizzle
1	d & r	drizzle and rain
2	d & p	drizzle and passing showers
3	d & s	drizzle and snow
4	r	rain
5	r & p	rain and passing showers
6	r & s	rain and snow
7	p	passing showers
8	p & s	passing showers and snow
9	s	snow
		X/ indicates X-overpunch of digit indicated
X/0	rs	sleet (ice, rain, snow together)
X/1	h	hail
X/2	h & d	hail and drizzle
X/3	h & r	hail and rain
X/4	h & p	hail and passing showers
X/5	h & s	hail and snow
Blank		No precipitation occurring at time of observation

Note: When 3 or more types of precipitation were recorded 2 combined types were punched in the order of preference: 1. Hail, 2. Sleet, 3. Snow, 4. Rain, 5. Showers, 6. Drizzle.

Code 10 ✓

other phenomena

Code	Symbol	Description
0	w	Dew
1	x	Hoarfrost
2	g	Gloomy Weather Sky covered by Low Clouds Rain seems to be falling, but showers or storm are absent
3	e	Wet without Rain Atmosphere feels wet or moist. Dew may be observed on cool surfaces
4	u	Ugly Weather Tendency to storm - sky covered by fast moving clouds and rain or strong winds are expected momentarily
5	q	Squalls
6	l	Lightning
7	t	Thunder
8	t & l	Thunder and Lightning
9	q & l	Squall with lightning or
	q & t	Squall with Thunder
X	q & t & l	Squall with Thunder & Lightning
Blank		None of the above phenomena observed.

Code 11 ✓

Obstructions to Vision

Code	Symbol	Description
0	v	Unusual Visibility Object visible at 750 km.
1	z	Haze
2	m	Mist
3	F	Fog
Blank		None of the above

Note: Precipitation is not coded as an obstruction to vision.

Code 12

V - Horizontal visibility

Code Figure	Km.	Yards (Approx.)	Statute Miles (Approx.)	Nautical Miles (Approx.)
0	<0.05	<55	<1/32	
1	0.05	55	1/32	
2	0.2	220	1/8	
3	0.5	550	5/16	1/4
4	1	1,100	5/8	1/2
5	2	2,200	1 1/4	1
6	4	4,400	2 1/2	2
7	10	11,000	6 1/4	5
8	20	22,000	12 1/2	10
9	≥ 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 13

S - Sea Waves Heights

Code	Description	Height Feet	Height Meters
0	Calm	0	0
1	Very Smooth	< 1	0.3
2	Smooth	1-2	0.3-0.6
3	Slight	2-3	0.6-1.0
4	Moderate	3-5	1.0-1.5
5	Rather Rough	5-8	1.5-2.5
6	Rough	8-12	2.5-4.0
7	High	12-20	4.0-7.0
8	Very High	20-40	7.0-13
9	Phenomenal	> 40	> 13
X	Variable or Confused		

Note: When the height is the exact value for two codes the lower code was punched

Code 14

K - Swell Heights

Code	Description	Height Approx. Feet	Height Meters
0	No Swell	0	0
1	Slight	< 1-1	0.1-0.4
2	Moderate	2-4	0.5-1.4
3	Rather Rough	5-8	1.5-2.4
4	Rough	9-12	2.5-3.9
5	Heavy	13-17	4.0-5.4
6	Very Heavy	18-22	5.5-6.9
7	Abnormal	≥ 23	≥ 7.0

Code 15

C_2 - Type of Ice

Code	Description
0	No sea ice
1	New Ice
2	Fast Ice
3	Drift Ice
4	Ice field
5	Packed (Compact) Slush or strips of hummocked Ice
6	Open lead near shore
7	Heavy Fast Ice
8	Heavy Drift Ice
9	Hummocked Ice
X	Ice Jamming

When two or more Ice codes were reported the highest code figure was punched.

Code 16

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°		

Code 17

SpSp - Special Phenomena

Columns 60-63 - (Blank means none occurred.) The highest code figure was punched covering the previous 6 hours for each category when 2 or more kinds of phenomena were reported in one category.

Code	Description
1	Afterglow
2	Morningglow
3	Halo
4	Corona
5	Abnormal Refraction
6	Mirage
7	St Elmo's Fire
8	Aurora

The highest code was punched when two or more types of optical phenomena were reported.

Code 18

Sea Water Phenomena or Lithometers

Column 61

Code	Description
1	Discolored Water
2	Rip Tide
3 — —	Abnormal Tide
4 — —	Rip Current
5	Dust Fall
6 — —	Fall of Volcanic Ash
7	Pumice
8	Marine Volcano
9	Graupel

Code 19

Disastrous Phenomena - Column 62

Code	Description
1	High Water
2	Squall
3	Tidal Wave
4	Eye of Storm
5	Water Spout

Code 20

Seaquake (Kaishin) - Rudolph Scaler Quantity

Column 63

Code	Description	Remarks
1	Weak Sound	Cannot be felt on deck
2	Felt	Man awakened from sleep
3	Very Slight	Felt as if a heavy mass were dropped on deck
4	Slight	Slight shock felt as if a heavy anchor was dropped rapidly
5	Moderate	Shock felt as if the ship ran upon a coral reef or sand bar
6	Rather Strong	Cups, glasses, etc. are vibrated
7	Strong	Unable to stand on deck
8	Very Strong	Furniture, mast, etc. are trembled, compass, thermometers may be broken
9	Disastrous	Ship is pushed to one side and cannot be navigated
X	Very Disastrous	Men on deck are brought down, heavy objects are thrown upward, ship may be broken

U.S. DEPARTMENT OF COMMERCE
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
ENVIRONMENTAL DATA SERVICE
NATIONAL WEATHER RECORDS CENTER

Layout Form — 80 Column Card

MERCHANT MARINE DATA BEGINNING MAY 1973

JOB # 15328128

HDR MAROBS

Card column(s)	Group	Field	Code / notes
1		Temp. Indicator	
2–5		Call Letters	
6–7		Month	
8–9		Year	
10–12	POSITION	Lat.	$L_aL_aL_a$
13	POSITION	Quadrant	Qc
14–17	POSITION	Long.	$L_oL_oL_oL_o$
18–19		Day	
20–21		Hour	
22		Wind Indicator	iw
23		Total Cloud Amt.	N
24–25	WIND	Direction	dd
26–27	WIND	Speed	ff
28–29		Visibility	VV
30–31		Present Weather	ww
32		Past Weather	W
33–37		Sea - Level Pressure	09 or 10 PPP
38–41		Dry Bulb	+ = 0 - = X
42–45		Wet Bulb	+ = 0 - = X
46		Ice on Wet Bulb (punch X when reptd)	
47	CLOUDS	Amount of Low Clouds	Nh
48	CLOUDS	Type of Low Cloud	CL
49	CLOUDS	Ht. of Lowest Cloud	h
50	CLOUDS	Type of Middle Cloud	Cm
51	CLOUDS	Type of High Cloud	CH
52		Indicator	
53		Ships Course	Ds
54		Ships Speed	Vs
55		Character of Change	a
56–58		Amt. of Pressure Change	pp; 0, 1 or 2
59–61		Sea Temp.	+ = 0 - = X
62			
63–64	WAVES – Wind	Period	PwPw
65–66	WAVES – Wind	Height	HwHw
67–68	WAVES – Swell	Direction	dwdw
69	WAVES – Swell	Period	Pw
70–71	WAVES – Swell	Height	HwHw
72		°C or °F	Blank = °C X = °F
73			Bucket = X Intake = [illegible]
74–80			

Instructions for Selection and Punching of High Wind Speeds Aloft

A. Criteria for Selection of Layers to be Punched:

1. The cards will be prepared only at rawin stations, for both rawins and pibal soundings.

2. Cards should not be punched for those observations that do not indicate a wind speed of at least 45 mps (about 100 mph).

3. When a wind speed $\geq$ 45 mps is indicated for any portion of a sounding, data should be punched to describe the layer of high speed winds as follows: (a) height of the base of the layer, i.e., the height at which the wind first reached a speed of 45 mps, (b) the height of the maximum wind speed of the layer, and its direction and speed, (c) the height of the top of the layer, i.e., the height at which the wind decreased below 45 mps, or if the sounding ends before this happens, the maximum height reached. Heights should be punched in meters above mean sea-level.

4. When more than 1 layer of wind $\geq$ 45 mps occur during a sounding, data should be punched for each layer.

5. When punching data for a layer of winds $\geq$ 45 mps, fluctuations of 2 mps or less below 45 mps should not be considered. Example: Winds of 45 mps increasing with height to 80 mps, decreasing to 43 mps, and increasing again to 70 mps, would be considered as a single layer. Were the 43 mps wind (foregoing sentence) 42 mps, 2 layers would be indicated.

B. Instructions for Card Punching:

1. Station No., Yr., Mo. (Cols. 1-9) Do not punch these columns at land observing stations. Ocean station vessels will punch QLaLa $l_o l_o$ in Columns 1-5.

2. Day (Cols. 10-11), Hour (Cols. 12, 13). Punch the day of month and hour of the actual time of release (G.C.T.), as on the WBAN #4 Card. SCHEDULED

3. Card No. (Cols. 14, 15). Keep a log of the number of "Maximum Wind Layer" cards punched each calendar month in order to assign a number to each card. The first card punched in a calendar month will be numbered "01"; the second card punched in the same month will be numbered "02"; and so on, assigning the next consecutive number to each card until a new month is begin. Punch "X" in

Col. 15 of the final Maximum Wind Layer Card for the month. If the critical velocity is not reached during a month punch one card at the close of the month punching 00 as card number with an "X" overpunch in column 15. All other columns will be left blank.

4. Type of Equipment (Col. 16). Punch in the same code as used in punching "Type of Equipment" on the WBAN No. 4 card.

5. 1st Layer (Cols. 17-36)

   a. Height of Base (Cols. 17-21). Punch the lowest height in meters at which the wind first reached a speed of 45 mps.

   b. Fastest Wind (Cols. 22-31). In Columns 22-26, punch the height in meters at which the fastest wind occurs for the layer. Punch the direction of the fastest wind to whole degrees, in columns 27-29. Punch the speed of the fastest wind in meters per second, in columns 30-31. If the wind speed is 100 mps or more, punch "X" in column 30, and the excess over 100 mps in Columns 30 and 31 in the usual fashion.

   c. Height of Top (Columns 32-36). Punch the height of the top of the layer in meters. If the top of this layer is also the top of the sounding also punch an "X" in column 36.

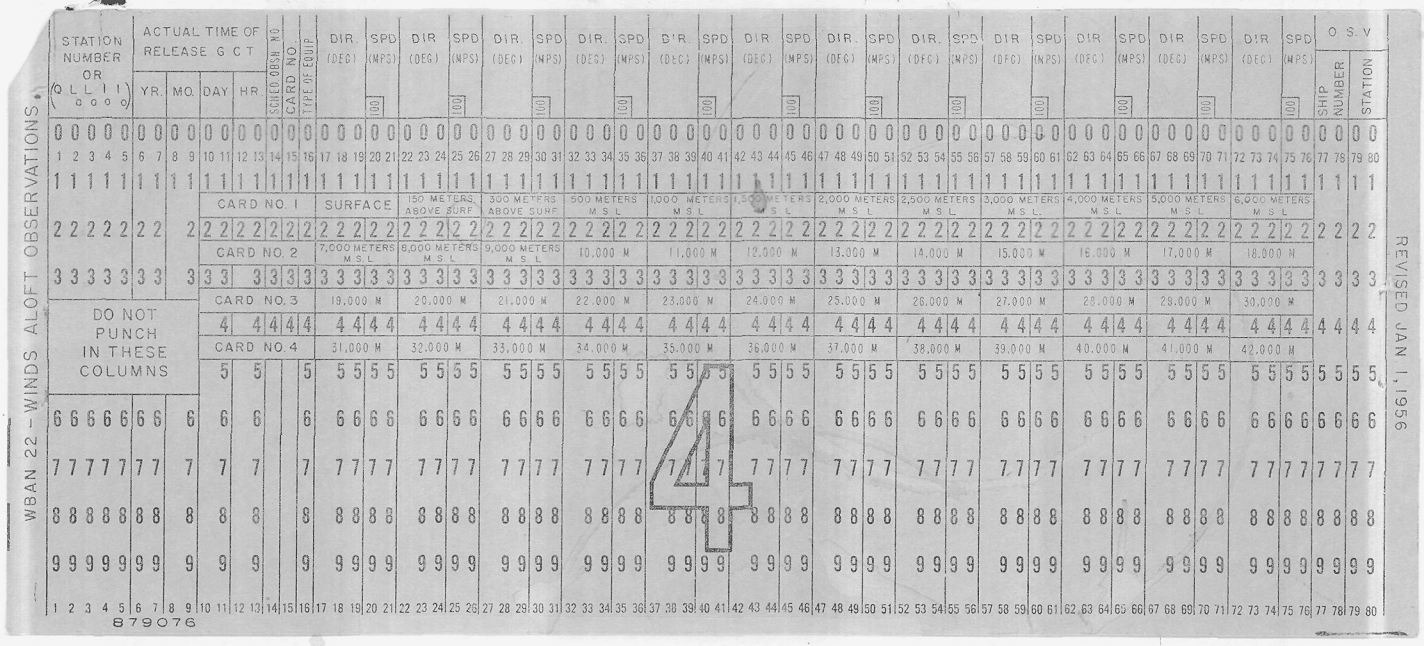
6. 2nd or 3rd Layers (Cols. 37-76). If more than one layer is selected for punching from one sounding, punch the second (next higher) layer in card columns 37-56, and the third layer, if present, in card columns 57-76, in accordance with the instructions above for punching data for the first layer.

   If more than three layers are selected for one sounding, punch a second card for the sounding, carrying the next consecutive card number and the data for the layers above the 3rd layer.

7. O.S.V. (Card Cols. 77-80). Land stations will not punch in these columns. Ocean Station Vessels will punch Ship No. and Station, as on the WBAN No. 4 card.

C. Disposition of Cards. The "Maximum Wind Layer" cards are to be kept with the WBAN No. 4 cards, and sent to the NWRC at Asheville, N. C., in the same shipment with, and for the same period as the WBAN No. 4 Winds Aloft Cards.

PIBAL 1956 -



Columns	Description
1 - 5	A five-digit WBAN number to designate land stations. Octant, latitude, and longitude (QLL11) are punched in columns 1-5 for ship positions. For octant.

N			S		
0° - 90°	W	0	0° - 90°	W	5
90° - 180°	W	1	90° - 180°	W	6
180° - 90°	E	2	180° - 90°	E	7
90° - 0°	E	3	90° - 0°	E	8

To find octant: If latitude is N, use North table. If latitude is S, use South table and find position which corresponds to longitude. This will give correct octant. Example:

Latitude	Longitude	Punch Position
38° 07'N	13° 26'E	33813
76° 00'N	162° 00'W	17662

The latitude and longitude are recorded in whole degrees and minutes, but will be punched in whole degrees, rounding off minutes if 30 or more. If the longitude is 100 degrees or more, the "1" is omitted.

Ship from July 1, do not round off Lat & Lon.

Punch Only on Station do not Punch on Ships

Columns	Description
1 - 5	Example:

Latitude	Longitude	Punch Cols. 1-5
38° 07'N	13° 26'E	33813
76° 20'N	162° 00'W	17662
84° 05'N	47° 30'W	08448
76° 00'N	162° 00'W	17662

6 - 7 Year. Punch last 2 numbers.
1960 = 60
1962 = 62

8 - 9 Month. January - December
01 - 12

10 - 11 Day. 01 - 31

12 - 13 Hour. Although these columns are headed actual time, the scheduled observational times of 0000, 0600, 1200, and 1800 GCT hours will be used. If any schedule hour is off more than 1½ hours (either side), punch actual time. ~~If marked special, use actual time.~~

Detached

2330 = 00 on following day
0130 = 00
0530 = 06
1100 = 12
1300 = 12
1730 = 18

14 Scheduled observation number.
Punch according to the nearest scheduled time (GCT) of the observation, using the following table:

00 = 1
06 = 2
12 = 3
18 = 4
Specials = 5

15 Card Number. Indicate the levels to be punched on a card as follows:

Card	
1	Surface thru 6,000 m.
2	7,000 thru 18,000 m.
3	19,000 thru 30,000 m.
4	31,000 thru 42,000 m.

Columns	Description
16	Type of Equipment. The appropriate code number as given in the following table will be punched in each card containing winds aloft data to indicate the method or type of equipment used in obtaining the upper wind data: 0 = Single theodolite 1 = Double theodolite 2 = Rabal single theodolite 3 = SCR-268 and SCR-525 4 = SCR-584 and SCR-545 5 = SCR-615 6 = SCR-658 7 = SA-2 Radar 8 = GMD-1 or GMD-1A, and WBRT-57 9 = Other
17-76	Codes for wind direction and speed are the same for surface and all levels reported. A five column group is designated for every level, the first 3 columns being used for the direction and the other two for the speed. Column numbers and levels are listed in the following table:

Card 1		Card 2		Card 3		Card 4	
Level	Columns	Level	Columns	Level	Columns	Level	Columns
Sfc.	17-21	7,000	17-21	19,000	17-21	31,000	17-21
150	22-26	8,000	22-26	20,000	22-26	32,000	22-26
300	27-31	9,000	27-31	21,000	27-31	33,000	27-31
500	32-36	10,000	32-36	22,000	32-36	34,000	32-36
1,000	37-41	11,000	37-41	23,000	37-41	35,000	37-41
1,500	42-46	12,000	42-46	24,000	42-46	36,000	42-46
2,000	47-51	13,000	47-51	25,000	47-51	37,000	47-51
2,500	52-56	14,000	52-56	26,000	52-56	38,000	52-56
3,000	57-61	15,000	57-61	27,000	57-61	39,000	57-61
4,000	62-66	16,000	62-66	28,000	62-66	40,000	62-66
5,000	67-71	17,000	67-71	29,000	67-71	41,000	67-71
6,000	72-76	18,000	72-76	30,000	72-76	42,000	72-76

Direction will be punched to the nearest whole degree using 360 for North. Direction can be 000-360. Direction can be 000-360. Calm will be five zeroes. Speeds will be punched to the nearest meter per second. For speeds of 100 m.p.s. or more, X overpunch the left-hand column of the speed field, punching the excess over 100 m.p.s. in the normal manner.

If any level is missing, leave blank.

Columns	Description

17-76

Example:

Direction	Speed		Direction	Speed
0	0	Punch	000	00
249	3		249	03
300	10		300	10
81	12		081	12
08	20		008	20
146	110		146	X/10
132	100		132	X/00

77-80

For Ocean Vessel Stations.
Cols. 77-78 designated for ship number.
Cols. 79-80 designated for station number.
The following are Ocean Weather Stations received and their station number.

Atlantic	B	02
Atlantic	C	03
Atlantic	D	04
Atlantic	E	05
Pacific	N	24
Pacific	V	25

Each Ocean Weather Vessel is to work within a certain radius and when outside that radius, the station number will be reported as 00.
The ship number will be written on front of form and will remain the same on or off station except when an "on station" ID card is punched. The ship number will be punched "00".

For Navy ship number.
Will always begin with X.
Example: X009 punch X009
X311 punch X311

Moving Ships.
Punch ship number in cols. 77-78 and zeroes in cols. 79 and 80.

Leave blank for land stations.

I.D. cards will be made for missing hours for all stations except Navy Ships that begin with X, punching columns 1 thru 15.

If Station I D Cards should be Corrected on Station for Latt & Long.

Check for 128 Job

Never a Numeric 1 or 0

INTERNATIONAL MARINE CARD (DECK 128)

JOB NO. 15328

Effective with May 1973 Data

COLUMN	ELEMENT	
1	Temperature Indicator	Temperature indicators 1 and 3 only will be used. 1 °C and tenths 3 Whole °C If temperatures are reported in °F, punch 3 in column 1 and X in column 72.
2-5	Call Letters or Numeric	Most will be 4 alpha letters. If call sign has more than 4 characters use the last four. Example: ABCD = ABCD WICO = WICO WYZ2801 = 2801 5MOC = 5MOC
6-7	Month	01 - 12 January - December
8-9	Year	Last 2 digits of year.
10-12	Latitude ($L_aL_aL_a$)	Degrees and tenths.
13	Quadrant (Q_c)	Code / Longitude 1 0.0° E - 180.0° E North 3 0.0° E - 180.0° E South 5 0.0° W - 180.0° W South 7 0.0° W - 180.0° W North
14-17	Longitude ($L_oL_oL_oL_o$)	Degrees and tenths. prefix zero if necessary. Example: 0169 = 0169 1123 = 1123
18-19	Day (YY)	Day of the month 01 - 31
20-21	Hour (GG)	Punch all Hours as reported
22	Wind Indicator (i_w)	36 points Estimated Knots (3 on form) punch 0 Measured Knots (4 on form) punch 6 If "1" is reported punch as measured = 6
23	Total Cloud Amount (N)	0, 1 - 9
24-25	Wind Direction (dd)	Tens of degrees 00 - 36 Type of Wind Data is indicated by the Code keyed in Col. 22.

Check Col 73 - X if Bucket

COLUMN	ELEMENT	
26-27	Wind Speed (ff)	Knots X overpunch column 26 for speeds 100 or more. Example: 100 = 00 (X), 102 = 02 (X), 122 = 22
28-29	Visibility (VV)	90 - 99
30-31	Present Weather (ww)	00 - 99
32	Past Weather (W)	0, 1 - 9
33-37	Sea Level Pressure (PPP)	Millibars and tenths (cols 14 & 15 on Form) If entered in 3 digits, prefix 09 if first digit is 9, 8, 7. Prefix 10 if first digit is 0,1,2 or 3. Ask Supervisor if first digit is 4,5 or 6
38-41	Dry Bulb (TT) If tenths position is Mez - Punch a zero - Check col 33 or form first.	Indicator marked on top of each sheet. When using indicator 1, key from cols. 16 and 17 on form. Col. 16 will be whole degrees, and col. 17 or 33 will be tenths In col. 38, key 0 for plus temperature and numeric X for minus temperature. Indicator 3 at top of sheet indicates all temperatures are whole degrees and tenths will be 0. In col. 38, key 0 for plus and X for minus temperatures.
42-45	Wet Bulb	°C and tenths. Key from col. 18 on form. same instructions as dry bulb.
46	Ice on Wet Bulb	Key numeric X if reported. not likely to happen on merchant ships.
(47-51)	Clouds ($N_h C_L h C_M C_H$)	
47	Amount of Lowest Cloud (N_h)	0, 1 - 9
48	Type of Low Clouds (C_L)	0, 1 - 9 Leave blank when X is reported.
49	Height of Low or Middle Cloud (h)	0, 1 - 9 Leave blank when X is reported.
50	Type of Middle Cloud (C_M)	0, 1 - 9 Leave blank when X is reported.
51	Type of High Cloud (C_H)	0, 1 - 9 Leave blank when X is reported.

COLUMN	ELEMENT	
(52-58)	$6D_sV_s$app	For Merchant Ships, Forms 72-1 (615-5) the $6D_sV_s$app group will be punched. If this group is not reported, cols. 52 - 58 will be left blank
52	Indicator	Key 6
53	Ships Course (D_s)	0, 1 - 9
54	Ships Speed (V_s)	0, 1 - 9
55	Character of Change (a)	
56-58	Amount of Pressure Change (ppp)	Mbs. and tenths. Prefix zero unless 10 mbs. or more. Example: 0.3 = 003 || 3 tenths mb. 1.1 = 011 || 1 and 1 tenth mb. 0.9 = 009 || 9 tenths mb. 10.4 = 104 || 10 mbs. & 4 tenths 19.9 = 199 || 19 mbs. & 9 tenths 20.0 = 200 || 20 mbs. & 0 tenths
59-62	Sea Temperature ($T_wT_wT_w$)	°C and tenths. If reported in whole degrees key terminal 0 in column 62. If plus temperature prefix a zero. If minus temperature prefix a numeric X. Example: 09.5 = 0095 11.1 = 0111 -0.2 = X002
(63-66)	Wind Waves (P_wP_w) (H_wH_w)	
63-64	Period of Sea Waves (P_wP_w)	Punch reported 2 figures. (Seconds) 99 punch 99 // leave blank 49 punch 49 Calm punch 00
65-66	Height of Sea Waves (H_wH_w)	Punch reported 2 figures. (Half-meters) Leave blank when X is reported. Calm punch 00
(67-71)	Swell Waves (d_wd_w) (P_w) (H_wH_w)	
67-68	Direction of Swell Waves (d_wd_w)	Tens of degrees 00 - 36, 99 99 punch 99 // leave blank
69	Period of Swell Waves (P_w)	Punch coded figure in column 58. X punched X / (slant) punched X

COLUMN	ELEMENT	
70-71	Height of Swell Waves (H_wH_w)	Punch reported 2 figures. (Half-meters) Leave blank when X is reported. If 2 Swell Wave groups are reported, punch the group with the highest height. If heights are the same, punch group with the lowest period. Examples: Calm punch 00X00 Confused 07 punch 99sp07 CONFUSED 207 punch 99207
72		Punch X for °F temperature. °C leave blank.
73-~~80~~ Bucket = X, Intake = sp } Sea Temp		~~Leave Blank~~
74-80		Blank

In Verifing Punch P1 in Beginning of a field to Continues