

WORLD METEOROLOGICAL ORGANIZATION

INTERGOVERNMENTAL OCEANOGRAPHIC
COMMISSION (OF UNESCO)

DATA BUOY COOPERATION PANEL

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TWENTY-FIRST SESSION

ITEM: 8.2

BUENOS AIRES, ARGENTINA

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ENGLISH ONLY

Code matters

(Submitted by the Technical Coordinator)

Summary and purpose of document

This document reports on utilization of BUFR for GTS distribution of buoy data, and particularly BUFR compression as was required by the Panel at its 19th session. It also addresses the issue of reporting wave spectra data in BUFR.

ACTION PROPOSED

The panel will be invited to to comment, and particularly make decisions or recommendations, as appropriate on the following topics:

- (a) Review new proposed BUFR template for buoy data, including for wave directional data, and suggest any changes that might be required, including addition of new BUFR descriptors;
 - (b) Decide on any other actions required regarding this issue.
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DISCUSSION

1) BUFR compression

At the time of writing this report (late June 2005), implementation of new software to deal with BUFR compression at the Argos GTS sub-system had not been implemented. Operational implementation was planned for September 2005 so by the time of the DBCP meeting things should be in place. Details will be provided when discussing this agenda item.

2) BUFR template for buoy wave data

At its 20th session, the Data Buoy Cooperation Panel (DBCP) expressed concern that there was no BUFR template defined for wave data reported from buoys. It asked its Technical Coordinator to investigate the issue and to report at the next Panel session. The following is the result from TC study that was conducted in coordination with France, Spain, and initial contacts made with the CBS Expert Team on Data Representation and Codes.

There is the need for a buoy wave template because there are a number of directional and non-directional wave buoys deployed that report their data in real time. FM-65-XI Ext. WAVEOB format (annex B) is usually being used for GTS distribution of the data.

Also, Puertos Del Estado, Spain (PDE, <http://www.puertos.es/externo/clima/Rayo/indexeng.html>) had deployed a moored buoy network around the Iberic Peninsula both in the Atlantic Ocean and the Mediterranean Sea. Many of these buoys do measure and report directional wave data. PDE had designed and developed in cooperation with Instituto Nacional de Meteorología español (INM) a Spanish version of a BUFR template for wave buoy data that meets their needs (annex C). However, while the latter contains useful descriptors and satisfies many user needs, it contains minor inconsistencies and is not entirely satisfactory as a standard and for global use (encoding practices, lack of required descriptors).

A new BUFR template for buoy wave data was therefore herewith proposed that would

- (i) Meet PDE needs and users of PDE wave data;
- (ii) Include additional descriptors corresponding to fields that appear in WAVEOB format but did not appear in the PDE template;
- (iii) Remain compatible with the BUFR template for buoy data that was adopted by the CBS Expert Team on data representation and codes at its Arusha meeting, 17-21 February 2003 and which is now being used operationally by Service Argos for GTS distribution of buoy data in BUFR. Compatibility is ensured by just adding new required descriptors at the end of the existing template.

Proposed draft BUFR template is described in annex A.

The Panel is invited to make comments and possibly suggest changes in the proposed templates.

Annex A

Proposed BUFR Template for buoy and wave data (draft)

Proposed template is listed in the table 1 below. Descriptors number 1 to 84 in the table correspond to the existing BUFR template for buoy data (i.e. the “Arusha” template).

Descriptors used are from BUFR Master table 0, version 11. No local table is being used.

- Are indicated in red descriptors that are presently being used for BUFR encoding of PDE buoy data
- Are indicated in blue descriptors that are similar to those being used for BUFR encoding of PDE buoy data (i.e. another way to code the same information is proposed)
- Are indicated in green, information which will have to be encoded for PDE buoys if the information is available (i.e. will be useful or required by users)
- ***New proposed descriptors for BUFR template for buoy data are indicated in bold and italic. They correspond to descriptors 85 and after.***

Implication for PDE buoys:

- Buoy WMO identification number to be coded and divided in 3 descriptors instead of 1 (i.e. 001003, 001020, and 001005).
- Buoy position to be coded in high accuracy instead of coarse accuracy.
- Air pressure reduced to sea level (MSLP) must be computed and encoded.
- Sensor height with regard to platform deck and average sea level will have to be encoded for air temperature and wind; wind is assumed to be corrected to 10m so this will have to be indicated in the reports (i.e. 008082 coded 1, and 007033 coded for 10m).
- Fields for which information is not available will be coded with “missing”.
- Section 1 of existing PDE BUFR reports was not encoded according to existing regulations:
 - Local table version should be coded 0 (not 1) as all descriptors being used are formal WMO descriptors (i.e. no PDE local descriptors are being used).
 - Current BUFR table version is 11 (not 1)
 - Year should be coded as following: YYYY coded (YYYY-100*(Century-1)), e.g. 2005 coded 05.

Table 1: Proposed new template for buoy data, including directional and non-directional wave data

#	Descriptor or	Name	Expanded descriptors	Comment, encoding
1	001003	WMO region	001003	First digit of WMO number (e.g. 62024 => 6)
2	001020	WMO region sub-area	001020	Second digit of WMO number (e.g. 62024 => 2)
3	001005	Buoy/platform identifier	001005	Last 3 digits of WMO number (e.g. 62024 => 024)
4	002001	Type of station	002001	1=Manned station
5	002036	Buoy type	002036	1=Fixed buoy
6	002149	Type of data buoy	002149	16=Unspecified moored buoy 24=Omnidirectional waverider 25=Directional waverider
7	301011	Date	004001 (year) 004002 (month) 004003 (day)	Date of observation
8	301012	Time	004004 (Hour) 004005 (Minutes)	Time of observation
9	008021	Time significance	008021	Value = 26 (time of last known position)
10	301011	Date	004001 (year) 004002 (month) 004003 (day)	Date of last known position coded here; coded missing for fixed station
11	301012	Time	004004 (Hour) 004005 (Minutes)	Time of last known position coded here; coded missing for fixed station
12	008021	Time significance	008021	Value = "missing"
13	301021	Latitude and longitude (high accuracy)	005001 (Lat; high accuracy) 006001 (Lon; high accuracy)	Coarse accuracy descriptors (005002 and 006002 respectively) were used with PDE buoys
14	027004	Alternate latitude (high accuracy)	027004	Coded if Argos is used for location; otherwise coded missing
15	028004	Alternate longitude (high accuracy)	028004	Coded if Argos is used for location; otherwise coded missing
16	007030	Height of station above MSL	007030	
17	001051	Platform Transmitter ID (CCITT IA5)	001051	If Argos is used, Argos ID number;
18	002148	Data collection and/or Location system	002148	1=Argos 2=GPS Coded missing if none
19	001012	Platform drift direction	001012	Coded missing for moored buoys
20	001014	Platform drift speed	001014	Coded missing for moored buoys
21	002040	Method of removing platform direction and speed from current	002040	Coded missing for moored buoys
22	033022	Quality of buoy satellite transmission	033022	0=Good 1=Dubious 3=missing
23	033023	Quality of buoy location	033023	0=Reliable 1=Last known position 2=Dubious 3=missing
24	033027	Location quality class (range of radius of 66% confidence)	033027	0: >= 1500m 1: 500m to 1500m
25	022063	Total water depth	022063	Mooring depth; otherwise coded missing

26	302021	Waves	022001 (direction of waves) 022011 (period of waves) 022021 (height of waves)	
27	302022	Wind waves	022002 (direction wind ww) 022012 (period wind ww) 022022 (height wind ww)	
28	302023	Swell waves	022003 (direction swell ww) 022013 (period swell ww) 022023 (height swell ww)	
29	008081	Type of equipment (observing platform)	008081	(New descriptor, scale=0, ref=0, bits=6) 0=sensor 1=transmitter 2=receiver 3=observing system Here coded with value=3: Equipment = "platform" Platform battery voltage
30	025026	Battery voltage	025026	(New descriptor, Volts, scale=0, ref=0, bits=6) Platform battery voltage
31	008081	Type of equipment (transmitter)	008081	(New descriptor, scale=0, ref=0, bits=6) 0=sensor 1=transmitter 2=receiver 3=observing system Here coded with value=1: Equipment = "transmitter"
32	025026	Battery voltage	025026	(New descriptor, Volts, scale=0, ref=0, bits=6) Transmitter battery voltage
33	008081	Type of equipment (receiver)	008081	(New descriptor, scale=0, ref=0, bits=6) 0=sensor 1=transmitter 2=receiver 3=observing system Here coded with value=2: Equipment = "receiver"
34	025026	Battery voltage	025026	(New descriptor, Volts, scale=0, ref=0, bits=6) Receiver battery voltage
35	008081	Type of equipment – value Missing = cancel	008081	0=sensor 1=transmitter 2=receiver 3=observing system Here coded with value = "missing"
36	002034	Drogue type	002034	Coded missing for moored buoys
37	022060	Lagrangian drifter drogue status	022060	(New descriptor, scale=0, ref=0, bits=3) 0=detached 1=attached 3=missing Coded missing for moored buoys
38	007070	Drogue depth	007070	Coded missing for moored buoys
39	002190	Lagrangian drifter submergence	002190	Coded missing for moored buoys
40	025086	Depth correction indicator for sub-surface measurements along cable	025086	0=depths are not corrected 1=depths are corrected

41	002035	Cable length	002035	3=missing Depth of hydrostatic pressure sensor at bottom of cable
42	002168	Hydrostatic pressure of lower end of cable	002168	
43	020031	Ice deposit (thickness)	020031	Ice thickness
44	002038	Method of temperature and/or velocity measurement	002038	e.g. 2=hull contact sensor 8=thermistor chain
45	306004	Digitization, depth/salinity method, depths/salinities/temperatures	002032 (indicator for digit) 002033 (method sal/depth) 103000 (delayed repl. 3 desc) 031001 (replication factor) 007062 (depth) 022043 (sea temperature) 022062 (salinity)	Replication factor indicates number of (depth, temp., salinity) data points that are encoded
46	002030	Method of current measurement	002030	
47	306005	Time/duration of current measurement, depths/directions/speeds	002031 (method current) 103000 (delayed repl. 3 desc) 031001 (replication factor) 007062 (depth) 022004 (direction current) 022031 (speed current)	Replication factor indicates number of (pepth, dir, speed) data points that are encoded
48	007031	Height of barometer above MSL	007031	
49	008081	Type of equipment (sensor)	008081	(New descriptor, scale=0, ref=0, bits=6) 0=sensor 1=transmitter 2=receiver 3=observing system Here coded with value=0: Equipment = "sensor"
50	012064	Instrument temperature	012064	Temperature of air pressure sensor
51	302001	Pressure and pressure change	010004 (pressure at station) 010051 (MSLP) 010061 (3-hour tendency) 010063 (tend. Characteristic)	Mean Seal Level Pressure to be computed based upon pressure at station level and sensor height
52	008081	Type of equipment – value missing = cancel	008081	(New descriptor, scale=0, ref=0, bits=6) 0=sensor 1=transmitter 2=receiver 3=observing system Here coded with value = "missing"
53	007032	Height of sensor above marine deck platform (for temp.&hum. measurement)	007032	Height of thermometer above marine desk
54	007033	Height of sensor above water surface (for temp.&hum. measurement)	007033	Height of thermometer (assumed should be coded with value = 2 metres for PDE buoys)
55	012101	Dry-bulb temperature (scale 2)	012101	
56	012103	Dew-point temperature (scale 2)	012103	
57	013003	Relative humidity	013003	
58	007032	Height of sensor above marine deck platform (for wind measurement)	007032	Real height of anemometer above marine deck

59	007033	Height of sensor above water surface (for wind measurement)	007033	Real height of anemometer above average water surface
60	008082	Artificial correction of sensor height to another value	008082	(New descriptor, scale=0, ref=0, bits=6) 0=sensor height is not corrected 1=sensor height is artificially corrected 7=missing Assumed should be coded to value 1 for PDE buoys
61	007033	Height of sensor above water surface (here height of anemometer to which it is artificially corrected)	007033	Assumed should be coded to value 1 for PDE buoys Here height of anemometer to which it is artificially corrected Assumed should be coded with value = 10 metres for PDE buoys
62	002169	Anemometer type	002169	e.g. 0=rotor 1=propeller rotor
63	002002	Type of instrumentation for wind measurement	002002	
64	008021	Time significance	008021	Value = 2 (time averaged)
65	004025	Time period in minutes	004025	Value for averaging period (e.g. 10 minutes)
66	011001	Wind direction	011001	Wind direction at 10m (011011) was used with PDE buoys
67	011002	Wind speed	011002	Wind speed at 10m (011012) was used with PDE buoys
68	008021	Time significance	008021	Value = 23 (monitoring period)
69	004025	Time period in minutes	004025	Period during which gust is being monitored prior to observation time
70	011043	Maximum wind gust direction	011043	
71	011041	Maximum wind gust speed	011041	
72	008082	Artificial correction of sensor height to another value (set to missing to reset previous value)	008082	(New descriptor, scale=0, ref=0, bits=6) 0=sensor height is not corrected 1=sensor height is artificially corrected 7=missing Here coded with value = "missing"
73	007033	Height of sensor above water surface (set to missing to cancel previous value)	007033	Value="missing": Redefine height to previous level
74	007032	Height of sensor above marine deck platform (for precipitation measurement)	007032	Here height of precipitations
75	004024	Time period in hours	004024	Period during which precipitation is being monitored prior to observation time
76	013011	Total precipitation	013011	Total precipitation during monitoring period
77	007032	Height of sensor above marine deck platform (set to missing to cancel the previous value)	007032	Value = "missing"
78	008021	Time significance	008021	Value = 3 (accumulated)
79	004024	Time period in hours	004024	Period during which global radiation is being accumulated prior to observation time
80	014021	Global radiation, integrated over period specified	014021	
81	008021	Time significance	008021	Value = "missing"
82	025028	Operator or manufacturer defined parameter (#1)	025028	(New descriptor, scale=1, ref=-16384, bits=15) Housekeeping parameter number 1
83	025028	Operator or manufacturer defined parameter (#2)	025028	(New descriptor, scale=1, ref=-16384, bits=15) Housekeeping parameter number 2
84	025028	Operator or manufacturer defined	025028	(New descriptor, scale=1, ref=-16384, bits=15)

	parameter (#3)		Housekeeping parameter number 3
85	022073	Maximum wave height	022073
86	022070	Significant wave height	022070
87	022074	Average wave period	022074
88	022076	Direction from which dominant waves are coming	022076
89	022077	Directional spread of dominant waves	022077
90	022071	Spectral peak wave period	022071
91	022078	Duration of wave record	022078
92	022082	Maximum non-directional spectral wave density	022082
93	022084	Band containing maximum non-directional spectral wave density	022084
94	025043	Wave sampling interval (time)	025043
95	025044	Wave sampling interval (space)	025044
96	112000	Delayed replication of 12 descriptors	112000
97	031001	Replication factor	031001
98	022080	Waveband central frequency	022080
99	201134	Add 6 bits to data width	201134
100	022096	Spectral band width	022096
101	201000	Reset data width to normal	201000
102	022090	Non-directional spectral estimate by wave frequency	022090
103	022086	Mean direction from which waves are coming	022086
104	022087	Principal direction from which waves are coming	022087
105	022095	Directional spread of individual waves	022095
106	022085	Spectral wave density ratio	022085
107	022088	First normalized polar coordinate from Fourier coefficients	022088
108	022089	Second normalized polar coordinate from Fourier coefficients	022089
109	022092	Directional spectral estimate by wave frequency	022092

Annex B

WAVEOB code (WMO code form FM 65-XI Ext. WAVEOB)

Wave spectrum observation from a sea station (e.g. buoy) or remote platform (aircraft or satellite).

Note: This is neither an official description of WMO GTS code forms, nor a detailed one. For formal WMO regulations and details, see the WMO Manual on Codes, Volume 1, International Codes, WMO N° 306.

In the following code descriptions,

- (i) Code fields are indicated in **bold**
- (ii) Each symbolic letter represents a character to encode (e.g. **d_{a1}** represents one character)
- (iii) Fields are separated by one space ASCII character (i.e. ASCII code 32).
- (iv) Sections are separated by the following sequence of ASCII characters: Carriage Return, Carriage Return, Line Feed (i.e. ASCII codes 13,13,10)
- (v) Optional elements are indicated in parentheses ()
- (vi) **Underlined&bold** fields are constant fields or constant part of the message (e.g. **888**)

1) Description of the FM 65-XI Ext. WAVEOB code:

Section 0 is mandatory, all other sections are optional. However, if one of sections 2 to 5 is present, section 1 must be included.

Section 0:	<u>MMXX</u> (D...D or A <u>1b_wn_bn_bn_b</u> or <u>l₆l₆l₆l₆l₆l₆</u>) YYMMJ GGgg/ (lliii or (QcL_aL_aL_aL_aL_aL_a L_oL_oL_oL_oL_oL_o)) <u>00l_al_ml_p</u> <u>1hhhh</u> <u>2H_sH_sH_sH_s</u> <u>3P_pP_pP_pP_p</u> <u>(4H_mH_mH_mH_m)</u> <u>(5P_aP_aP_aP_a)</u> <u>(6H_{se}H_{se}H_{se}H_{se})</u> <u>(7P_{sp}P_{sp}P_{sp}P_{sp})</u> <u>(8P_{sa}P_{sa}P_{sa}P_{sa})</u> <u>(9d_dd_dd_dd_s)</u>
Section 1:	<u>(111B_TB_T SSSS/ D'D'D'D'</u> BB// <u>1f₁f₁f₁x1f_df_df_dx</u> ... BB// <u>nf_nf_nf_nx</u> <u>nf_df_df_dx</u>)
Section 2:	<u>(2222x</u> C_mC_mC_mn_mn_m <u>1c₁c₁c₂c₂ <u>3c₃c₃c₄c₄ ... n-1c_{n-1}c_{n-1}c_nc_n (or nc_nc_nl/))</u></u>
Section 3:	<u>(3333x</u> C_{sm}C_{sm}C_{sm}n_{sm}n_{sm} <u>1c_{s1}c_{s1}c_{s2}c_{s2} <u>3c_{s3}c_{s3}c_{s4}c_{s4} n-1c_{sn-1}c_{sn-1}c_{sn}c_{sn} (or nc_{sn}c_{sn}l/))</u></u>
Section 4:	<u>(4444</u> <u>1d_{a1}d_{a1}d_{a2}d_{a2} 1r₁r₁r₂r₂ <u>2d_{a1}d_{a1}d_{a2}d_{a2}2r₁r₁r₂r₂ ...</u></u> <u>nd_{a1}d_{a1}d_{a2}d_{a2} nr₁r₁r₂r₂)</u>
Section 5:	<u>(5555l_b</u> <u>1A₁A₁A₁x (1d₁d₁d_sd_s) 1A₂A₂A₂x (2d₂d₂d_sd_s) ...</u> <u>nA_nA_nA_nx (nd_nd_nd_sd_s)</u>

Each WAVEOB report should be terminated with character '='.

Explanation of fields:

Section 0

M_iM_iX_jX_j	Here coded with 4 letter "MMXX"
D....D	Ship's call sign (ship observation only)
A1bwnbnbnb	WMO Number (WMO region, sub-area, buoy number) (sea station or remote platform, e.g. wave buoy)
I₆I₆	Satellite numeric indicator (Common code table C-5) (satellite observation only)
YYMMJ	Observation date (day of month, month, year of decade)
GGgg	Observation time (hours, minutes)
IIiii	Block number and station number (fixed sea station only)
Qc	Quadrant of the globe (1:NE, 3:SE, 5:SW, 7:NW) (sea station or remote platform)
L_aL_aL_aL_a	Latitude (degrees and minutes) (sea station or remote platform, e.g. wave buoy)
L_oL_oL_oL_oL_o	Longitude (degrees and minutes) (sea station or remote platform, e.g. wave buoy)
I_a	Indicator for frequency or wave number (code table 1731): 0=frequency (Hz); 1=wave number (m ⁻¹)
I_m	Indicator for method of calculation of spectral data (code table 1744): 1=Longuet-Higgins (1964); 2=Longuet Higgins (F3 method); 3=Maximum probability method; 4=Maximum entropy method.
I_p	Indicator for type of platform (code table 1747): 0=sea station; 1=buoy; 2=aeronef; 3=satellite
hhhh	Water depth (m)
H_sH_sH_sH_s	Significant wave height (cm)
P_pP_pP_pP_p	Spectral peak period derived from heave sensor
H_mH_mH_mH_m	Altitude of the level of maximum wind (1/10 of geopotential metres)
P_aP_aP_aP_a	Average wave period (1/10 s)
H_{se}H_{se}H_{se}H_{se}	Estimate of significant wave height from slope sensor (cm)
P_{sp}P_{sp}P_{sp}P_{sp}	spectral peak period derived from slope sensors (1/10s) or spectral peak wave length (m)
P_{sa}P_{sa}P_{sa}P_{sa}	Average period derived from slope sensors (1/10s) or average wave length (m)
d_dd_d	True direction, in units of 4 degrees, from which dominant wave is coming (code table 880) (00: 358°-2°, 01: 2°-6°, 02: 6°-10°, 89: 354°-358°)
d_sd_s	Directional spread, in whole degrees, of the dominant wave

Section 1

B_TB_T	Total number of bands described
SSSS	Sampling interval (1/10s or m)
D'D'D'D'	Duration of record of waves (s) or length of record of waves (1/10m)
BB	Number of bands described by the following two groups; BB=00 to indicate that each of the following groups represents only one central frequency or central wave number.
f_nf_nf_nx	Centre frequency or centre wave number (x is used for exponent, see below; decimal point is supposed to be placed at left, e.g. 3004 => 0.300 10 ⁻¹)
f_df_df_dx	Increment to be added to previous centre frequency or previous wave

number to obtain the next centre frequency or next wave number (x used for exponent, see below; decimal point is supposed to be placed at left, e.g. 3004 => 0.300 10⁻¹).

Section 2

x	Exponent to be applied (code table 4800): exponent = 10 ^(x-5)
C_mC_mC_m	Maximum non-directional spectral density derived from heave sensors, in m ² Hz ⁻¹ for frequencies and m ³ for wave numbers
n_mn_m	Number of the band in which the maximum non-directional spectral density determined by heave sensor lies
c_nc_n	The ratio of the spectral density derived from heave sensors for a given band, to the maximum spectral density given by C _m C _m C _m . A code value of 00 may indicate either zero, or that the band contains the maximum spectral density. Since the band containing the maximum value will have been identified, it will be obvious which meaning should be assigned.

Section 3

C_{sm}C_{sm}C_{sm}	Maximum non-directional spectral density derived from slope sensors, in m ² Hz ⁻¹ for frequencies and m ³ for wave numbers
n_{sm}n_{sm}	Number of the band in which the maximum non-directional spectral density determined by slope sensor lies
c_{sn}c_{sn}	The ratio of the spectral density derived from slope sensors for a given band, to the maximum spectral density given by C _{sm} C _{sm} C _{sm} . A code value of 00 may indicate either zero, or that the band contains the maximum spectral density. Since the band containing the maximum value will have been identified, it will be obvious which meaning should be assigned.

Section 4

d_{a1}d_{a1}	Mean direction, in units of 4 degrees, from which waves are coming for the band indicated, relative to true north (code table 880). A value of 99 indicates the energy for that band is below a given threshold.
d_{a2}d_{a2}	Principal direction, in units of 4 degrees, from which waves are coming for the band indicated, relative to true north (code table 880). A value of 99 indicates the energy for that band is below a given threshold.
r₁r₁	First normalized polar coordinate derived from Fourier coefficients
r₂r₂	Second normalized polar coordinate derived from Fourier coefficients.

Section 5

I_b	Indicator for directional or non-directional spectral wave data (code table 1732). 0: non-directional data; 1= directional data.
A_nA_nA_n	Spectral estimations of n th frequency band or wave number (x used for exponent, see above)
d_nd_n	True direction (rounded of to the nearest 5°), in tens of degrees, from which wind is blowing at specified levels starting with sea surface level.
d_sd_s	Directional spread, in whole degrees, of the dominant wave. The value of the directional thread is normally less than one radian (about 57°).

Annex C

Template presently being used to encode PDE buoy data in BUFR

DATA DESCRIPTORS (UNEXPANDED)

1	001005	48	000000
2	002001	49	000000
3	004001	50	000000
4	004002	51	000000
5	004003	52	000000
6	004004	53	000000
7	004005	54	000000
8	005002	55	000000
9	006002	56	000000
10	010004	57	000000
11	011011	58	000000
12	011012	59	000000
13	012004	60	000000
14	022070	61	000000
15	022074	62	000000
16	022076	63	000000
17	022071	64	000000
18	002031	65	000000
19	107014	66	000000
20	022080	67	000000
21	201134	68	000000
22	022096	69	000000
23	201000	70	000000
24	022090	71	000000
25	022086	72	000000
26	022095	73	000000
27	000000	74	000000
28	000000	75	000000
29	000000	76	000000
30	000000	77	000000
31	000000	78	000000
32	000000	79	000000
33	000000	80	000000
34	000000	81	000000
35	000000	82	000000
36	000000	83	000000
37	000000	84	000000
38	000000	85	000000
39	000000	86	000000
40	000000	87	000000
41	000000	88	000000
42	000000		
43	000000		
44	000000		
45	000000		
46	000000		
47	000000		

DATA DESCRIPTORS (EXPANDED)

1	001005	Buoy/platform identifier
2	002001	Type of station
3	004001	Year
4	004002	Month
5	004003	Day
6	004004	Hour
7	004005	Minute
8	005002	Latitude (coarse accuracy)
9	006002	Longitude (coarse accuracy)
10	010004	Pressure
11	011011	Wind direction at 10 m
12	011012	Wind speed at 10 m
13	012004	Dry-bulb temperature at 2 m
14	022070	Significant wave height
15	022074	Average wave period
16	022076	Direction from which dominant waves are coming
17	022071	Spectral peak wave period
18	002031	Duration and time of current measurement
19	022080	Waveband central frequency
20	022096	Spectral band width
21	022090	Non-directional spectral estimate by wave frequency
22	022086	Mean direction from which waves are coming
23	022095	Directional spread of individual waves
24	022080	Waveband central frequency
25	022096	Spectral band width
26	022090	Non-directional spectral estimate by wave frequency
27	022086	Mean direction from which waves are coming
28	022095	Directional spread of individual waves
29	022080	Waveband central frequency
30	022096	Spectral band width
31	022090	Non-directional spectral estimate by wave frequency
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34	022080	Waveband central frequency
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36	022090	Non-directional spectral estimate by wave frequency
37	022086	Mean direction from which waves are coming
38	022095	Directional spread of individual waves
39	022080	Waveband central frequency
40	022096	Spectral band width
41	022090	Non-directional spectral estimate by wave frequency
42	022086	Mean direction from which waves are coming
43	022095	Directional spread of individual waves
44	022080	Waveband central frequency
45	022096	Spectral band width

46 022090 Non-directional spectral estimate by wave
frequency

47 022086 Mean direction from which waves are coming

48 022095 Directional spread of individual waves

49 022080 Waveband central frequency

50 022096 Spectral band width

51 022090 Non-directional spectral estimate by wave
frequency

52 022086 Mean direction from which waves are coming

53 022095 Directional spread of individual waves

54 022080 Waveband central frequency

55 022096 Spectral band width

56 022090 Non-directional spectral estimate by wave
frequency

57 022086 Mean direction from which waves are coming

58 022095 Directional spread of individual waves

59 022080 Waveband central frequency

60 022096 Spectral band width

61 022090 Non-directional spectral estimate by wave
frequency

62 022086 Mean direction from which waves are coming

63 022095 Directional spread of individual waves

64 022080 Waveband central frequency

65 022096 Spectral band width

66 022090 Non-directional spectral estimate by wave
frequency

67 022086 Mean direction from which waves are coming

68 022095 Directional spread of individual waves

69 022080 Waveband central frequency

70 022096 Spectral band width

71 022090 Non-directional spectral estimate by wave
frequency

72 022086 Mean direction from which waves are coming

73 022095 Directional spread of individual waves

74 022080 Waveband central frequency

75 022096 Spectral band width

76 022090 Non-directional spectral estimate by wave
frequency

77 022086 Mean direction from which waves are coming

78 022095 Directional spread of individual waves

79 022080 Waveband central frequency

80 022096 Spectral band width

81 022090 Non-directional spectral estimate by wave
frequency

82 022086 Mean direction from which waves are coming

83 022095 Directional spread of individual waves

84 022080 Waveband central frequency

85 022096 Spectral band width

86 022090 Non-directional spectral estimate by wave
frequency

87 022086 Mean direction from which waves are coming

88 022095 Directional spread of individual waves

Example of decoded data:

1	Buoy/platform i	0.6202400000E+05	NUMERIC
2	Type of station	0.0000000000E+00	CODE TABLE
3	Year	0.2005000000E+04	Year
4	Month	0.4000000000E+01	Month
5	Day	0.1600000000E+02	Day
6	Hour	0.2300000000E+02	Hour
7	Minute	0.0000000000E+00	Minute
8	Latitude (coars	0.4363999939E+02	Degree
9	Longitude (coar	-0.3039999962E+01	Degree
10	Pressure	0.1016000000E+06	Pa
11	Wind direction	0.2760000000E+03	Degree true
12	Wind speed at 1	0.6099999905E+01	m s-1
13	Dry-bulb temper	0.2842999878E+03	K
14	Significant wav	0.2460000038E+01	m
15	Average wave pe	0.6099999905E+01	s
16	Direction from	0.3260000000E+03	Degree true
17	Spectral peak w	0.8600000381E+01	s
18	Duration and ti	0.3000000000E+01	CODE TABLE
19	Waveband centra	0.6899999827E-01	Hz
20	Spectral band w	0.1799999923E-01	s-1
21	Non-directional	0.9000000358E-01	m2 s
22	Mean direction	0.2870000000E+03	Degree true
23	Directional spr	0.5800000000E+02	Degree
24	Waveband centra	0.8100000024E-01	Hz
25	Spectral band w	0.4999999888E-02	s-1
26	Non-directional	0.5799999833E+00	m2 s
27	Mean direction	0.2810000000E+03	Degree true
28	Directional spr	0.5800000000E+02	Degree
29	Waveband centra	0.8699999750E-01	Hz
30	Spectral band w	0.8000000380E-02	s-1
31	Non-directional	0.7500000000E+00	m2 s
32	Mean direction	0.2810000000E+03	Degree true
33	Directional spr	0.5000000000E+02	Degree
34	Waveband centra	0.9300000221E-01	Hz
35	Spectral band w	0.3000000026E-02	s-1
36	Non-directional	0.4769999981E+01	m2 s
37	Mean direction	0.3040000000E+03	Degree true
38	Directional spr	0.4200000000E+02	Degree
39	Waveband centra	0.9899999946E-01	Hz
40	Spectral band w	0.9999999776E-02	s-1
41	Non-directional	0.2519999981E+01	m2 s
42	Mean direction	0.3040000000E+03	Degree true
43	Directional spr	0.4200000000E+02	Degree
44	Waveband centra	0.1089999974E+00	Hz
45	Spectral band w	0.9999999776E-02	s-1
46	Non-directional	0.5030000210E+01	m2 s
47	Mean direction	0.3090000000E+03	Degree true
48	Directional spr	0.5000000000E+02	Degree
49	Waveband centra	0.1159999967E+00	Hz
50	Spectral band w	0.4999999888E-02	s-1
51	Non-directional	0.9239999771E+01	m2 s
52	Mean direction	0.3090000000E+03	Degree true

53	Directional spr	0.5800000000E+02	Degree
54	Waveband centra	0.1239999980E+00	Hz
55	Spectral band w	0.9999999776E-02	s-1
56	Non-directional	0.5030000210E+01	m2 s
57	Mean direction	0.3260000000E+03	Degree true
58	Directional spr	0.3600000000E+02	Degree
59	Waveband centra	0.1379999965E+00	Hz
60	Spectral band w	0.1799999923E-01	s-1
61	Non-directional	0.2710000038E+01	m2 s
62	Mean direction	0.3260000000E+03	Degree true
63	Directional spr	0.5000000000E+02	Degree
64	Waveband centra	0.1580000073E+00	Hz
65	Spectral band w	0.2199999988E-01	s-1
66	Non-directional	0.2240000010E+01	m2 s
67	Mean direction	0.3260000000E+03	Degree true
68	Directional spr	0.5000000000E+02	Degree
69	Waveband centra	0.1889999956E+00	Hz
70	Spectral band w	0.3999999911E-01	s-1
71	Non-directional	0.1250000000E+01	m2 s
72	Mean direction	0.3150000000E+03	Degree true
73	Directional spr	0.5000000000E+02	Degree
74	Waveband centra	0.2380000055E+00	Hz
75	Spectral band w	0.5900000036E-01	s-1
76	Non-directional	0.4199999869E+00	m2 s
77	Mean direction	0.3090000000E+03	Degree true
78	Directional spr	0.5800000000E+02	Degree
79	Waveband centra	0.2930000126E+00	Hz
80	Spectral band w	0.5000000075E-01	s-1
81	Non-directional	0.2500000000E+00	m2 s
82	Mean direction	0.3090000000E+03	Degree true
83	Directional spr	0.5800000000E+02	Degree
84	Waveband centra	0.4090000093E+00	Hz
85	Spectral band w	0.1819999963E+00	s-1
86	Non-directional	0.7000000030E-01	m2 s
87	Mean direction	0.2980000000E+03	Degree true
88	Directional spr	0.5800000000E+02	Degree
