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COMMISSION

WORLD METEOROLOGICAL
ORGANIZATION

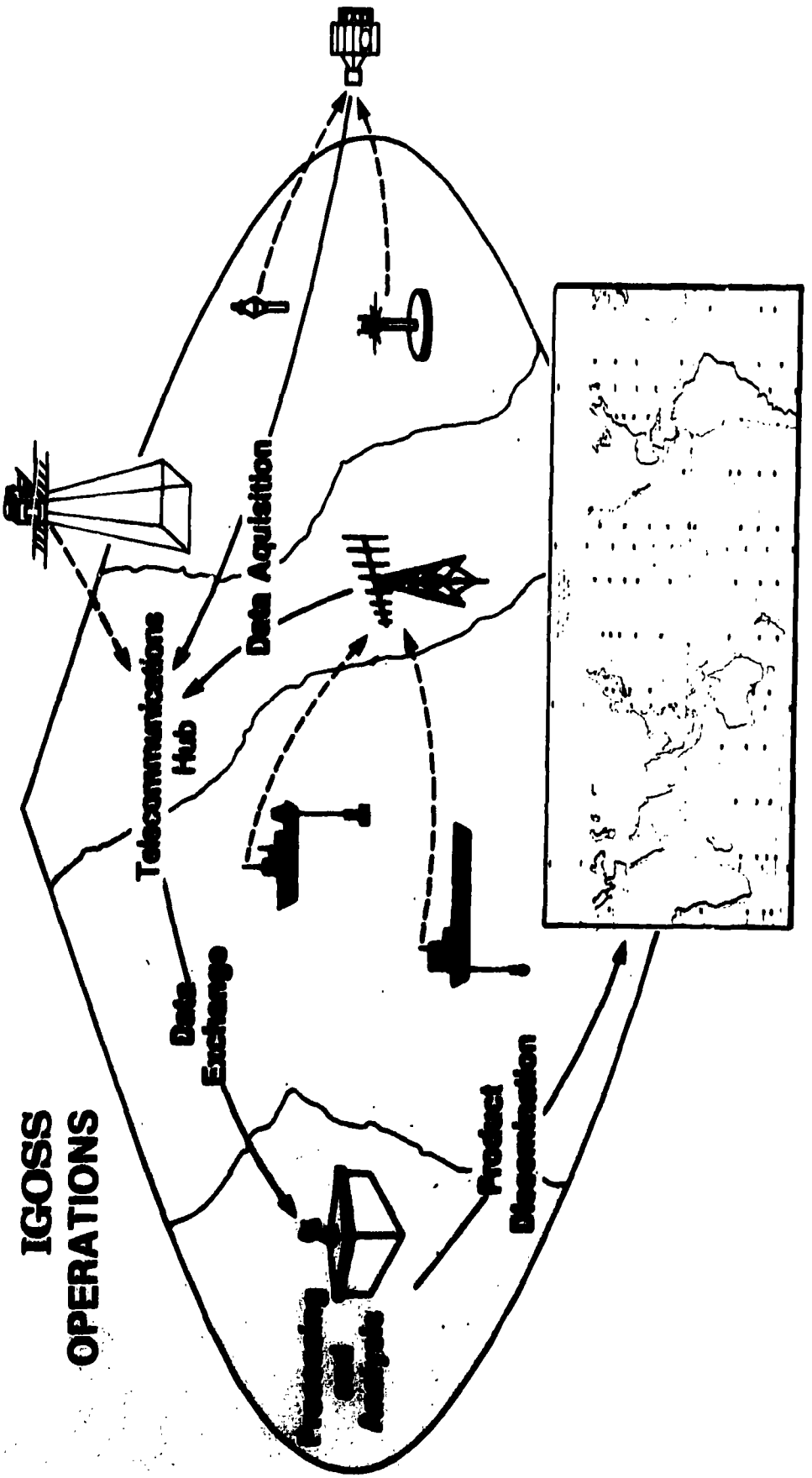
INTEGRATED GLOBAL OCEAN STATION SYSTEM (IGOSS)

GUIDE ON OPERATIONAL INSTRUCTIONS FOR THE REPORTING OF OCEANOGRAPHIC DATA (BATHY AND TESAC)

D R A F T

SC-80/WS/1

Unesco, October 1979


IGOSS
OPERATIONS
Data Acquisition
Telecommunications
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INTEGRATED GLOBAL OCEAN STATION SYSTEM (IGOSS)

Guide on operational instructions for the reporting of oceanographic data (BATHY and TESAC)

1. INTRODUCTION

1.1 The Integrated Global Ocean Station System (IGOSS) is a joint IOC/WMO programme for the provision of world-wide information on the state of the ocean. The purpose of IGOSS is to promote, develop and co-ordinate the international co-operation necessary for the timely global acquisition and exchange of ocean data, and the dissemination of oceanographic products for governmental, commercial and private interests.

1.2 The Intergovernmental Oceanographic Commission (IOC) and the World Meteorological Organization (WMO) are co-operating in the implementation of the IGOSS programme. The operation of this programme depends heavily on the facilities of the Global Telecommunication System (GTS) of the World Weather Watch (WWW) of the WMO and on the full support of all WMO and IOC Member States.

1.3 This guide describes the operational procedures for that part of the IGOSS programme directed towards the real- and non-real-time reporting of ocean temperature, salinity and current data using BATHY and TESAC logs. It is important to note that oceanographic data reported in BATHY and TESAC logs are exchanged internationally, and are also used by participating nations to prepare oceanographic products. This process is illustrated in the frontispiece.

2. PURPOSE

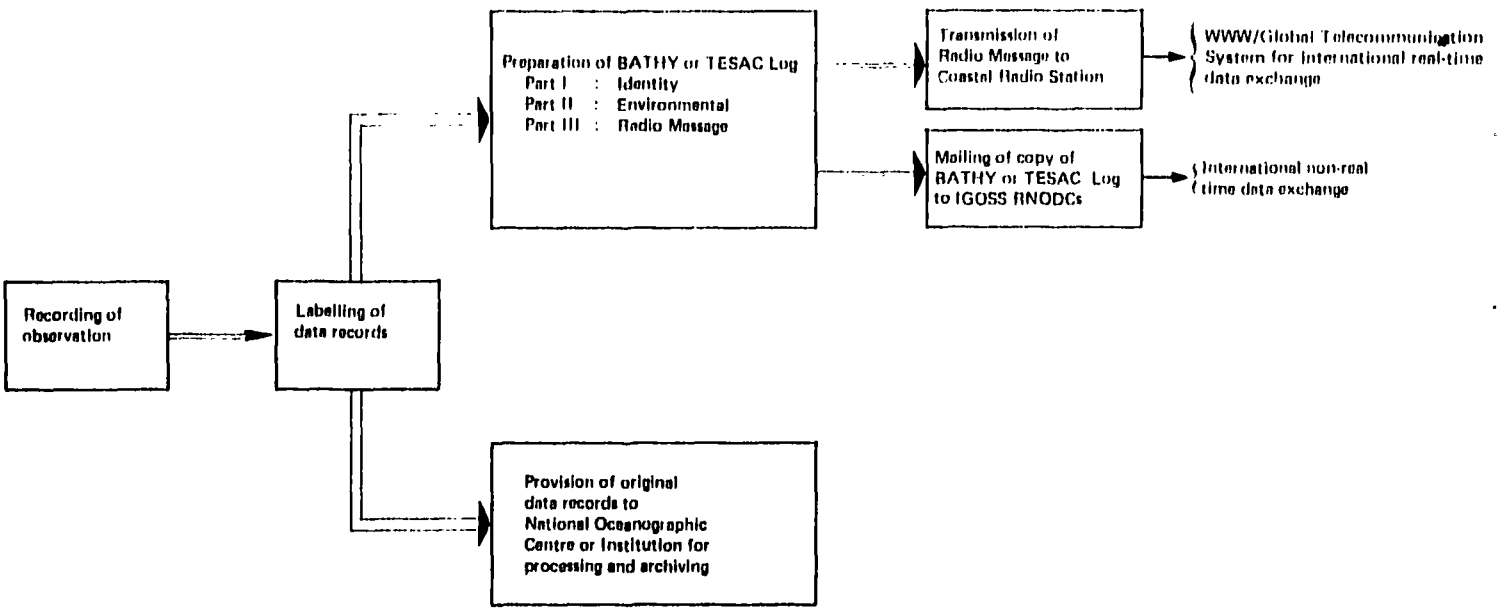
2.1 The purpose of this guide is to provide complete instructions to the reporting of data via the IGOSS BATHY/TESAC Operational Programme. This guide can be used when preparing national instructions for reporting oceanographic data. Also, if the manual satisfies national needs, it can be used directly as a working manual aboard ship.

2.2 Although a few copies of the BATHY and TESAC code forms are available upon request from the Secretariats of WMO and IOC, sufficient copies of these forms for use on ships must be obtained nationally from the National Co-ordinator for the IGOSS BATHY/TESAC Operational Programme as listed in Annex V, or the local Port Meteorological Officer (see section 3.2 herein).

3. DATA REPORTING PROCEDURE: OVERVIEW

3.1 Figure I shows the overall scheme within the IGOSS programme for reporting oceanographic data using BATHY and TESAC log forms. The following sections will discuss briefly the Observation procedures, Data recording procedures, and the Real-time and Non-real-time data reporting procedures.

Figure 1 — Overview of procedure used within the IGOSS programme for reporting oceanographic data (BATHY and TESAC)



3.2 Although the complete procedure for reporting data using BATHY and TESAC code forms is provided herein, many Meteorological Services have appointed Port Meteorological Officers (PMO) who can further assist voluntary observing ships by:

(i) Maintaining personal periodic contact with master, deck and radio officers; and

(ii) Providing necessary forms (log-books, etc.) for recording and transmission of observations.

It is, therefore, recommended that the advice and assistance of the Meteorological Service and PMOs appointed by it be sought by personnel on ships of opportunity.

3.3 Participants in the IGOSS BATHY/TESAC Operational Programme are further reminded that National Co-ordinators for this programme are listed in Annex V. These National Co-ordinators will offer assistance and guidance on all aspects of the programme.

4. OBSERVATION PROCEDURES

The preferred times for BATHY and TESAC observations are the following: 0000, 0600, 1200 and 1800 GMT. However, data taken at any time are useful and should be transmitted. For special areas of interest and programmes, BATHY and TESAC may be required and reported at any hour of the day. Increased observations are

especially useful when the vessel is traversing ocean areas where the occurrence of large variations in water temperature or salinity are known or suspected, such as major current regions and before and after the passage of large atmospheric disturbances.

5. LABELLING DATA RECORDS

5.1 For the most part, data for the BATHY log form will be obtained using expendable bathythermographs (XBTs), or mechanical BTs. The data for the TESAC log form will be obtained using Nansen bottles in conjunction with accurate deep-sea reversing thermometers, or salinity-temperature-depth (STD)/conductivity-temperature-depth (CTD) systems.

5.2 When the data are originally recorded on strip charts, such as in the case of the XBT and STD devices, the information listed below, in the sequence shown, should be entered on the face of the chart. However, DO NOT OBSCURE THE DATA TRACES.

Ship (name, call sign)

Cruise

Latitude (N/S)

Longitude (E/W)

Time (GMT)

Day, Month, Year (GMT)

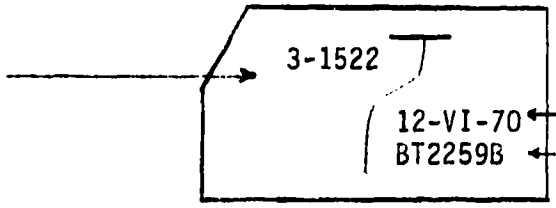
Observation number

Station number (if different from observation number)

Bottom depth in metres (optional)

5.3 If a mechanical BT is used, then mark the slide as indicated below, using a sharp pencil. Be sure each slide has been rinsed in fresh water immediately after labelling. Do not touch, write over, or otherwise obscure the trace.

Example of marked slide:



Slide number - GMT hours & minutes

Day-month(Roman numerals) - year (last two digits)

BT instrument number (found near nose of instrument and stamped on lower right side of BT grid). Report complete number with letter prefix and suffix, if given. If the BT instrument number and grid number (prefix and suffix) do not agree, do not use the BT.

6. DATA RECORDING PROCEDURES

6.1 After observation, the oceanographic data are transferred to the appropriate IGOSS BATHY and TESAC message logs. Instructions on how to fill in these logs are contained in Annex I and II respectively. Note that both BATHY and TESAC logs are divided into three parts: Part I: Identity Information; Part II: Environmental Information; and Part III: Radio Message Information.

6.2 Part III of these log forms is used to prepare the appropriate coded message for transmission. These codes have been tested thoroughly and it is essential for the efficiency of the programme that they be employed for the transmission of BATHY and TESAC data without the introduction of national modifications.

7. REAL-TIME DATA REPORTING PROCEDURES

Telecommunications (ship to coastal radio station)

7.1 The completed Part III of either the BATHY or the TESAC log can serve as the radio transmission form. After verifying that the information is correct, this form is submitted to the radio officer.

7.2 Care should be taken to check the message before transmission, for accuracy of the coded data and identifiers. Experience has identified certain sources of errors in coded BATHY and TESAC messages; these are as follows:

(i) "1" or "9" instead of "/" in the time groups of the BATHY and TESAC reports.

(ii) No "/" in the time groups.

(iii) Temperatures in degrees Fahrenheit instead of Celsius.

(iv) Incorrect "Qc".

(v) Confusion between the use of JJXX (BATHY) and KKXX (TESAC).

(vi) Missing JJXX or KKXX identifier beginning each message.

(vii) Missing ship's call sign at the end of each message.

7.3 BATHY and TESAC messages should be transmitted to one of the coastal radio stations listed in Annex III designated for the reception of these messages. For more complete information about these coastal radio stations reference should be made to WMO publication N° 9, Volume D which is updated regularly.

7.4 The abbreviation OBS should be included as a paid service indicator at the beginning of the address of BATHY or TESAC reports transmitted from observing ships to coastal radio stations.

7.5 The transmission of BATHY and TESAC messages should be made preferably within 24 hours, but can be made up to 48 hours after the time of observation.

7.6 BATHY and TESAC reports should be transmitted separately from meteorological (surface or upper air) reports. They should be transmitted to a specified coastal radio station at times which will not interfere with the transmission of meteorological reports, avoiding, as far as possible, the following periods:

2330 GMT - 0200 GMT
0530 GMT - 0800 GMT
1130 GMT - 1400 GMT
1730 GMT - 2000 GMT

8. NON-REAL-TIME DATA REPORTING PROCEDURES

8.1 IGOSS BATHY and TESAC logs completed according to the above are to be mailed as soon as possible to a National Oceanographic Data Centre (NODC), Designated National Agency (DNA) or to any IGOSS Responsible National Oceanographic Data Centre (RNODC) (addresses in Annex IV).

8.2 Correctly labelled primary data, such as mechanical BT slides and XBT and STD charts, should also be forwarded to the appropriate national or other data centre for the derivation of high quality control data.

ANNEX I: INSTRUCTIONS FOR PREPARING THE "BATHY" MESSAGE LOG

INTRODUCTION

The BATHY Log as provided herein is to be used for recording temperature observations taken with instruments which measure sea water temperature with depth. It is designed to provide a message format for the radio transmission of sub-surface temperature and to provide Oceanographic Data Archiving Centres and other shore facilities with additional essential information required for the complete processing of the temperature-depth observations. The BATHY Log is divided into three parts. The third part is used for preparation of the radio message.

PART I - IDENTITY INFORMATION

1. PLATFORM

Enter in the space provided the appropriate code for platform type from Table 1. If code 9 is entered, identify type under remarks. Enter the full name of the platform and, where applicable, the vessel's call sign.

TABLE 1: Platform type code

Code	Platform type
1	Ship
2	Lightship
3	Buoy
4	Fixed tower
5	Submersible
6	Aircraft
7	Ice island
8	Fixed coastal station
9	Other

2. COUNTRY

The country name entered should reflect the nationality of the institution sponsoring or operating the platform during the particular survey.

3. INSTITUTION

Enter the full name of the institution sponsoring or operating the platform during the particular survey.

4. ORIGINATOR'S CRUISE NUMBER

Enter the identifying cruise number or designator, if any, assigned to the survey by the originating institution.

5. PROJECT OR EXPEDITION DESIGNATOR

When applicable, enter the name of the project, expedition, or experiment.

6. STATION NUMBER

When applicable, enter the station number or other designator assigned at the time of observation, as preassigned by cruise plan or local location grid.

7. OBSERVATION NUMBER

Enter the consecutive number of the observation beginning with the numeral 1 assigned to the first observation of a series of observations taken during a survey. A single XBT, BT, or STD/CTD record is considered to be one observation.

8. ODAS DESIGNATOR

When applicable, enter the international designator of the Ocean Data Acquisition System, Aids and Devices (ODAS) from or at which the data were collected (i.e., Ocean Weather Station A, etc., see TABLE 2A).

9. INSTRUMENT

Enter in the space provided the code from Table 2 indicating the type of instrument used to collect the data. For mechanical BTs, enter the complete grid number (including letter) in the space provided.

TABLE 2B: Instrument type code

Code	Instrument
1	Bathythermograph
2	Expendable bathythermograph
3	Reversing thermometer
4	Salinity (or conductivity)/ temperature/depth probe (STD/CTD)
5	Other

PART II - ENVIRONMENTAL INFORMATION

10. DEPTH TO BOTTOM

Enter depth to bottom to the nearest metre.

11 & 27. WIND ($i_u$ddff)(1)

a. Wind speed units indicator (i_u)

Enter "0" if speed in metres per second and "1" if speed in knots.

b. True wind direction (dd)

Enter the true wind direction, in tens of degrees, from which the wind is blowing. Enter "00" for calm and "36" for a wind direction of 355° to 4°.

c. True wind speed (ff)

Enter true wind speed in metres per second or knots. Prefix zeros to fill the field. Enter "00" for calm.

12. SEA LEVEL PRESSURE (PPPP)

Enter the corrected sea level barometric pressure to tenths of a millibar. Choose the correct hundreds value (9 or 10) and cross out the other value in the first box of the field.

13 & 28. AIR TEMPERATURE - DRY (S_nTTT)(2)

(1) Wind data will only be recorded in field 27 when it is to be transmitted with the BATHY or TESAC data.

(2) Air temperature (dry bulb) will only be recorded in field 28 when it is to be transmitted with the BATHY or TESAC data.

TABLE 2A: Ocean Data Acquisition System, Aids and Devices (ODAS) category code

Code	Description of categories
1	Mobile ODAS: vessels which are covered by the International Regulations for Preventing Collisions at sea
2	Mobile ODAS: drifting (free-floating), surface penetrating ODAS
3	Mobile ODAS: drifting (free-floating), sub-surface ODAS
4	Anchored (moored) or bottom-bearing ODAS: surface penetrating ODAS
5	Anchored (moored) or bottom-bearing ODAS: sub-surface ODAS

BATHY MESSAGE LOG FORM

PART I IDENTITY INFORMATION

1 PLATFORM		SHIP'S CALL SIGN
TYPE		

2 COUNTRY

3 INSTITUTION

4 CRUISE No.

5 PROJECT OR EXPEDIT. DESIG

6 STATION No

7 OBSERVATION No

8 ODAS DESIG	
	CODE

9 INSTRUMENT	
TYPE	NUMBER AND LETTER

Remarks:

PART II ENVIRONMENTAL INFORMATION

10 DEPTH TO BOTTOM (m)

11	WIND			
UNIT	DIR.		SPEED	
IU	d	d	f	f

12 SEA LEVEL PRESS. (mb)				
P	P	P	P	
10/9				.

13 AIR TEMP.DRY				
±	VALUE °C			
sn	T	T	T	
				.

14 AIR TEMP. WET				
±	VALUE °C			
sn	T	T	T	
				.

15 SEA TEMP. °C				
VALUE				
Tw	Tw	Tw	INSTR.	
		.		

16 WIND WAVES			
PER.		HT.	
Pw	Pw	Hw	Hw

17 SWELL				
DIR.		PER	HT.	
dw	dw	Pw	Hw	Hw

18 SOL.RAD. LANG/MIN.		
	.	

19 PRECIP. (mm)	
R	R
	.

20 TRANS. (m)	
	.

21 (ADDITIONAL OPTIONAL ENTRIES)

Remarks:
Remember to mail a copy of this log to an appropriate data archiving centre

PART III RADIO MESSAGE INFORMATION (BATHY)

(for use with WMO code form FM 63 V)

SECTION 1:

22 MESSAGE-IDENTIFIER	23 DATE (GMT) DAY / MON. / YR	24 TIME (GMT) HOUR / MIN.	25 LATITUDE DEGR. / MIN.	26 LONGITUDE DEGREE / MIN.	27 WIND DIR. / SPEED	28 AIR TEMP. (DBY) IN / ± / VALUE
Mi Mi Mj Mj	Y Y M M J	G G g g	Qc La La La La	Lo Lo Lo Lo Lo	iu d d f f	sn T T T
J J X X						2

TRANSMISSION OPTIONAL

SECTION 2: VALUES AT SIGNIFICANT DEPTHS

INDICATOR-GROUP	DEPTH	TEMP	DEPTH	TEMP	DEPTH	TEMP	DEPTH	TEMP	DEPTH	TEMP	DEPTH	TEMP	DEPTH	TEMP	DEPTH	TEMP	DEPTH	TEMP
	zo zo	To To To	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T
8 8 8 8 8																		
z z T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T
z z T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T
z z T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T
z z T T T	z z	T T T	z z	T T T	z z	T T T												

SECTION 3: (OPTIONAL) VALUES AT SELECTED OR STANDARD DEPTHS

INDIC. GRP		DEPTH	TEMP	DEPTH	TEMP	DEPTH	TEMP	DEPTH	TEMP	DEPTH	TEMP	DEPTH	TEMP	DEPTH	TEMP	DEPTH	TEMP	DEPTH	TEMP
	iz iz	zo zo	To To To	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T
7 7 7																			
z z T T T		z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T
z z T T T		z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T	z z	T T T				

REMARKS:

DATE OF TRANSMISSION:

RECEIVER:
via coastal station:

a. Air temperature sign indicator (S_n)

Enter "0" for positive temperatures and "1" for negative temperatures.

b. Air temperature (TTT)

Enter the air temperature to tenths of a degree Celsius. Prefix zeros to fill the field.

14. WET BULB TEMPERATURE

a. Air temperature sign indicator (S_n)

Enter "0" for positive temperatures and "1" for negative temperatures.

b. Wet bulb temperature (TTT)

Enter the wet bulb temperature in tenths of a degree Celsius. Prefix zeros to fill the field.

15. SEA SURFACE TEMPERATURE

a. Value - Sea surface temperature (TwTwTw)

Enter the temperature in tenths of a degree Celsius. To indicate negative temperatures, add 50.0 to the absolute value of the temperature and drop the negative sign. For example: -1.2°C would be encoded "51.2". If a thermometer, such as an engine-room intake, is read only to the nearest whole degree Celsius, this should be indicated in the tenths column in field 15 by a solidus (/). Prefix zeros to fill the field.

b. Instrument - Sea surface temperature instrument indicator

Enter in the last box of field 15 the code for the method of obtaining the sea surface temperature, according to Table 3. This reading should be from an instrument <u>different</u> from the instrument used to fill in Section 2 and 3 of the radio message.

TABLE 3: Sea surface temperature instrument code

Code	Instrument
1	Bucket thermometer
2	Thermometer in condenser intake on steam ships, or inlet of engine cooling system on motor ships
3	Trailing thermistor
4	Hull contact sensor
5	"Through hull" sensor
6	Radiation thermometer
7	Bait tanks thermometer
9	Other

<u>Note</u>: If "9" is entered, describe the instrument in "Remarks" space.

16. WIND WAVES

a. Wind wave period (PwPw)

Enter the average wind wave period to the nearest second. Prefix zeros to fill the field. Enter "00" for calm and "99" when the wind wave cannot be determined

because the sea is confused. When the wind wave period cannot be determined for any other reason, enter two solidi (//).

b. Wind wave height (HwHw)

This code is based on wave heights estimated to the nearest half metre. For example, a height of seven metres is reported using code figure "14"; that is, 14 half metres.

17. SWELL

a. Swell direction (dwdw)

Enter the direction from which the swell is coming in tens of degrees, using "01" to "36" for directions 010° to 360°, "00" for calm, and "99" for a confused sea when direction is indeterminate. If the swell direction is determined to the nearest degree, convert the value to the nearest 10 degrees, and drop the final zero.

b. Swell period (Pw)

Use Table 4 to code the period of the swell in seconds. Note that this period code is different from that of the wind wave period.

TABLE 4: PERIOD OF SWELL

Code Figure	Average Period (sec.)	Code Figure	Average Period (sec.)
		0	10
5	5 or less	1	11
6	6	2	12
7	7	3	13
8	8	4	14 or more
9	9	/	Calm or not determined

c. Swell height (HwHw)

The code is based on wave heights estimated to the nearest half metre. For example, a height of seven metres is reported using code figure "14"; that is, 14 half metres.

18. SOLAR RADIATION

Enter the average value of the global (direct plus diffuse) radiation in langleys per minute to the nearest hundredth . The average should be for the hour preceding and ending with the observation time.

19. PRECIPITATION (RR)

Enter the amount of precipitation for the six hours preceding the observation time to the nearest 0.2 mm. If the value should be 10.0 mm or greater, place both the units and tens digits in the first of the two boxes in field 19. Use "00", meaning trace, if precipitation is too small to measure.

20. WATER TRANSPARENCY (Secchi disc)

Enter the average value to the nearest metre. Prefix zeros to fill the field.

21. ADDITIONAL OPTIONAL ENTRIES

Part III - Radio Message Information (BATHY)

The following instructions for encoding the radio message information should be followed strictly (ref. WMO No. 306, Manual on Codes).

For purposes of data control, record the ship or platform call sign in the space provided at the bottom right-hand side of the log and transmit it after each message.

Section 1

22. All BATHY messages must contain the message identifier JJXX in the first line of the text.

23. DATE (GMT)

a. Day (YY)

Enter the day of month as determined by GMT, using numeral 01 to 31.

b. Month (MM)

Enter month of year as determined by GMT using numerals 01 to 12.

c. Year (J)

Enter the last digit of year as determined by GMT.

24. TIME (GGgg/)

Enter the GMT time of observation in hours and minutes. Include the solidus(/) at the end as part of the transmitted group.

25. LATITUDE

a. Quadrant of globe (Qc)

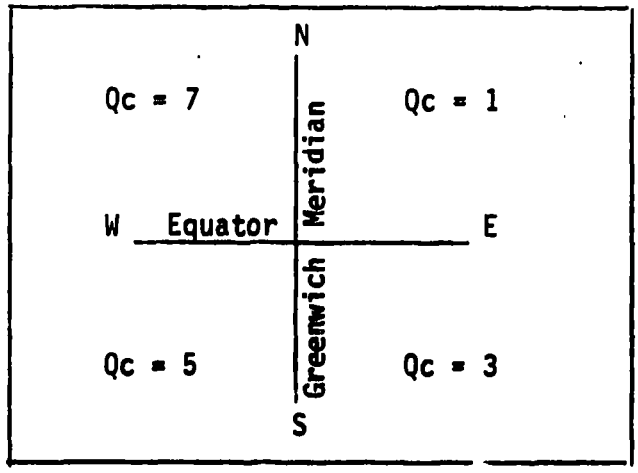
Enter the quadrant of the globe according to Table 5.

b. Latitude (LaLaLaLa)

Enter latitude of the observation in degrees and minutes.

TABLE 5: Quadrant of the globe (Qc)

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



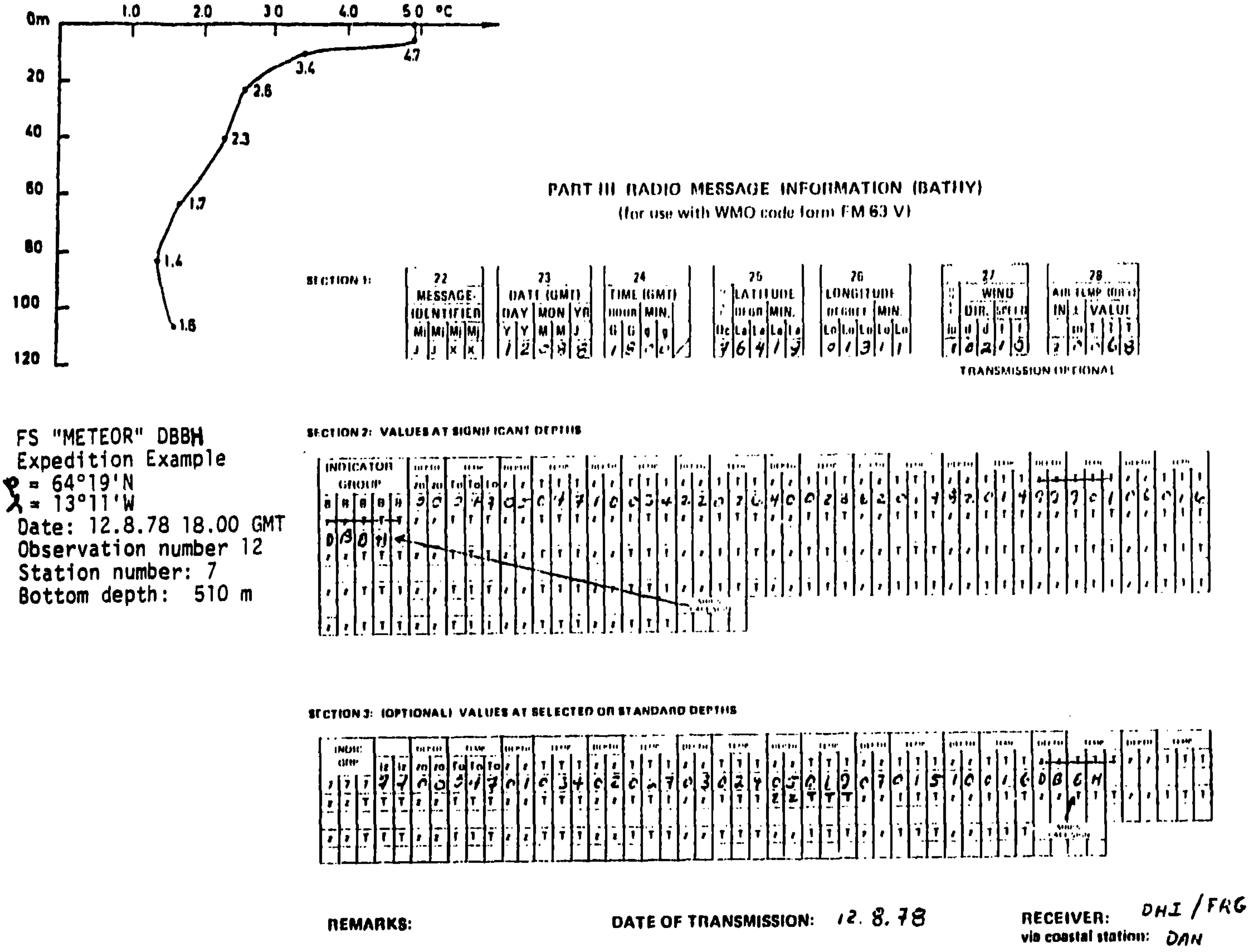
26. LONGITUDE (LoLoLoLoLo)

Enter longitude of the observation in degrees and minutes.

27 & 28 Optional. Refer to instructions given under Annex 1, Part II, 11 and 13.

The following procedures should be used when encoding the Bathythermograph trace: when interpreting these procedures please refer to the example coded BATHY message shown in Figure A.

Figure A - Example coded BATHY message



Section 2. Encoding Temperature Values at "Significant" Depths

1. The trace should be read to the nearest tenth of a degree Celsius at each selected depth. Depth is read to whole metres.

2. In selecting depths at which temperatures are to be read:

a. Always include temperature at the sea surface (or use the first readable temperature in the upper ten metres for this purpose) and at the deepest point of the trace.

b. Select sufficient "significant" (flexure point) depths to describe the basic features of the temperature profile.

c. Fewer than 20 significant depths should usually be encoded to describe the upper 500 metres of the profile even at the sacrifice of some detail.

d. Include the depth and temperature of the top and bottom of isothermal layers.

3. Do not adjust the trace to agree with the reference temperature or interpret the trace at convenient depth increments (5m, 20m, etc.) unless flexure points actually exist at these depths.

4. If the instrument used strikes the sea bottom, enter five zeros (00000) after the last depth-temperature entry.

5. To indicate a negative temperature, add 50.0 to the absolute value of the temperature and drop the negative sign.

6. Enter indicator group 88888 before recording depth-temperature values.

7. Record the depth-temperature values as follows.

For sub-surface depths to 99 metres, enter in whole metres the depth at which corresponding temperature values are read from the trace. Prefix zeros to fill the field; e.g., for 8m, record 08. Before each depth increment of 100 metres or greater, the code 999zz is recorded. zz is coded as follows:

999 01 = 100 to 199 metres
999 02 = 200 to 299 metres
999 03 = 300 to 399 metres
.....
.....
999 10 = 1000 to 1099 metres
999 11 = 1100 to 1199 metres
.....
.....
999 20 = 2000 to 2099 metres
etc.

The tens and units digits of depths are then entered with the corresponding temperatures. For example:

	z z T T T	z z T T T
:9:9:9:0:1:	:5:0:1:2:8:	:7:5:0:5:3:
The following depth values at 100 - 199 metres	150 metres	175 metres

Where the 999zz code is entered, mark out the zzTTT heading.

Section 3. Encoding Temperature Values at Selected Depths (optional)

1. There are several ways of using Section 3. It also can be used to record the temperature at any selected or preferred depth, or the depth at a selected or preferred temperature. It also can be used to record IAPO standard depths as given in paragraph 3 below.

2. SELECTED DEPTHS

The temperature for any selected or preferred depth can be recorded in Section 3 through the use of an indicator group in a similar fashion to Section 2. The indicator group 777 iz iz identifies the following data as belonging to a certain depth range as follows:

777 iz iz

777 7 7 indicates depths in tens of metres.

777 5 5 indicates depths in hundreds of metres.

The surface is encoded as 00.

3. STANDARD DEPTHS

If desired, the temperature values can be encoded at IAPO Standard Depths as follows:

Standard depths (list), and their corresponding message code entries may be found in Table 6.

TABLE 6: Depths of IAPO standard levels (and indicator for range and units of depth $i_z i_z$) (ZoZo, $Z_1Z_1 \ldots Z_nZ_n$)

With $i_z i_z$ = 77:		With $i_z i_z$ = 55:	
Code figure	Metres	Code figure	Metres
00	Surface	10	1 000
01	10	12	1 200
02	20	15	1 500
03	30	20	2 000
05	50	25	2 500
07	70 *	30	3 000
10	100	40	4 000
15	150	etc.	
20	200		
30	300		
40	400		
50	500		
60	600		
80	800		

* Correct IAPO depth is 75 metres, but Section 3 only allows reporting of 70 or 80 metres.

To indicate negative temperatures, add 50.0 to the absolute temperature values and drop the negative sign.

Do not adjust the trace to agree with the reference temperature.

IMPORTANT REMINDER

Observers collecting temperature data, either on BT glass slides or on XBT recorder charts should, in addition to completing the BATHY Log, also mail the slides and/or recorder charts to the appropriate national or other shore facility or IGOSS RNODC (Annex IV). The original records will be carefully processed, and will constitute a unique and valuable source of information on the detail of the temperature structure of the oceans.

ANNEX II: INSTRUCTIONS FOR PREPARING THE "TESAC" MESSAGE LOG

INTRODUCTION

The TESAC Message Log as provided herein is to be used for recording data from Nansen casts, STDs, and other devices which measure temperature and salinity with depth. The log may also be used to transmit measured current data at one or more depths. THIS LOG IS NOT TO BE USED FOR TRANSMITTING TEMPERATURE-DEPTH DATA OBTAINED BY MECHANICAL OR EXPENDABLE BATHYTHERMOGRAPHS OR SIMILAR INSTRUMENTS. It is designed to meet the following needs:

1. To provide a message format for radio transmission of synoptic temperature-salinity-current-depth data coded according to the WMO Code Form FM 64 V (refer to WMO No. 306, Manual on Codes).

2. To provide standard instructions for encoding Nansen casts, STD and similar type observations based on internationally approved coding procedures (refer to WMO No. 306, Manual on Codes).

3. To provide oceanographic data archiving centres and other shore facilities with essential information required for the complete processing of TESAC observations.

This log is not a substitute for reporting fully processed data according to national practice as may be required by the various NODCs.

PART I - IDENTITY INFORMATION

1. Instructions for items 1 to 8 are identical to the corresponding items of the BATHY Message Log in Annex I.

9. MULTI-SENSOR INSTRUMENT

When applicable, enter the name and model number of the multi-sensor instrument used to sense temperature and salinity (i.e., BISSETT BERMAN, Model 9040 STD; NUS Corp. 1600 Series, etc.).

9A. SINGLE-SENSOR INSTRUMENT

When applicable, enter the name of any instrumentation used to measure separately temperature or salinity recorded to hundredths of a degree Celsius or hundredths of a part per thousand.

9B. CURRENT INSTRUMENT (Name/Model No.)

When applicable, enter the name(s) and model number(s) of the current meter(s) used to collect current data (i.e., BRAINCON Type 381; GEODYNE Model 850; PLESSEY Model M021; etc.).

PART II - ENVIRONMENTAL INFORMATION

Instructions for this section are identical to the corresponding items of the BATHY Message Log in Annex I.

PART III - RADIO MESSAGE INFORMATION (TESAC)

The following instructions for encoding the radio message information should be followed strictly (Ref. WMO No. 306, Manual on Codes).

For purposes of data control, please record the ship or platform radio call sign in the space provided at the bottom right-hand side of the log and transmit it after each message.

Section 1

22. All TESAC messages must contain the message identifier KKXX in the first line of the text.

23 - 28. Instructions are identical to the corresponding items of the BATHY Message Log (Radio message information) in Annex I.

Encoding Temperature and Salinity Values at Significant Depths

Section 2

The following instructions should be followed in selecting salinity-temperature depth values for encoding when value selections are from STD strip charts or other (data logger, etc.) media:

1. Always include the values at the surface and bottom of traces; and sufficient significant (flexure point) depth values to reproduce the basic features of the temperature and salinity traces.

2. Select values at depths which define the top and bottom of isothermal/ isohaline layers.

3. Select no more (and usually less) than 20 significant depths in the upper 500 metres, even at the cost of loss of detail.

4. When reading the salinity trace on an STD, "spikes" should be smoothed out before the message is prepared.

5. If the last temperature/salinity reading is at the sea bottom, enter five zeros (00000) after the last entry.

6. To indicate a negative temperature, add 50.0 to the absolute value of the temperature and drop the negative sign.

7. The selection of any one variable or depth for encoding necessitates reporting of all available parameters for that particular depth.

8. The numerals 2, 3 and 4 preprinted on the log sheet must be radio transmitted to identify each data group. If values for a data field are not available, do not fill or transmit that field. When observations are not made to the significant digit provided for on the log sheet, enter and transmit a zero (0) in the appropriate column.

9. Record data on log sheet from left to right, line by line; each line will accommodate four depth levels.

TESAC MESSAGE LOG FORM

PART I IDENTITY INFORMATION

1	
PLATFORM	SHIP'S CALL SIGN
TYPE	

2
COUNTRY

3
INSTITUTION

4
CRUISE No.

5
PROJECT OR EXPEDIT. DESIG.

6
STATION No.

7
OBSERVATION No.

8	
ODAS DESIG.	CODE

9
MULTI SENSOR INSTRUMENT (Name · Model No.)

9 A
SINGLE SENSOR INSTRUMENT
TEMP. _____
SAL. _____

9 B
CURRENT INSTRUMENTS (Name · Model No.)
1. _____
2. _____
3. _____
4. _____
5. _____

Remarks:

PART II ENVIRONMENTAL INFORMATION

10
DEPTH TO BOTTOM (m)

	11			
UNIT	WIND			
	DIR.		SPEED	
IU	d	d	f	f

12			
SEA LEVEL PRESS. (mb)			
P	P	P	P
19/			.

13			
AIR TEMP.DRY			
±	VALUE °C		
sn	T	T	T
			.

14			
AIR TEMP. WET			
±	VALUE °C		
sn	T	T	T
			.

15			
SEA TEMP. °C			
VALUE			
Tw	Tw	Tw	INSTR.
		.	

16			
WIND WAVES			
PER.		HT.	
Pw	Pw	Hw	Hw

17				
SWELL				
DIR.		PER	HT.	
dw	dw	Pw	Hw	Hw

18		
SOL.RAD.		
LANG/MIN.		
	.	

19	
PRECIP.	
(mm)	
R	R
	.

20	
TRANS.	
(m)	
	.

21 (ADDITIONAL OPTIONAL ENTRIES)

Remarks:
Remember to mail a copy of this log to an appropriate data archiving centre

October 1979

PART III RADIO MESSAGE INFORMATION (TESAC) CENTER

(for use with WMO code form FM 64-E)

SECTION 1:

22	23	24	25	26	27	28
MESSAGE-IDENTIFIER	DATE (GMT)	TIME (GMT) e	QUAD / LATITUDE	LONGITUDE	UNIT / WIND	AIR TEMP (DRY)
	DAY / MON. / YR	HOUR / MIN.	DEGR / MIN.	DEGREE / MIN.	DIR.	IN / VALUE
Mi Mi Mj Mj	Y Y M M J	G G g g	Qc La La La La	Lo Lo Lo Lo Lo	iu d d f f	sn T T T
K K X X						2

TRANSMISSION OPTIONAL

SECTION 2: TEMP. AND SALINITY AT SIGNIFICANT DEPTHS

INDICATOR GROUPS	K2
8 8 8 8	

DEPTH	TEMP.	SALINITY
2 z z z z	3 T T T T	4 S S S S
2 0 0 0 0	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .

DEPTH	TEMP.	SALINITY
2 z z z z	3 T T T T	4 S S S S
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .

DEPTH	TEMP.	SALINITY
2 z z z z	3 T T T T	4 S S S S
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .

DEPTH	TEMP.	SALINITY
2 z z z z	3 T T T T	4 S S S S
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .

SHIP'S CALL SIGN

SECTION 3: (OPTIONAL) TEMP. AND SALINITY DATA AT SELECTED DEPTHS

INDICATOR GROUPS	K2
7 7 7 7	

DEPTH	TEMP.	SALINITY
2 z z z z	3 T T T T	4 S S S S
2 0 0 0 0	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .

DEPTH	TEMP.	SALINITY
2 z z z z	3 T T T T	4 S S S S
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .

DEPTH	TEMP.	SALINITY
2 z z z z	3 T T T T	4 S S S S
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .

DEPTH	TEMP.	SALINITY
2 z z z z	3 T T T T	4 S S S S
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .
2	3 .	4 .

SHIP'S CALL SIGN

SECTION 4: (OPTIONAL) CURRENT DATA AT STATED DEPTHS

INDICATOR GROUPS	K4	K3
6 6 6		

DEPTH	DIR	SPD
2 z z z z	d d	c c c
2		
2		

DEPTH	DIR	SPD
2 z z z z	d d	c c c
2		
2		

DEPTH	DIR	SPD
2 z z z z	d d	c c c
2		
2		

DEPTH	DIR	SPD
2 z z z z	d d	c c c
2		
2		

DEPTH	DIR	SPD
2 z z z z	d d	c c c
2		
2		

DEPTH	DIR	SPD
2 z z z z	d d	c c c
2		

SHIP'S CALL SIGN

REMARKS:

DATE OF TRANSMISSION:

RECEIVER:
via coastal station:

10. Enter 8888 followed by the method of salinity/depth measurement (K_2) according to Table 7 (7777 for section 3.).

TABLE 7: Method of salinity/depth measurement (K_2)

Code figure	
0	No salinity measured
1	In situ sensor, accuracy better than 0.02°/₀₀
2	In situ sensor, accuracy less than 0.02°/₀₀
3	Sample analysis

11. To record the depth-temperature values:

a. Enter depth to the nearest metre.

b. Enter temperature to hundredths of a Celsius degree.

c. Enter salinities to hundredths of parts per thousand (°/₀₀).

Encoding Temperature and Salinity Values at Selected Depths(1)

Section 3

1. When reading the salinity trace on an STD, "spikes" should be smoothed out before the message is prepared.

2. To indicate negative temperatures, add 50.0 to the absolute value of the temperature and drop the negative sign.

3. Refer to the previous section, Annex II, Part III, Section 2, for instructions on filling the DEPTH/TEMPERATURE/SALINITY Field. However, no special depth codes are required for encoding depth in this section; the complete depth values are encoded. Also refer to Annex I, Part III, Section 3 for a discussion of selected and standard depths.

Encoding Current Data at Stated Depths(2)

Section 4

1. Depth.

   Enter depth to the nearest metre.

2. Current Direction and Speed (ddCCC).

---

(1) The transmission of selected depth entries is optional. When transmitted, the indicator group $7777k_2$ must precede the first depth entry. k_2 is determined from Table 7.

(2) The transmission of current data is optional. When transmitted, the indicator group $666k_4k_3$ must precede the first depth entry. k_4 and k_3 are determined from Tables 8 and 9, respectively.

2. continued.

Record true direction towards which the sea current is moving in tens of degrees. Nearly all current meters measure current direction with respect to magnetic north; local variations must be applied to convert the direction to degrees true. If the local variation is easterly, add it to the observed direction to obtain the true direction; if the local variation is westerly, subtract it from the observed direction. Enter the current speed in centimetres per second.

TABLE 8: Duration and time of current measurement (vector method) (K_3)

Code figure	
1	Instantaneous
2	Averaged over three minutes or less
3	Averaged over more than three minutes, but six at the most
4	Averaged over more than six minutes, but 12 at the most
9	Vector method not used

Note: H = Time of observation

TABLE 9: Period of current measurement (drift method) (K_4)

Code figure	
1	One hour or less
2	More than one hour but two at the most
3	More than two hours but four at the most
4	More than four hours but eight at the most
5	More than eight hours but 12 at the most
6	More than 12 hours but 18 at the most
7	More than 18 hours but 24 at the most
8	Drift method not used

ANNEX III

Coastal Radio Stations accepting BATHY and TESAC reports*

Name and type of the station **	Country	Call sign	Radio address of meteorological or oceanographic centre
	REGION I - AFRICA		
S. Vicente de Cabo Verde (a)	Cape Verde	D4A	METEOSAL
Saint-Denis (c)	France (Réunion)	FFD	Meteo Réunion Chaudron
Mombasa Radio (a)	Kenya	5 ZF 5 ZF 2 5 ZF 3 5 ZF 4 MSA radio	Meteo Mombasa
Agadir Radio (a)	Morocco	CND	Meteo Agadir
Casablanca Radio	Morocco	CNP	Meteo Casablanca
Safi Radio (a)	Morocco	CND 3	Meteo Safi
Tanger Radio (a)	Morocco	CNW	Meteo Tanger
Martin de Viviès (c)	Saint Paul and Amsterdam Is.	FJY 4	Meteo Saint Paul and Amsterdam
Dar-es-Salaam (c)	United Republic of Tanzania	5 HA	Meteo DSM

* For more complete information about these coastal radio stations, consult WMO Publication N° 9, Volume D, which is updated regularly.

** Letters in brackets denote the following:

(a) Station keeping a continuous 24-hour watch;

(b) Station keeping a watch for at least 30 minutes beginning at 0000, 0600, 1200 and 1800 GMT daily; watch should also be kept for a similar minimum time at the beginning of the nearest "single operator period" following those standard synoptic hours;

(c) Station keeping watch for shorter periods (stations with limited hours of operation) than those mentioned under (b) above (when these stations are considered of particular value).

Name and type of the station	Country	Call sign	Radio address of meteorological or oceanographic centre
	REGION II - ASIA		
Bombay (a)	India	VWB	Meteo Weather
Calcutta (a)	India	VWC	Meteo Weather
Cochin (a)	India	VWN	Meteo Weather
Goa (a)	India	VWG	Meteo Weather
Kandla (a)	India	VWK	Meteo Weather
Madras (a)	India	VWM	Meteo Weather
Mangalore (a)	India	VWL	Meteo Weather
Port Blair (a)	India	VWP	Meteo Weather
Ratnagiri(a)	India	VWZ	Meteo Weather
Tuticorin (a)	India	VWT	Meteo Weather
Vishakhapatnam (a)	India	VWV	Meteo Weather
Choshi (a)	Japan	JCS JCT JCU JDC	Meteo Tokyo
Dickson (a)	USSR	UPV	Meteo Dickson
Petropavlovsk na kamcatke (a)	USSR	UBE 4	Meteo Petropavlovsk
Vladivostok (a)	USSR	UIK	Meteo Vladivostok
Amderma (a)	USSR	UPM	Meteo Amderma
Holmsk	USSR	UFO	Meteo Holmsk
	REGION III - SOUTH AMERICA		
Comodoro Rivadavia Radio (a)	Argentina	LPX LPX2	SERHIDRO METEO BAIRES
Ponton Recalada Rio de La Plata Radio (a)	Argentina	LSR LSR 44	SERHIDRO
Buenos Aires (a)	Argentina	LSO 4 LSO 8 LSO 44	SERHIDRO
Mar del Plata Radio (a)	Argentina	LPM	SERHIDRO METEO BAIRES
Rio de Janeiro Radio FC (a)	Brazil	PPR	METEO RIO
Ilha Fiscal (b)	Brazil	PXF	METEO RIO

Name and type of the station	Country	Call sign	Radio address of meteorological or oceanographic centre
REGION IV - NORTH AND CENTRAL AMERICA			
Alert Bay, B.C. (a)	Canada	VAF	Meteo Vancouver
Bull Harbour, B.C. (a)	Canada	VAG	Meteo Vancouver
Cambridge Bay, N.W.T.(a)	Canada	VFC	Meteo Vancouver
Canso, N.S. (a)	Canada	VAX	Meteo Halifax
Cardinal, Ont. (a)	Canada	VDQ	Meteo Malton
Cartwright, Nfld. (a)	Canada	VOK	Meteo Halifax
Charlottetown, P.E.I. (a)	Canada	VCA	Meteo Halifax
Churchill, Man. (a)	Canada	VAP	Meteo Halifax
Comfort Cove, Nfld. (a)	Canada	VOO	Meteo Halifax
Comox, B.C. (a)	Canada	VAC	Meteo Vancouver
Coppermine, N.W.T. (a)	Canada	VFU 6	Meteo Vancouver
Coral Harbour, N.W.T. (a)	Canada	VFU	Meteo Halifax
Frobisher, N.W.T. (a)	Canada	VFF	Meteo Halifax
Goose, Nfld. (a)	Canada	VFZ	Meteo Halifax
Grindstone, Que. (a)	Canada	VCN	Meteo Halifax
Halifax, N.S. (a)	Canada	VCS	Meteo Halifax
Inoucdjouac, Que. (a)	Canada	VAL	Meteo Halifax
Inuvik, N.W.T. (a)	Canada	VFA	Meteo Vancouver
Mont Joli, Que. (a)	Canada	VCF	Meteo Halifax
Montreal, Que. (a)	Canada	VFN	Meteo Halifax
Port Burwell, Ont. (a)	Canada	VBF	Meteo Malton
Poste-de-la-Baleine, Que.(a)	Canada	VAV	Meteo Halifax
Prince Rubert, B.C. (a)	Canada	VAJ	Meteo Vancouver
Quebec, Que. (a)	Canada	VCC	Meteo Halifax
Resolute, N.W.T. (a)	Canada	VFR	Meteo Halifax
Rivière-au-Renard, Que. (a)	Canada	VCG	Meteo Halifax
Saint John, N.B. (a)	Canada	VAR	Meteo Halifax
Sandspit, B.C. (a)	Canada	VAH	Meteo Vancouver
Sarnia, Ont. (a)	Canada	VBE	Meteo Malton
Sault Ste Marie, Ont. (a)	Canada	VBB	Meteo Malton
Sept Iles, Que. (a)	Canada	VCK	Meteo Halifax
Station P (Ocean Weather Station) (a)	Canada	C7P	Meteo Vancouver
St. John's, Nfld. (a)	Canada	VON	Meteo Halifax
St. Laurence, Nfld. (a)	Canada	VCP	Meteo Halifax

Name and type of the station	Country	Call sign	Radio address of meteorological or oceanographic centre
Stephenville, Nfld. (a)	Canada	VOJ	Meteo Halifax
Sydney, N.S. (a)	Canada	VCO	Meteo Halifax
Thunder Bay, Ont. (a)	Canada	VBA	Meteo Malton
Tofino, B.C. (a)	Canada	VAE	Meteo Vancouver
Toronto, Ont. (a)	Canada	VBG	Meteo Malton
Vancouver, B.C. (a)	Canada	VAI	Meteo Vancouver
Victoria, B.C. (a)	Canada	VAK	Meteo Vancouver
Wiarton, Ont. (a)	Canada	VBC	Meteo Malton
Yarmouth, N.S. (a)	Canada	VAU	Meteo Halifax
Kingston Radio (a)	Jamaica	6YI	Meteo Kingston
Curaçao Radio (a) +	Netherlands Antilles	PJC	Meteo WASHDC
Fort-de-France Radio (a)	Martinique	FFP FFP 2 FFP 3 FFP 7	Meteo Fort-de-France
Balboa (a)	Panama	NBA	Meteo WASHDC
San Juan (a)	Puerto Rico	NMR	Meteo WASHDC
Adak, Alaska (a)	USA	NOX	Meteo WASHDC
Astoria, Oregon (a)	USA	NMW	Meteo WASHDC
Boston, Mass. (a)	USA	NMF	Meteo WASHDC
Galveston, Tex. (a)	USA	KLC	Meteo WASHDC
Ketchikan, Alaska (a)	USA	NMJ	Meteo WASHDC
Kodiak, Alaska (a)	USA	NOJ	Meteo WASHDC
Long Beach, Calif. (a)	USA	NMQ	Meteo WASHDC
Miami, Fla. (a)	USA	NMA	Meteo WASHDC
New Orleans, La. (a)	USA	NMG	Meteo WASHDC
Portsmouth, Va. (a)	USA	NMN	Meteo WASHDC
San Francisco, Calif. (a)	USA	KPH	Meteo WASHDC

+ Note: Messages are accepted from a ship only when the ship is unable to send them to an official U.S. coastal station.

Name and type of the station	Country	Call sign	Radio address of meteorological or oceanographic centre
	REGION V - SOUTH-WEST PACIFIC		
Broome (a)	Australia	VIO	Meteo Melbourne
Darwin (a)	Australia	VID	Meteo Melbourne
Perth (a)	Australia	VIP VIP 3,4,5,6	Meteo Melbourne
Sydney (a)	Australia	VIS VIS 3,5,6, 35,42	Meteo Melbourne
Townsville (a)	Australia	VIT	Meteo Melbourne
Mahina Radio (a)	French Polynesia	FJA FJA 41 FJA 8 FJA 26	Meteo Papeete
Guam (a)	Mariana Islands	NRV	Meteo Guam
Nouméa Radio (b)	New Caledonia	FJP FJP 6 FJP 8 FJP 23 FJP 2 FJP 4 FJP 9	Meteo Nouméa
Honolulu, Hawaii (a)	USA	NMO	Meteo WASHDC
	REGION VI - EUROPE		
Ostende Radio (a)	Belgium	OST OST 3 OST 32 OST 4 OST 42 OST 5 OST 52 OST 6 OST 62 OST 7 OST 72	Metaereo Bruxelles
Rügen Radio (a)	German Democratic Republic	DHS	Meteo Warnemünde
Bordeaux-Arcachon Radio (a)	France	FFC	Meteo Bordeaux
Boulogne Radio (a)	France	FFB	Meteo Paris
Brest Le Conquet Radio (a)	France	FFV	Meteo Brest

Name and type of the station	Country	Call sign	Radio address of meteorological or oceanographic centre
Saint-Lys Radio (a)	France	FFL2 FFL 3 FFS 4 FFL 4 FFL 6 FFT 6 FFS 8 FFL 8 FFL 9 FFS 9	Meteo Paris
Saint-Nazaire (a)	France	FFO	Meteo Paris
Grasse Radio (c)	France	TKM	Meteo Paris
Marseille Radio (a)	France	FFM	Meteo Paris
Scheveningen Radio (a)	Netherlands	PCH 20 PCH 25 PCH 30 PCH 35 PCH 40 PCH 41 PCH 42 PCH 45 PCH 50 PCH 51 PCH 52 PCH 53 PCH 55 PCH 60 PCH 61 PCH 62 PCH 65 PCH 70 PCH 71 PCH 85 PCG 20 PCG 21 PCG 22 PCG 23 PCG 24 PCG 30 PCG 31 PCG 40 PCG 41 PCG 42 PCG 43 PCG 50 PCG 51 PCG 52 PCG 53	Meteo de Bilt

Name and type of the station	Country	Call sign	Radio address of meteorological or oceanographic centre
		PCG 60 PCG 61 PCG 62 PCG 63 PCG 70 PCG 71 PCG 72	
Rogaland Radio (a)	Norway	LGQ LGW LGU LGB LGJ LGX LGG	Meteo Oslo
Gdynia Radio (a)	Poland	SPH SPC	Meteo Gdynia
Monsanto Radio (a)	Portugal	CTV CTV 8 CTU 7	METEOLISB
Ponta Delgada Radio	Portugal (Azores)	CTD CTD 4 CTD 8	METEOLISB
Göteberg Radio (a)	Sweden	SAG SAG 2 SAG 3 SAG 4 SAG 6 SAG 8 SAG 9 SAG 25 SAB 2 SAB 3 SAB 4 SAB 6 SAB 8 SAB 9 SAB 25	Metocean Norrköping
Härnosand Radio (a)	Sweden	SAH	Meteo Norrköping
Karlskrona Radio (a)	Sweden	SAA	Meteo Norrköping
Tingstäde Radio (a)	Sweden	SAE	Meteo Norrköping
Stockholm (a)	Sweden	SDJ	Meteo Norrköping
Portishead (a)	United Kingdom	GKB	OBS Portishead
Odessa (a)	USSR	UDE	Meteo Odessa
Murmansk (a)	USSR	UMN	Meteo Murmansk

ANNEX IV

Addresses of IGOSS RNODCs

IGOSS RNODC - FRANCE
Centre Océanologique de Bretagne
Bureau National des Données Océaniques
B.P. 337
29273 BREST CEDEX
FRANCE

IGOSS RNODC - JAPAN
Japan Oceanographic Data Centre
Hydrographic Department
Maritime Safety Agency
N° 3-1 Tsukiji - 5 Chome Chuo-ku
Tokyo 104
JAPAN

IGOSS RNODC - USSR
National Oceanographic Data Centre
6 ul. Koroleva
Obninsk
Kaluzhskaya Oblasth
USSR

IGOSS RNODC - USA
National Oceanographic Data Center
Environmental Data Service
Washington D.C. 20235
USA

ANNEX V

National Co-ordinators for the IGOSS Operational Programme on Collection and Exchange of BATHY and TESAC data *

Servicio de Hidrografia Naval
Viamonte 1636 - 3° A
Buenos Aires
Argentina

The RAN Hydrographer
c/o HMA Naval Establishments
Garden Island
N.S.W. 2000
Australia

Coordination Générale du SMISO
Services du Premier Ministre
Services de Programmation de la
Politique Scientifique
8, rue de la Science
1040 Brussels
Belgique

Director de Hidrografia e Navegaçao
Ministerio de Marinha
Ilha Fiscal
Rio de Janeiro
Brazil

Mr. G.L. Holland
Director
Ocean and Aquatic Science Affairs Branch
Department of Fisheries and Oceans
240 Sparks Street
Ottawa, Ontario K1A OE6
Canada

Hydrographic and Oceanographic Service
of the Navy (SERHYO)
Casilla 5940
Guayaquil
Ecuador

Dr. Saad Eldin Harb
Vice-Chairman Board of Directors
Meteorological Authority
Cairo
Arab Republic of Egypt

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* The IOC and WMO Secretariats are presently updating the list of National Co-ordinators for the IGOSS BATHY/TESAC Operational Programme (one per country). The list presented herein is tentative.

Institute of Marine Research
P.O. Box 14166
SF 00141 Helsinki 14
Finland

Chef, Bureau National des
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Centre Océanologique de Bretagne
B.P. 337
29273 Brest Cedex
France

Dr. E. Francke
Institute of Marine Research
Academy of Sciences of the
German Democratic Republic
15, Seestrasse
DDR-2530 Warnemünde
German Democratic Republic

Dr. K. Huber
Deutsches Hydrographisches Institut
Bernhard-Nocht-Strasse 78
Postfach 220
2000 Hamburg 4
Federal Republic of Germany

Dr. Svend-Aago Malmberg
Marine Research Institute
Department of Oceanography
Skulgata 4
Reykjavik
Iceland

Head, Planning and Data Division
National Institute of Oceanography
P.O. Box N. 10
Dona Paula
Goa - 403004
India

Dr. Abdul Hakim Al-Rawi
Secretary of the National Oceanographic Committee
Scientific Research Foundation
Baghdad
Iraq

Mr. Owen Sweeney
National Board for Science and Technology
Shelbourne House
Shelbourne Road, Ballsbridge
Dublin 4, Ireland

Prof. C. Morelli
Osservatorio Geofisico Sperimentale
di Trieste
4, Viale R. Gessi
34123 Trieste
Italy

Dr. B. Voituriez
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