

**ADDITIONS TO BUFR/CREX TABLES FOR PRE-OPERATIONAL IMPLEMENTATION
 ENDORSED BY CBS for full operational status on 7 November 2007 (updated
 04/01/07)**

**ENTRIES FOR REPORTING DEGREE OF TURBULENCE IN WAFS SIGWX MESSAGES
 (already approved by chairs and CBS President in August 2005)**

F	X	Y	Element name	BUFR			CREX			
0	11	030	Extended degree of turbulence	Code table	0	0	6	Code table	0	2

**0 11 030
 Extended degree of turbulence**

Code figure

0	Nil)	in cloud
1	Light		
2	Moderate		
3	Severe)	in clear air
4	Nil		
5	Light		
6	Moderate)	cloud/clear air not specified
7	Severe		
8	Nil		
9	Light)	
10	Moderate (MOD)		
11	Severe (SEV)		
12	Extreme, in clear air		
13	Extreme, in cloud		
14	Extreme, cloud/clear air not specified (EXTREME)		
15	Light, isolated moderate (ISOL MOD)		
16	Light, occasional moderate (OCNL MOD)		
17	Light, frequently moderate (FRQ MOD)		
18	Moderate, isolated severe (MOD ISOL SEV)		
19	Moderate, occasional severe (MOD OCNL SEV)		
20	Moderate, frequently severe (MOD FRQ SEV)		
21	Severe, isolated extreme (SEV ISOL EXTREME)		
22	Severe, occasional extreme (SEV OCNL EXTREME)		
23	Severe, frequently extreme (SEV FRQ EXTREME)		
24-62	Reserved		
63	Missing value		

ADDITIONS REQUESTED FOR ENVISAT

Envisat requested change in the current RA2 radar altimeter BUFR data. They want to include two additional elements needed by wave modelers.

021093 Ku band peakiness numeric 3 0 16
021094 S band peakiness numeric 3 0 16

In addition 033047 " Measurement confidence data " flag table should be amended to add:

Bit number	Meaning
8	S band anomaly error detected

NEW TABLE ENTRIES FOR MARINE DATA

0 08 080 - Qualifier for GTSP quality class

New Code figure

5-9	<i>Reserved</i>
10	Water pressure at a level
11	Water temperature at a level
12	Salinity at a level
13-19	<i>Reserved</i>
20	Position
21-62	<i>Reserved</i>

New table entries to describe profiling float identifier and vertical coordinate below sea/water surface in pressure are necessary as follows.

Table reference	Table element name	Unit	Scale	Ref.	Data width
001087	WMO Marine observing platform extended identifier		Numeric 0	0	23
007065	Water pressure		Pa	-3	0 17

SEQUENCE DESCRIPTORS FOR SYNOPTIC REPORTS FROM LAND AND SEA STATIONS (SUITABLE FOR SYNOP, SYNOP MOBIL AND SHIP OBSERVATION DATA)

1. List of sequence descriptors displayed in the templates

The following sequence descriptors for synoptic reports from land and ship (suitable for SYNOP, SYNOP MOBIL and SHIP observations data) are listed below within the Templates in paragraph 3.

3 01 090, 3 01 092, 3 01 093, 3 02 031, 3 02 032, 3 02 033, 3 02 034, 3 02 035, 3 02 036, 3 02 037, 3 02 038, 3 02 039, 3 02 040, 3 02 041, 3 02 042, 3 02 043, 3 02 044, 3 02 045, 3 02 046, 3 02 047, 3 02 048, 3 02 052, 3 02 053, 3 02 054, 3 02 055, 3 02 056, 3 02 057, 3 02 058, 3 02 059, 3 02 060, 3 07 080, 3 07 090 and 3 08 007.

2. Sequence descriptors 3 02 046, 3 02 047 and 3 02 048

3 02 046 is proposed to express the data of the SYNOP group $54g_0s_nd_T$, where

g_0 is "Period of time, in hours, between the time of observation and the temperature change",

s_n is "Sign of the temperature change" – Code table 3845,

d_T is "Amount of temperature change, the sign of the change given by s_n " – Code table 0822.

						<i>(Temperature change)</i>
3	02	046	0	04	024	Time period or displacement
			0	04	024	Time period or displacement
			0	12	049	Temperature change over period specified

3 02 047 is proposed to express data of SYNOP group $56D_LD_MD_H$, where

D_L is "True direction from which C_L clouds are moving" – Code table 0700,

D_M is "True direction from which C_M clouds are moving" – Code table 0700,

D_H is "True direction from which C_H clouds are moving" – Code table 0700.

						<i>(Direction of cloud drift)</i>
3	02	047	1	02	003	Replicate 2 descriptors 3 times
			0	08	002	Vertical significance
			0	20	054	True direction from which clouds are moving

3 02 048 is proposed to express data of SYNOP group $57CD_ae_C$, where

C is "Genus of cloud" – Code table 0500,

D_a is "True direction in which the phenomenon indicated is observed" – Code table 0700,

e_C is "Elevation angle of the top of the cloud indicated by C " – Code table 1004.

						<i>(Direction and elevation of cloud)</i>
3	02	048	0	05	021	Bearing or azimuth
			0	07	021	Elevation angle
			0	20	012	Cloud type
			0	05	021	Bearing or azimuth (= missing to cancel the previous value)
			0	07	021	Elevation angle (= missing to cancel the previous value)

For reporting all groups of SYNOP Section 3 described in the international part of Manual on Codes (groups 54g₀s_nd_T, 56D_LD_MD_H, 57CD_ae_C, 58p₂₄p₂₄p₂₄ and 59p₂₄p₂₄p₂₄). BUFR/CREX following entries are proposed (0 12 049 for data representation of s_nd_T, 0 20 054 for D_L, D_M and D_H):

F X Y	Element name	BUFR				CREX		
0 12 049	Temperature change over specified period	K	0	-30	6	°C	0	2
0 20 054	True direction from which clouds are moving	Degree true	0	0	9	Degree true	0	3

DESCRIPTORS FOR REGIONAL PRACTICES

F X Y	Element name	BUFR				CREX		
0 12 121	Ground minimum temperature	K	2	0	16	°C	2	4
0 12 122	Ground minimum temperature of the preceding night	K	2	0	16	°C	2	4
0 13 056	Character and intensity of precipitation	Code table	0	0	4	Code table	0	2
0 13 057	Time of beginning or end of precipitation	Code table	0	0	4	Code table	0	2
0 20 040	Evolution of drift of snow	Code table	0	0	4	Code table	0	2
0 20 055	State of sky in tropics	Code table	0	0	4	Code table	0	2
0 20 066	Maximum diameter of hailstones	m	3	0	8	m	3	3
0 20 067	Diameter of deposit	m	3	0	9	m	3	3
0 20 101	Locust (acridian) name	Code table	0	0	4	Code table	0	2
0 20 102	Locust (maturity) color	Code table	0	0	4	Code table	0	2
0 20 103	Stage of development of locusts	Code table	0	0	4	Code table	0	2
0 20 104	Organization state of swarm or band of locusts	Code table	0	0	4	Code table	0	2
0 20 105	Size of swarm or band of locusts and duration of passage of swarm	Code table	0	0	4	Code table	0	2

0 20 106	Locust population density	Code table	0	0	4	Code table	0	2
0 20 107	Direction of movements of locust swarm	Code table	0	0	4	Code table	0	2
0 20 108	Extent of vegetation	Code table	0	0	4	Code table	0	2

Moreover, it is proposed to rename descriptor **0 20 054** “True direction from which clouds are moving” to read “**True direction from which a phenomenon or clouds are moving**” to allow its usage for data representation of groups 919M_wD_a (type of water spout, tornado, whirlwind, dustdevils and direction from which they approach the station) and 918s_qD_p (type of squall and direction from which it approaches the station).

Proposed new Code tables:

0 13 056	Character and intensity of precipitation	Manual on Codes, WMO-No.306, Vol. II Code table 167
-		
0 13 057	Time of beginning or end of precipitation	Code table 168
-		
0 20 055	State of sky in tropics	Code table 430
-		
0 20 101	Locust (acridian) name	Code table 162
-		
0 20 102	Locust (maturity) color	Code table 159
-		
0 20 103	Stage of development of locusts	Code table 160
-		
0 20 104	Organization state of swarm or band of locusts	Code table 161
-		
0 20 105	Size of swarm or band of locusts and duration of passage of swarm	Code table 173
-		
0 20 106	Locust population density	Code table 139
-		
0 20 107	Direction of movements of locust swarm	Code table 140
-		
0 20 108	Extent of vegetation	Code table 182
-		

The existing extent of the above listed Code tables from Manual on Codes, WMO-No. 306, Volume II, is to be supplemented by code figures 10-14 Reserved and by code figure 15 Missing value.

Code Table 0 20 040 is proposed to express code figures for S'₈ (Code table 3776, Manual on Codes, WMO-No. 306, Volume I.1).

0 20 040
Evolution of drift of snow

Code figure	
0	Drift snow ended before the hour of observation
1	Intensity diminishing
2	No change
3	Intensity increasing
4	Continues, apart from interruption lasting less than 30 minutes
5	General drift snow has become drift snow near the ground
6	Drift snow near the ground has become general drift snow
7	Drift snow has started again after an interruption of more than 30 minutes
8 -14	Reserved
15	Missing value

Additions to the existing Flag tables: *Operational*

	0 20 023
Bit No.	Other weather phenomena
12	Water-spout

	0 20 027
Bit No.	Phenomenon occurrence
6	Below station level

BUFR TEMPLATE FOR SYNOPTIC REPORTS FROM FIXED LAND STATIONS SUITABLE FOR SYNOP OBSERVATION DATA

TM 307080 - BUFR template for synoptic reports from fixed land stations suitable for SYNOP data

3 07 080		Sequence for representation of synoptic reports from a fixed land station suitable for SYNOP data
	3 01 090	Fixed surface station identification, time, horizontal and vertical coordinates
	3 02 031	Pressure data
	3 02 035	Basic synoptic "instantaneous" data
	3 02 036	Clouds with bases below station level
	3 02 047	Direction of cloud drift
	0 08 002	Vertical significance
	3 02 048	Direction and elevation of cloud
	3 02 037	State of ground, snow depth, ground minimum temperature
	3 02 043	Basic synoptic "period" data
	3 02 044	Evaporation data
	1 01 002	Replicate next descriptor 2 times
	3 02 045	Radiation data (from 1 hour and/or 24 hour period)
	3 02 046	Temperature change

This BUFR template for synoptic reports from fixed land stations further expands as follows:

3 01 090			Fixed surface station identification, time, horizontal and vertical coordinates	Unit, scale
	3 01 004	0 01 001	WMO block number	ll Numeric, 0
		0 01 002	WMO station number	iii Numeric, 0
		0 01 015	Station or site name	CCITT IA5, 0
		0 02 001	Type of station	(ix) Code table, 0
	3 01 011	0 04 001	Year	Year, 0
		0 04 002	Month	Month, 0
		0 04 003	Day	YY Day, 0
	3 01 012	0 04 004	Hour	GG Hour, 0
		0 04 005	Minute	gg Minute, 0
	3 01 021	0 05 001	Latitude (high accuracy)	Degree, 5
		0 06 001	Longitude (high accuracy)	Degree, 5
	0 07 030		Height of station ground above mean sea level	m, 1
	0 07 031		Height of barometer above mean sea level	m, 1
3 02 031			Pressure data	
	3 02 001	0 10 004	Pressure	P₀P₀P₀P₀ Pa, -1
		0 10 051	Pressure reduced to mean sea level	PPPP Pa, -1
		0 10 061	3-hour pressure change	ppp Pa, -1
		0 10 063	Characteristic of pressure tendency	a Code table, 0
		0 10 062	24-hour pressure change	p₂₄p₂₄p₂₄ Pa, -1
		0 07 004	Pressure (standard level)	a₃ Pa, -1
		0 10 009	Geopotential height of the standard level	hhh gpm, 0
3 02 035			Basic synoptic "instantaneous" data	
			Temperature and humidity data	
	3 02 032	0 07 032	Height of sensor above local ground (for temperature and humidity measurement)	m, 2

		0 12 101	Temperature/dry-bulb temperature(sc.2) $s_n TTT$	K, 2
		0 12 103	Dew-point temperature (scale 2) $s_n T_d T_d T_d$	K, 2
		0 13 003	Relative humidity	%, 0
			Visibility data	
3 02 033	0 07 032		Height of sensor above local ground (for visibility measurement)	m, 2
		0 20 001	Horizontal visibility VV	m, -1
			Precipitation past 24 hours	
3 02 034	0 07 032		Height of sensor above local ground (for precipitation measurement)	m, 2
		0 13 023	Total precipitation past 24 hours $R_{24} R_{24} R_{24} R_{24}$	kg m ⁻² , 1
	0 07 032		Height of sensor above local ground (set to missing to cancel the previous value)	m, 2
			Cloud data	
3 02 004	0 20 010		Cloud cover (total) N	%, 0
	0 08 002		Vertical significance	Code table, 0
	0 20 011		Cloud amount (of low or middle clouds) N_h	Code table, 0
	0 20 013		Height of base of cloud h	m, -1
	0 20 012		Cloud type (low clouds C_L) C_L	Code table, 0
	0 20 012		Cloud type (middle clouds C_M) C_M	Code table, 0
	0 20 012		Cloud type (high clouds C_H) C_H	Code table, 0
			Individual cloud layers or masses	
	1 01 000		Delayed replication of 1 descriptor	
	0 31 001		Delayed descriptor replication factor	Numeric, 0
	3 02 005	0 08 002	Vertical significance	Code table, 0
		0 20 011	Cloud amount (N_s) N_s	Code table, 0
		0 20 012	Cloud type (C) C	Code table, 0
		0 20 013	Height of base of cloud ($h_s h_s$) $h_s h_s$	m, -1
			Clouds with bases below station level	
3 02 036	1 05 000		Delayed replication of 5 descriptors	
	0 31 001		Delayed descriptor replication factor	Numeric, 0
	0 08 002		Vertical significance	Code table, 0
		0 20 011	Cloud amount N'	Code table, 0
		0 20 012	Cloud type C'	Code table, 0
		0 20 014	Height of top of cloud $H'H'$	m, -1
		0 20 017	Cloud top description C_t	Code table, 0
			Direction of cloud drift gr. 56 $D_L D_M D_H$	
3 02 047	1 02 003		Replicate 2 descriptors 3 times	
	0 08 002		Vertical significance = 7 (low cloud) = 8 (middle cloud) = 9 (high cloud)	Code table, 0
	0 20 054		True direction from which clouds are moving D_L, D_M, D_H	Degree true, 0
0 08 002			Vertical significance (set to missing to cancel the previous value)	Code table, 0
			Direction and elevation of cloud gr. 57 $C D_a e_c$	
3 02 048	0 05 021		Bearing or azimuth D_a	Degree true, 2
	0 07 021		Elevation angle e_c	Degree, 2
	0 20 012		Cloud type C	Code table, 0
	0 05 021		Bearing or azimuth (set to missing to cancel the previous value)	Degree true, 2
	0 07 021		Elevation angle	Degree, 2

			(set to missing to cancel the previous value)	
			State of ground, snow depth, ground minimum temperature	
3 02 037	0 20 062		State of ground (with or without snow) E or E'	Code table, 0
	0 13 013		Total snow depth sss	m, 2
	0 12 113		Ground minimum temperature (scale2), past 12 hours s_nT_gT_g	K, 2
3 02 043			Basic synoptic "period" data	
			Present and past weather	
3 02 038	0 20 003		Present weather ww	Code table, 0
	0 04 024		Time period in hours	Hour, 0
	0 20 004		Past weather (1) W₁	Code table, 0
	0 20 005		Past weather (2) W₂	Code table, 0
			Sunshine data (from 1 hour and 24 hour period)	
	1 01 002		Replicate 1 descriptors 2 times	
3 02 039	0 04 024		Time period in hours	Hour, 0
	0 14 031		Total sunshine SS and SSS	Minute, 0
			Precipitation measurement	
3 02 040	0 07 032		Height of sensor above local ground (for precipitation measurement)	m, 2
	1 02 002		Replicate next 2 descriptors 2 times	
	0 04 024		Time period in hours t_R	Hour, 0
	0 13 011		Total precipitation / total water equivalent of snow RRR	kg m ⁻² , 1
			Extreme temperature data	
3 02 041	0 07 032		Height of sensor above local ground (for temperature measurement)	m, 2
	0 04 024		Time period or displacement	Hour, 0
	0 04 024		Time period or displacement (see Notes 1 and 2)	Hour, 0
	0 12 111		Maximum temperature (scale 2) at height and over period specified s_nT_xT_xT_x	K, 2
	0 04 024		Time period or displacement	Hour, 0
	0 04 024		Time period or displacement (see Note 2)	Hour, 0
	0 12 112		Minimum temperature (scale 2) at height and over period specified s_nT_nT_nT_n	K, 2
			Wind data	
3 02 042	0 07 032		Height of sensor above local ground (for wind measurement)	m, 2
	0 02 002		Type of instrumentation for wind measurement i_w	Flag table, 0
	0 08 021		Time significance (= 2 (time averaged))	Code table, 0
	0 04 025		Time period (= - 10 minutes, or number of minutes after a significant change of wind)	Minute, 0
	0 11 001		Wind direction dd	Degree true, 0
	0 11 002		Wind speed ff	m s ⁻¹ , 1
	0 08 021		Time significance (= missing value)	Code table, 0
	1 03 002		Replicate next 3 descriptors 2 times	
	0 04 025		Time period in minutes	Minute, 0
	0 11 043		Maximum wind gust direction	Degree true, 0
	0 11 041		Maximum wind gust speed 910f_mf_m, 911f_xf_x	m s ⁻¹ , 1
	0 07 032		Height of sensor above local ground (set to missing to cancel the previous value)	m, 2

			Evaporation data	
3 02 044	0 04 024		Time period in hours	Hour, 0
	0 02 004		Type of instrument for evaporation or crop type for evapotranspiration i_E	Code table, 0
	0 13 033		Evaporation /evapotranspiration EEE	kg m ⁻² , 1
			Radiation data (from 1 hour and 24 hour period)	
1 01 002			Replicate next descriptor 2 times	
3 02 045	0 04 024		Time period in hours	Hour, 0
	0 14 002		Long-wave radiation, integrated over period specified 553SS 4 FFFF or 553SS 5 FFFF , 55SSS 4 F₂₄F₂₄F₂₄F₂₄ or 55SSS 5 F₂₄F₂₄F₂₄F₂₄	J m ⁻² , -3
	0 14 004		Short-wave radiation, integrated over period specified 553SS 6 FFFF , 55SSS 6 F₂₄F₂₄F₂₄F₂₄	J m ⁻² , -3
	0 14 016		Net radiation, integrated over period specified 553SS 0 FFFF or 553SS 1 FFFF , 55SSS 0 F₂₄F₂₄F₂₄F₂₄ or 55SSS 1 F₂₄F₂₄F₂₄F₂₄	J m ⁻² , -4
	0 14 028		Global solar radiation (high accuracy), integrated over period specified 553SS 2 FFFF , 55SSS 2 F₂₄F₂₄F₂₄F₂₄	J m ⁻² , -2
	0 14 029		Diffuse solar radiation (high accuracy), integrated over period specified 553SS 3 FFFF , 55SSS 3 F₂₄F₂₄F₂₄F₂₄	J m ⁻² , -2
	0 14 030		Direct solar radiation (high accuracy), integrated over period specified 55408 4 FFFF , 55508 5 F₂₄F₂₄F₂₄F₂₄	J m ⁻² , -2
			Temperature change group 54g ₀ s _n d _T	
3 02 046	0 04 024		Time period or displacement	Hour, 0
	0 04 024		Time period or displacement (see Note 3)	Hour, 0
	0 12 049		Temperature change over period specified s _n d _T	K, 0

Notes:

- 1) Within RA-IV, the maximum temperature at 1200 UTC is reported for the previous calendar day (i.e. the ending time of the period is not equal to the nominal time of the report). To construct the required time range, descriptor 004024 has to be included two times. If the period ends at the nominal time of the report, value of the second 004024 shall be set to 0.
- 2) Within RA-III, the maximum day-time temperature and the minimum night-time temperature is reported (i.e. the ending time of the period may not be equal to the nominal time of the report). To construct the required time range, descriptor 004024 has to be included two times. If the period ends at the nominal time of the report, value of the second 004024 shall be set to 0.
- 3) To construct the required time range, descriptor 004024 has to be included two times.

Regional regulations for reporting SYNOP data in BUFR/CREX

TM 307081 - BUFR template for synoptic reports from fixed land stations suitable for SYNOP data in compliance with reporting practices in RA I

3 07 081:

3 01 090	Fixed surface station identification, time, horizontal and vertical coordinates		Unit, scale
3 02 031	Pressure data		
3 02 035	Basic synoptic "instantaneous" data		
3 02 036	Clouds with bases below station level		
3 02 047	Direction of cloud drift		
0 08 002	Vertical significance (= missing to cancel the previous value)		Code table, 0
3 02 048	Direction and elevation of cloud		
3 02 037	State of ground, snow depth, ground minimum temperature (past 12 hours)		
0 12 122	Ground minimum temperature of the preceding night	$s_n T_g T_g$	K, 2
0 13 056	Character and intensity of precipitation	R_c	Code table, 0
0 13 057	Time of beginning or end of precipitation	R_t	Code table, 0
0 20 101	Locust (acridian) name	L_n	Code table, 0
0 20 102	Locust (maturity) color	L_c	Code table, 0
0 20 103	Stage of development of locusts	L_d	Code table, 0
0 20 104	Organization state of swarm or band of locusts	L_g	Code table, 0
0 20 105	Size of swarm or band of locusts and duration of passage of swarm	s_L	Code table, 0
0 20 106	Locust population density	d_L	Code table, 0
0 20 107	Direction of movements of locust swarm	D_L	Code table, 0
0 20 108	Extent of vegetation	v_e	Code table, 0
3 02 043	Basic synoptic "period" data		
3 02 044	Evaporation data		
1 01 002	Replicate next descriptor 2 times		
3 02 045	Radiation data (from 1 hour and/or 24 hour period)		
3 02 046	Temperature change		

TM 307082 - BUFR template for synoptic reports from fixed land stations suitable for SYNOP data in compliance with reporting practices in RA II

3 07 082:

3 01 090	Fixed surface station identification, time, horizontal and vertical coordinates		Unit, scale
3 02 031	Pressure data		
3 02 035	Basic synoptic "instantaneous" data		
3 02 036	Clouds with bases below station level		
3 02 047	Direction of cloud drift		
0 08 002	Vertical significance (= missing to cancel the previous value)		Code table, 0
3 02 048	Direction and elevation of cloud		
3 02 037	State of ground, snow depth, ground minimum temperature (past 12 hours)		
0 12 121	Ground minimum temperature (at the time of observation)	$s_n T'_g T'_g$	K, 2

0 12 122	Ground minimum temperature of the preceding night $s_n T_g T_g$	K, 2
3 02 043	Basic synoptic "period" data	
3 02 044	Evaporation data	
1 01 002	Replicate next descriptor 2 times	
3 02 045	Radiation data (from 1 hour and/or 24 hour period)	
3 02 046	Temperature change	

TM 307083 - BUFR template for synoptic reports from fixed land stations suitable for SYNOP data in compliance with reporting practices in RA III

3 07 083:

3 01 090	Fixed surface station identification, time, horizontal and vertical coordinates	Unit, scale
3 02 031	Pressure data	
3 02 035	Basic synoptic "instantaneous" data	
3 02 036	Clouds with bases below station level	
3 02 047	Direction of cloud drift	
0 08 002	Vertical significance (= missing to cancel the previous value)	Code table, 0
3 02 048	Direction and elevation of cloud	
3 02 037	State of ground, snow depth, ground minimum temperature (past 12 hours)	
0 12 122	Ground minimum temperature of the preceding night $s_n T_g T_g$	K, 2
3 02 043	Basic synoptic "period" data	
3 02 044	Evaporation data	
1 01 002	Replicate next descriptor 2 times	
3 02 045	Radiation data (from 1 hour and/or 24 hour period)	
3 02 046	Temperature change	

TM 307084 - BUFR template for synoptic reports from fixed land stations suitable for SYNOP data in compliance with reporting practices in RA IV

3 07 084:

3 01 090	Fixed surface station identification, time, horizontal and vertical coordinates	Unit, scale
3 02 031	Pressure data	
3 02 035	Basic synoptic "instantaneous" data	
3 02 036	Clouds with bases below station level	
3 02 047	Direction of cloud drift	
0 08 002	Vertical significance (= missing to cancel the previous value)	Code table, 0
3 02 048	Direction and elevation of cloud	
3 02 037	State of ground, snow depth, ground minimum temperature (past 12 hours)	
0 20 055	State of sky in tropics C_s	Code table, 0
1 01 000	Delayed replication of 1 descriptor	
0 31 001	Delayed descriptor replication factor	Numeric, 0
2 05 001	Character field of 1 character	CCITT IA5, 0
3 02 043	Basic synoptic "period" data	
3 02 044	Evaporation data	

1 01 002	Replicate next descriptor 2 times	
3 02 045	Radiation data (from 1 hour and/or 24 hour period)	
3 02 046	Temperature change	

TM 307086 - BUFR template for synoptic reports from fixed land stations suitable for SYNOP data in compliance with reporting practices in RA VI

3 07 086:

3 01 090		Fixed surface station identification, time, horizontal and vertical coordinates	Unit, scale
3 02 031		Pressure data	
3 02 035		Basic synoptic "instantaneous" data	
3 02 036		Clouds with bases below station level	
0 08 002		Vertical significance (= missing to cancel the previous value)	
3 02 037		State of ground, snow depth, ground minimum temperature	
3 02 066		Dangerous weather phenomena	
		Groups 919M_wD_a and 96119 in SYNOP	
	0 20 023	Other weather phenomena M_w (1= Dust/sand whirl, 9= Funnel clouds not touching surface, 10 = Funnel clouds touching surface, 12 = Water-spout)	Flag table, 0
	0 20 024	Intensity of phenomena (1= Light, 2 = Moderate, 3 = Heavy, 4 = Violent)	Code table, 0
	0 20 027	Phenomenon occurrence (1=At time of observation, 3=In time period for past weather)	Flag table, 0
	0 20 054	True direction from which a phenomenon or clouds are moving D_a	Degree true, 0
		Group 918s_qD_p in SYNOP	
	0 20 023	Other weather phenomena (2 = Squalls) s_q	Flag table, 0
	0 20 027	Phenomenon occurrence (1=At time of observation, 3=In time period for past weather)	Flag table, 0
	0 20 054	True direction from which a phenomenon or clouds are moving D_p	Degree true, 0
		Group 929S₈S'₈ in SYNOP	
	0 20 025	Obscuration (13 = Snow)	Flag table, 0
	0 20 026	Character of obscuration (5= Low drifting, 6= Blowing) S₈	Code table, 0
	0 20 027	Phenomenon occurrence (1=At time of observation, 3=In time period for past weather)	Flag table, 0
	0 20 040	Evolution of drift of snow S'₈	Code table, 0
		Group 932RR	
	0 20 066	Maximum diameter of hailstones RR	m, 3
	0 20 027	Phenomenon occurrence (1=At time of observation, 3=In time period for past weather)	Flag table, 0
		Groups 934RR- 937RR in SYNOP	
	0 20 021	Type of precipitation (15=Glaze, 16=Rime, 20=Wet snow)	Flag table, 0
	0 20 067	Diameter of deposit RR	m, 3
	0 20 027	Phenomenon occurrence (1=At time of observation, 3=In time period for past weather)	Flag table, 0
3 02 043		Basic synoptic "period" data	
3 02 044		Evaporation data	
1 01 002		Replicate next descriptor 2 times	
3 02 045		Radiation data (from 1 hour and/or 24 hour period)	

Note:

Groups 56D_LD_MD_H, 57CD_ae_c and 54g_os_nd_T are not used in RA VI and therefore the corresponding sequence descriptors 3 02 047, 3 02 048 and 3 02 046 are not included in the RA VI regional template for SYNOP data.

TM 307090 - BUFR template for synoptic reports from mobile land stations suitable for SYNOP MOBIL data

3 07 090		Sequence for representation of synoptic reports from a mobile land station suitable for SYNOP MOBIL data
	3 01 092	Mobile surface station identification, time, horizontal and vertical coordinates
	3 02 031	Pressure data
	3 02 035	Basic synoptic "instantaneous" data
	3 02 036	Clouds with bases below station level
	3 02 047	Direction of cloud drift
	0 08 002	Vertical significance
	3 02 048	Direction and elevation of cloud
	3 02 037	State of ground, snow depth, ground minimum temperature
	3 02 043	Basic synoptic "period" data
	3 02 044	Evaporation data
	1 01 002	Replicate next descriptor 2 times
	3 02 045	Radiation data (from 1 hour and/or 24 hour period)
	3 02 046	Temperature change

This BUFR template for synoptic reports from mobile land stations further expands as follows:

3 01 092			Mobile surface station identification, time, horizontal and vertical coordinates	Unit, scale
	0 01 011		Mobile land station identifier D...D	CCITT IA5, 0
	0 01 003		WMO Region number A₁	Code table, 0
	0 02 001		Type of station (i_x)	Code table, 0
	3 01 011	0 04 001	Year	Year, 0
		0 04 002	Month	Month, 0
		0 04 003	Day YY	Day, 0
	3 01 012	0 04 004	Hour GG	Hour, 0
		0 04 005	Minute gg	Minute, 0
	3 01 021	0 05 001	Latitude (high accuracy) L_aL_aL_a	Degree, 5
		0 06 001	Longitude (high accuracy) L_oL_oL_oL_o	Degree, 5
	0 07 030		Height of station ground above mean sea level	m, 1
	0 07 031		Height of barometer above mean sea level	m, 1
	0 33 024		Station elevation quality mark i_m	Code table, 0
3 02 031			Pressure data	
	3 02 001	0 10 004	Pressure P₀P₀P₀P₀	Pa, -1
		0 10 051	Pressure reduced to mean sea level PPPP	Pa, -1
		0 10 061	3-hour pressure change ppp	Pa, -1
		0 10 063	Characteristic of pressure tendency a	Code table, 0
	0 10 062		24-hour pressure change p₂₄p₂₄p₂₄	Pa, -1
	0 07 004		Pressure (standard level) a₃	Pa, -1
	0 10 009		Geopotential height of the standard level hhh	gpm, 0
3 02 035			Basic synoptic "instantaneous" data	
			Temperature and humidity data	
	3 02 032	0 07 032	Height of sensor above local ground (for temperature and humidity measurement)	m, 2

		0 12 101	Temperature/dry-bulb temperature(sc.2) $s_n TTT$	K, 2
		0 12 103	Dew-point temperature (scale 2) $s_n T_d T_d T_d$	K, 2
		0 13 003	Relative humidity	%, 0
			Visibility data	
3 02 033	0 07 032		Height of sensor above local ground (for visibility measurement)	m, 2
		0 20 001	Horizontal visibility VV	m, -1
			Precipitation past 24 hours	
3 02 034	0 07 032		<i>Height of sensor above local ground</i> (for precipitation measurement)	m, 2
		0 13 023	Total precipitation past 24 hours $R_{24} R_{24} R_{24} R_{24}$	kg m ⁻² , 1
0 07 032			<i>Height of sensor above local ground</i> (set to missing to cancel the previous value)	m, 2
			Cloud data	
3 02 004	0 20 010		Cloud cover (total) N	%, 0
		0 08 002	Vertical significance	Code table, 0
		0 20 011	Cloud amount (of low or middle clouds) N_h	Code table, 0
		0 20 013	Height of base of cloud h	m, -1
		0 20 012	Cloud type (low clouds C_L) C_L	Code table, 0
		0 20 012	Cloud type (middle clouds C_M) C_M	Code table, 0
		0 20 012	Cloud type (high clouds C_H) C_H	Code table, 0
			Individual cloud layers or masses	
1 01 000			Delayed replication of 1 descriptor	
0 31 001			Delayed descriptor replication factor	Numeric, 0
3 02 005	0 08 002		Vertical significance	Code table, 0
		0 20 011	Cloud amount (N_s) N_s	Code table, 0
		0 20 012	Cloud type (C) C	Code table, 0
		0 20 013	Height of base of cloud ($h_s h_s$) $h_s h_s$	m, -1
			Clouds with bases below station level	
3 02 036	1 05 000		Delayed replication of 5 descriptors	
	0 31 001		Delayed descriptor replication factor	Numeric, 0
	0 08 002		Vertical significance	Code table, 0
	0 20 011		Cloud amount N'	Code table, 0
	0 20 012		Cloud type C'	Code table, 0
	0 20 014		Height of top of cloud $H'H'$	m, -1
	0 20 017		Cloud top description C_t	Code table, 0
			Direction of cloud drift gr. 56 $D_L D_M D_H$	
3 02 047	1 02 003		Replicate 2 descriptors 3 times	
	0 08 002		Vertical significance = 7 (low cloud) = 8 (middle cloud) = 9 (high cloud)	Code table, 0
	0 20 054		True direction from which clouds are moving D_L, D_M, D_H	Degree true, 0
0 08 002			Vertical significance (set to missing to cancel the previous value)	Code table, 0
			Direction and elevation of cloud gr. 57 $C D_a e_c$	
3 02 048	0 05 021		Bearing or azimuth D_a	Degree true, 2
	0 07 021		Elevation angle e_c	Degree, 2
	0 20 012		Cloud type C	Code table, 0
	0 05 021		Bearing or azimuth (set to missing to cancel the previous value)	Degree true, 2
	0 07 021		Elevation angle	Degree, 2

			(set to missing to cancel the previous value)	
			State of ground, snow depth, ground minimum temperature	
3 02 037	0 20 062		State of ground (with or without snow) E or E'	Code table, 0
	0 13 013		Total snow depth sss	m, 2
	0 12 113		Ground minimum temperature (scale2), past 12 hours s_nT_gT_g	K, 2
3 02 043			Basic synoptic "period" data	
			Present and past weather	
	3 02 038	0 20 003	Present weather ww	Code table, 0
		0 04 024	Time period in hours	Hour, 0
		0 20 004	Past weather (1) W₁	Code table, 0
		0 20 005	Past weather (2) W₂	Code table, 0
			Sunshine data (from 1 hour and 24 hour period)	
	1 01 002		Replicate 1 descriptors 2 times	
	3 02 039	0 04 024	Time period in hours	Hour, 0
		0 14 031	Total sunshine SS and SSS	Minute, 0
			Precipitation measurement	
	3 02 040	0 07 032	Height of sensor above local ground (for precipitation measurement)	m, 2
		1 02 002	Replicate next 2 descriptors 2 times	
		0 04 024	Time period in hours t_R	Hour, 0
		0 13 011	Total precipitation / total water equivalent of snow RRR	kg m ⁻² , 1
			Extreme temperature data	
	3 02 041	0 07 032	Height of sensor above local ground (for temperature measurement)	m, 2
		0 04 024	Time period or displacement	Hour, 0
		0 04 024	Time period or displacement (see Notes 1 and 2)	Hour, 0
		0 12 111	Maximum temperature (scale 2) at height and over period specified s_nT_xT_xT_x	K, 2
		0 04 024	Time period or displacement	Hour, 0
		0 04 024	Time period or displacement (see Note 2)	Hour, 0
		0 12 112	Minimum temperature (scale 2) at height and over period specified s_nT_nT_nT_n	K, 2
			Wind data	
	3 02 042	0 07 032	Height of sensor above local ground (for wind measurement)	m, 2
		0 02 002	Type of instrumentation for wind measurement i_w	Flag table, 0
		0 08 021	Time significance (= 2 (time averaged))	Code table, 0
		0 04 025	Time period (= - 10 minutes, or number of minutes after a significant change of wind)	Minute, 0
		0 11 001	Wind direction dd	Degree true, 0
		0 11 002	Wind speed ff	m s ⁻¹ , 1
		0 08 021	Time significance (= missing value)	Code table, 0
		1 03 002	Replicate next 3 descriptors 2 times	
		0 04 025	Time period in minutes	Minute, 0
		0 11 043	Maximum wind gust direction	Degree true, 0
		0 11 041	Maximum wind gust speed 910f_mf_m, 911f_xf_x	m s ⁻¹ , 1
	0 07 032		Height of sensor above local ground (set to missing to cancel the previous value)	m, 2

			Evaporation data	
3 02 044	0 04 024		Time period in hours	Hour, 0
	0 02 004		Type of instrument for evaporation or crop type for evapotranspiration i_E	Code table, 0
	0 13 033		Evaporation /evapotranspiration EEE	kg m ⁻² , 1
			Radiation data (from 1 hour and 24 hour period)	
1 01 002			Replicate next descriptor 2 times	
3 02 045	0 04 024		Time period in hours	Hour, 0
	0 14 002		Long-wave radiation, integrated over period specified 553SS 4 FFFF or 553SS 5 FFFF , 55SSS 4 F₂₄F₂₄F₂₄F₂₄ or 55SSS 5 F₂₄F₂₄F₂₄F₂₄	J m ⁻² , -3
	0 14 004		Short-wave radiation, integrated over period specified 553SS 6 FFFF , 55SSS 6 F₂₄F₂₄F₂₄F₂₄	J m ⁻² , -3
	0 14 016		Net radiation, integrated over period specified 553SS 0 FFFF or 553SS 1 FFFF , 55SSS 0 F₂₄F₂₄F₂₄F₂₄ or 55SSS 1 F₂₄F₂₄F₂₄F₂₄	J m ⁻² , -4
	0 14 028		Global solar radiation (high accuracy), integrated over period specified 553SS 2 FFFF , 55SSS 2 F₂₄F₂₄F₂₄F₂₄	J m ⁻² , -2
	0 14 029		Diffuse solar radiation (high accuracy), integrated over period specified 553SS 3 FFFF , 55SSS 3 F₂₄F₂₄F₂₄F₂₄	J m ⁻² , -2
	0 14 030		Direct solar radiation (high accuracy), integrated over period specified 55408 4 FFFF , 55508 5 F₂₄F₂₄F₂₄F₂₄	J m ⁻² , -2
3 02 046			Temperature change group 54g ₀ s _n d _T	
	0 04 024		Time period or displacement	Hour, 0
	0 04 024		Time period or displacement (see Note 3)	Hour, 0
	0 12 049		Temperature change over period specified s _n d _T	K, 0

Notes:

- 1) Within RA-IV, the maximum temperature at 1200 UTC is reported for the previous calendar day (i.e. the ending time of the period is not equal to the nominal time of the report). To construct the required time range, descriptor 004024 has to be included two times. If the period ends at the nominal time of the report, value of the second 004024 shall be set to 0.
- 2) Within RA-III, the maximum day-time temperature and the minimum night-time temperature is reported (i.e. the ending time of the period may not be equal to the nominal time of the report). To construct the required time range, descriptor 004024 has to be included two times. If the period ends at the nominal time of the report, value of the second 004024 shall be set to 0.
- 3) To construct the required time range, descriptor 004024 has to be included two times.

TM 308009 - BUFR template for synoptic reports from sea stations suitable for SHIP data

3 08 009		Sequence for representation of synoptic reports from a sea station suitable for SHIP data
	3 01 093	Ship identification, movement, date/time, horizontal and vertical coordinates
	3 02 001	Pressure data
	3 02 054	SHIP "instantaneous" data
	0 08 002	Vertical significance
	3 02 055	Icing and ice
	3 02 057	SHIP marine data
	3 02 060	SHIP "period" data

This BUFR template for synoptic reports from sea stations further expands as follows:

3 01 093			Ship identification, movement, date/time, horizontal and vertical coordinates	Unit, scale
	3 01 036	0 01 011	Ship or mobile land station identifier D...D	CCITT IA5, 0
		0 01 012	Direction of motion of moving observing platform ⁽³⁾ D_s	Degree true, 0
		0 01 013	Speed of motion of moving observing platform ⁽⁴⁾ v_s	m s ⁻¹ , 0
		0 02 001	Type of station (i_x)	Code table, 0
		0 04 001	Year	Year, 0
		0 04 002	Month	Month, 0
		0 04 003	Day YY	Day, 0
		0 04 004	Hour GG	Hour, 0
		0 04 005	Minute gg	Minute, 0
		0 05 002	Latitude (coarse accuracy) L_aL_aL_a	Degree, 2
		0 06 002	Longitude (coarse accuracy) L_oL_oL_o	Degree, 2
	0 07 030		Height of station platform above mean sea level	m, 1
	0 07 031		Height of barometer above mean sea level	m, 1
			Pressure data	
3 02 001	0 10 004		Pressure P₀P₀P₀P₀	Pa, -1
	0 10 051		Pressure reduced to mean sea level PPPP	Pa, -1
	0 10 061		3-hour pressure change ppp	Pa, -1
	0 10 063		Characteristic of pressure tendency a	Code table, 0
3 02 054			SHIP "instantaneous" data	
			Temperature and humidity data	
	3 02 052	0 07 032	Height of sensor above marine deck platform (for temperature and humidity measurement)	m, 2
		0 07 033	Height of sensor above water surface (for temperature and humidity measurement)	m, 1
		0 12 101	Temperature/dry-bulb temperature(sc.2) s_nTTT	K, 2
		0 02 039	Method of wet-bulb temperature measurement	Code table, 0
		0 12 102	Wet-bulb temperature (scale 2) s_wT_bT_bT_b	K, 2
		0 12 103	Dew-point temperature (scale 2) s_nT_dT_dT_d	K, 2
		0 13 003	Relative humidity	%, 0

			Visibility data	
	3 02 053	0 07 032	Height of sensor above marine deck platform (for visibility measurement)	m, 2
		0 07 033	Height of sensor above water surface (for visibility measurement)	m, 1
		0 20 001	Horizontal visibility VV	m, -1
	0 07 033		Height of sensor above water surface (set to missing to cancel the previous value)	m, 1
			Precipitation past 24 hours	
	3 02 034	0 07 032	Height of sensor above marine deck platform (for precipitation measurement)	m, 2
		0 13 023	Total precipitation past 24 hours R₂₄R₂₄R₂₄R₂₄	kg m ⁻² , 1
	0 07 032		Height of sensor above marine deck platform (set to missing to cancel the previous value)	m, 2
			Cloud data	
	3 02 004	0 20 010	Cloud cover (total) N	%, 0
		0 08 002	Vertical significance	Code table, 0
		0 20 011	Cloud amount (of low or middle clouds) N_h	Code table, 0
		0 20 013	Height of base of cloud h	m, -1
		0 20 012	Cloud type (low clouds) C_L	Code table, 0
		0 20 012	Cloud type (middle clouds) C_M	Code table, 0
		0 20 012	Cloud type (high clouds) C_H	Code table, 0
	1 01 000		Delayed replication of 1 descriptor	
	0 31 001		Delayed descriptor replication factor	Numeric, 0
	3 02 005	0 08 002	Vertical significance	Code table, 0
		0 20 011	Cloud amount N_s	Code table, 0
		0 20 012	Cloud type C	Code table, 0
		0 20 013	Height of base of cloud h_sh_s	m, -1
0 08 002			Vertical significance (set to missing to cancel the previous value)	Code table, 0
			Icing and ice	
3 02 055	0 20 031		Ice deposit (thickness) E_sE_s	m, 2
	0 20 032		Rate of ice accretion R_s	Code table, 0
	0 20 033		Cause of ice accretion I_s	Flag table, 0
	0 20 034		Sea ice concentration c_i	Code table, 0
	0 20 035		Amount and type of ice b_i	Code table, 0
	0 20 036		Ice situation z_i	Code table, 0
	0 20 037		Ice development S_i	Code table, 0
	0 20 038		Bearing of ice edge D_i	Degree true, 0
3 02 057			SHIP marine data	
	3 02 056		Sea surface temperature, method of measurement, and depth below sea surface	
		0 02 038	Method of sea/water temperature measurement	Code table, 0
		0 07 063	Depth below sea/water surface (for sea surface temperature measurement)	m, 2
		0 22 043	Sea/water temperature s_sT_wT_wT_w	K, 2
		0 07 063	Depth below sea/water surface (set to missing to cancel the previous value)	m, 2

			Waves	
	3 02 021	0 22 001	Direction of waves	Degree true
		0 22 011	Period of waves	$P_{wa}P_{wa}$ s, 0
		0 22 021	Height of waves	$H_{wa}H_{wa}$ m, 1
	3 02 024	0 22 002	Direction of wind waves	Degree true, 0
		0 22 012	Period of wind waves	P_wP_w s, 0
		0 22 022	Height of wind waves	H_wH_w m, 1
		1 01 002	Replicate 1 descriptor 2 times	
		3 02 023	Swell waves (2 systems of swell)	
			$d_{w1}d_{w1}, P_{w1}P_{w1}, H_{w1}H_{w1}$ $d_{w2}d_{w2}, P_{w2}P_{w2}, H_{w2}H_{w2}$	
	3 02 060		SHIP“period” data	
			Present and past weather	
	3 02 038	0 20 003	Present weather	ww Code table, 0
		0 04 024	Time period in hours	Hour, 0
		0 20 004	Past weather (1)	W₁ Code table, 0
		0 20 005	Past weather (2)	W₂ Code table, 0
			Precipitation measurement	
	3 02 040	0 07 032	Height of sensor above marine deck platform (for precipitation measurement)	m, 2
		1 02 002	Replicate next 2 descriptors 2 times	
		0 04 024	Time period in hours	t_R Hour, 0
		0 13 011	Total precipitation / total water equivalent of snow RRR	kg m ⁻² , 1
			Extreme temperature data	
	3 02 058	0 07 032	Height of sensor above marine deck platform (for temperature measurement)	m, 2
		0 07 033	Height of sensor above water surface (for temperature measurement)	m, 1
		0 04 024	Time period or displacement	Hour, 0
		0 04 024	Time period or displacement (see Notes 1 and 2)	Hour, 0
		0 12 111	Maximum temperature (scale 2) at height and over period specified	s_nT_xT_xT_x K, 2
		0 04 024	Time period or displacement	Hour, 0
		0 04 024	Time period or displacement (see Note 2)	Hour, 0
		0 12 112	Minimum temperature (scale 2) at height and over period specified	s_nT_nT_nT_n K, 2
			Wind data	
	3 02 059	0 07 032	Height of sensor above marine deck platform (for wind measurement)	m, 2
		0 07 033	Height of sensor above water surface (for wind measurement)	m, 1
		0 02 002	Type of instrumentation for wind measurement	i_w Flag table, 0
		0 08 021	Time significance (= 2 (time averaged))	Code table, 0
		0 04 025	Time period (= - 10 minutes, or number of minutes after a significant change of wind)	Minute, 0
		0 11 001	Wind direction	dd Degree true, 0
		0 11 002	Wind speed	ff m s ⁻¹ , 1
		0 08 021	Time significance (= missing value)	Code table, 0
		1 03 002	Replicate next 3 descriptors 2 times	
		0 04 025	Time period in minutes	Minute, 0

	0 11 043	Maximum wind gust direction	Degree true, 0
	0 11 041	Maximum wind gust speed	910f _m f _m , 911f _x f _x m s ⁻¹ , 1

Notes:

- 1) Within RA-IV, the maximum temperature at 1200 UTC is reported for the previous calendar day (i.e. the ending time of the period is not equal to the nominal time of the report). To construct the required time range, descriptor 004024 has to be included two times. If the period ends at the nominal time of the report, value of the second 004024 shall be set to 0.
- 2) Within RA-III, the maximum day-time temperature and the minimum night-time temperature is reported (i.e. the ending time of the period may not be equal to the nominal time of the report). To construct the required time range, descriptor 004024 has to be included two times. If the period ends at the nominal time of the report, value of the second 004024 shall be set to 0.
- 3) 0 01 012: Means course made good (average course over the ground) during the three hours preceding the time of observation.
- 4) 0 01 013: Means speed made good (average speed over the ground) during the three hours preceding the time of observation.
- 5) If "plain language" text is reported within Section 2, this information can be conveyed in BUFR via the use of an appropriate 205YYY field as an extra descriptor following the above basic template.

Entries in Common Code C-3 for animal instruments as listed below:

995 Mammal animals
996 Other animals

EDITORIAL ADDITIONS

1. Compression of CCITT IA5 elements

Current version of regulation 94.6.3, in particular sub-notes (iv) and (v) to Note (2), results into increasing of the data volume if character data are compressed.

Proposal 1:

It is proposed to change the current text of 94.6.3 **Note (2), sub-note (iv)**
“...or for character data, specifying number of octets representing the character string.”
to read
“...or for character data, specifying number of octets **needed for representing the character string in the data subsets.**”
Moreover, it is proposed change the current text of 94.6.3 **Note (2), sub-note (v)**
“Actual values, V, will then be obtained ...”
to read
“Actual values, V, **other than character values,** will then be obtained ...”.

2. Indirect reference to descriptors – Reg. 94.5.6.2

Current Regulation 94.5.6.2 reads:
“A sequence descriptor shall be equivalent to the corresponding list of descriptors in Table D.”
This statement is fully valid when data are being expanded. Data producers and authors of data templates, however, have to pay attention to the fact that if a sequence descriptor is located under a replication descriptor 1 X Y, the X has to be modified when the sequence descriptor is replaced by the corresponding list of descriptors from Table D.

Proposal 2:

It is proposed to add a **Note under Regulation 94.5.6.2:**
If a sequence descriptor is included within the scope of a replication descriptor 1 X Y, the number of descriptors to be repeated shall be modified if the sequence descriptor is replaced by the corresponding list of descriptors from Table D.

3. Definition of operator 2 02 Y

The current definition of 2 02 Y reads:
“Add Y-128 to scale in Table B for elements which are not code or flag tables.”
CCITT IA5 elements, however, should always have their scale = 0. Therefore, 2 02 Y should not apply to CCITT IA5 data.

Proposal 3:

It is proposed to modify the definition of 2 02 Y to read:
“**Add (Y-128) to the scale given for each data element in Table B, other than CCITT IA5 (character) data, code or flag tables.**”

4. Note (7) under the BUFR Table C

The Note (7) referring to 2 04 YYY reads:

“The data description operator 2 04 YYY shall be followed immediately by the descriptor 0 31 021 to indicate the meaning of the associated field”.

According to this Note, 2 04 000 should be also followed by the descriptor 0 31 021. According to Note (9), however, inclusion of the descriptor 0 31 021, defined or redefined within the scope of a 2 04 YYY, is pointless outside the scope of this 2 04 YYY.

Proposal 4:

It is proposed to modify Note (7) to read:

“The data description operator 2 04 YYY, **other than 2 04 000**, shall be followed immediately by the descriptor 0 31 021 to indicate the meaning of the associated field”.

5. Code figure 6 in the code table 0 31 021

The code figure 6 in 0 31 021 is defined as “Quality control flag according to GTSPP”. The entries of the detailed description of the associated field (0 = unqualified to 9 = missing) are values, not bit numbers.

Proposal 5:

It is proposed to rename code figure 6 to read:

“**4-bit indicator of quality control class** according to GTSPP”.

6. Note (5) under BUFR Table C

The Note (5)(a) specifies that each new definition adds to the currently defined associated field. It does not specify, however, the order of the included associated information. The order might either correspond with the order of the associated field significance or it might be reversed to it, i.e. the first included associated information would be related to the most recently defined associated field. The later approach would be in compliance with the procedure of cancellation in Note (5)(b), according to which cancellation 2 04 000 applies to the most recently defined addition to the associated field. The former alternative is reflected in the proposal below.

Proposal 6:

It is proposed to supplement Note (5)(a) with the following text:

“**The order of the included associated information shall correspond with the order in which the associated fields have been defined.**”

7. Changes entries in Code Table 0 08 052:

- 3 Maximum temperature less than 273.15 K
- 4 Maximum temperature equal to or more than 298.15 K
- 5 Maximum temperature equal to or more than 303.15 K
- 6 Maximum temperature equal to or more than 308.15 K
- 7 Maximum temperature equal to or more than 313.15 K
- 8 Minimum temperature less than 273.15 K
- 9 Maximum temperature equal to or more than 273.15 K

ADDITIONAL ENTRIES :

- Add the following new entry to existing BUFR/CREX code table 0-02-169/B-02-169 (i.e. "type of anemometer"):

3 Sonic

PROPOSED ADDITIONS TO THE EXISTING FLAG TABLE 0 08 042:

Bit No.	0 08 042 Extended vertical sounding significance
14	Top of wind sounding
15	Level determined by regional decision
17	Pressure level originally indicated by height as the vertical coordinate

In Code Table 0-02-163

Change: 13, Parameter = Reserved
to: 13, Parameter = IR / two WV channel ratioing method

I. Descriptors

I-1 For RADOB

Class 02 - Instrumentation

0	02	160	Wave length of the radar	Code table	0	0	4	Code table	0	2
---	----	-----	--------------------------	------------	---	---	---	------------	---	---

Class 19 - Synoptic features

0	19	100	Time interval to calculate the movement of the tropical cyclone	Code table	0	0	4	Code table	0	2
0	19	101	Accuracy of the position of the centre of the tropical cyclone	Code table	0	0	4	Code table	0	2
0	19	102	Shape and definition of the eye of the tropical cyclone	Code table	0	0	3	Code table	0	1
0	19	103	Diameter of major axis of the eye of the tropical cyclone	Code table	0	0	4	Code table	0	2
0	19	104	Change in character of the eye during the 30 minutes	Code table	0	0	4	Code table	0	2
0	19	105	Distance between the end of spiral band and the centre	Code table	0	0	4	Code table	0	2

I-2 For TRACKOB

Class 02 - Instrumentation

0	02	042	Indicator for sea surface current speed	Code table	0	0	2	Code table	0	1
---	----	-----	---	------------	---	---	---	------------	---	---

Class 04 - Location (time)

0	04	080	Averaging period for following value	Code table	0	0	4	Code table	0	2
---	----	-----	--------------------------------------	------------	---	---	---	------------	---	---

Class 22 - Oceanographic elements

0	22	005	Direction of sea surface current	Degree true	0	0	9	Degree true	0	3
0	22	032	Speed of sea surface current	m s ⁻¹	2	0	13	m s ⁻¹	2	4
0	22	049	Sea surface temperature	K	2	0	15	K	2	5
0	22	059	Sea surface salinity	Part per thousand	2	0	14	Part per thousand	2	5

I-3 For SAREP

Class 19 - Synoptic features

0	19	106	Identification number of tropical cyclone	Numeric	0	0	7	Numeric	0	3
0	19	107	Time interval of the tropical cyclone analysis	Code table	0	0	4	Code table	0	2
0	19	108	Accuracy of geographical position of the tropical cyclone	Code table	0	0	3	Code table	0	1
0	19	109	Mean diameter of the overcast cloud of the tropical cyclone	Code table	0	0	4	Code table	0	2
0	19	110	Apparent 24-hour change in	Code	0	0	4	Code	0	2

			intensity of the tropical cyclone	table				table		
0	19	111	Current Intensity (CI) number of the tropical cyclone	Numeric	1	0	7	Numeric	1	3
0	19	112	Data tropical (DT) number of the tropical cyclone	Numeric	1	0	7	Numeric	1	3
0	19	113	Cloud pattern type of the DT-number	Code table	0	0	4	Code table	0	2
0	19	114	Model Expected tropical (MET) number of the tropical cyclone	Numeric	1	0	7	Numeric	1	3
0	19	115	Trend of past 24-hour change (+: Developed, -: Weakened)	Numeric	1	-30	6	Numeric	1	2
0	19	116	Pattern tropical (PT) number of the tropical cyclone	Numeric	1	0	7	Numeric	1	3
0	19	117	Cloud picture type of the PT-number	Code table	0	0	3	Code table	0	1
0	19	118	Final tropical (T) number of the tropical cyclone	Numeric	1	0	7	Numeric	1	3
0	19	119	Type of the final T-number	Code table	0	0	3	Code table	0	1
0	19	150	Typhoon International Common Number (Typhoon Committee)	CCITTIA5	0	0	32	Character	0	4

Class 25 - Processing information

0	25	150	Satellite intensity analysis method of tropical cyclone	Code table	0	0	4	Code table	0	2
---	----	-----	---	------------	---	---	---	------------	---	---

Category 01 - Location and identification sequence

3	01	005	0 01 035 0 01 034	Originating centre Identification of originating/generating sub-centre
---	----	-----	----------------------	---

II. Code Tables

II-1 For RADOB

**0 02 160
Wave length of the radar**

Code figure	
0	Reserved
1	10 to less than 20 mm
2	Reserved
3	20 to less than 40 mm
4	Reserved
5	40 to less than 60 mm
6	Reserved
7	60 to less than 90 mm
8	90 to less than 110 mm
9	110 mm and greater
10-14	Not used
15	Missing value

0 19 100

Time interval to calculate the movement of the tropical cyclone

Code figure	
0-2	Not used
3	During the preceding 15 minutes
4	During the preceding 30 minutes
5	During the preceding 1 hour
6	During the preceding 2 hours
7	During the preceding 3 hours
8	During the preceding 6 hours
9	During a period of more than 6 hours
10	Undetermined
11-14	Not used
15	Missing value

0 19 101

Accuracy of the position of the centre of the tropical cyclone

Code figure	
0	Reserved
1	Eye visible on radar scope, accuracy good (within 10 km)
2	Eye visible on radar scope, accuracy fair (within 30 km)
3	Eye visible on radar scope, accuracy poor (within 50 km)
4	Position of the centre within the area covered by the radar scope, determination by means of the spiral-band overlay, accuracy good (within 10 km)
5	Position of the centre within the area covered by the radar scope, determination by means of the spiral-band overlay, accuracy fair (within 30 km)
6	Position of the centre within the area covered by the radar scope, determination by means of the spiral-band overlay, accuracy poor (within 50 km)
7	Position of the centre outside the area covered by the radar scope, extrapolation by means of the spiral-band overlay
8-9	Reserved
10	Accuracy undetermined
11-14	Not used
15	Missing value

0 19 102

Shape and definition of the eye of the tropical cyclone

Code figure	
0	Circular
1	Elliptical — the minor axis is at least 3/4 the length of the major axis
2	Elliptical — the minor axis is less than 3/4 the length of the major axis
3	Apparent double eye
4	Other shape
5	Ill defined
6	Undetermined
7	Missing

} *well defined*

0 19 103

Diameter of major axis of the eye of the tropical cyclone

Code figure	
0	Less than 5 km
1	5 to less than 10 km
2	10 to less than 15 km
3	15 to less than 20 km
4	20 to less than 25 km
5	25 to less than 30 km
6	30 to less than 35 km
7	35 to less than 40 km
8	40 to less than 50 km
9	50 km and greater
10	Undetermined
11-14	Not used
15	Missing value

0 19 104

Change in character of the eye during the 30 minutes

Code figure	
0	Eye has first become visible during the past 30 minutes
1	No significant change in the characteristics or size of the eye
2	Eye has become smaller with no other significant change in characteristics
3	Eye has become larger with no other significant change in characteristics
4	Eye has become less distinct with no significant change in size
5	Eye has become less distinct and decreased in size
6	Eye has become less distinct and increased in size
7	Eye has become more distinct with no significant change in size
8	Eye has become more distinct and decreased in size
9	Eye has become more distinct and increased in size
10	Change in character and size of eye cannot be determined
11-14	Not used
15	Missing value

0 19 105

Distance between the end of spiral band and the centre

Code figure	
0	0 to less than 100 km
1	100 to less than 200 km
2	200 to less than 300 km
3	300 to less than 400 km
4	400 to less than 500 km
5	500 to less than 600 km
6	600 to less than 800 km
7	800 km or more
8-9	Reserved
10	Doubtful or undetermined
11-14	Not used
15	Missing value

II-2 For TRACKOB

0 02 042

Indicator for sea surface current speed

Code figure	
0	Value originally reported in m/s
1	Value originally reported in knots
2	No sea current data available
3	Missing

0 04 080

Averaging period for following value

Code figure	
0	Spot values
1	Less than 15 minutes
2	From 15 to 45 minutes
3	More than 45 minutes
4-8	Reserved
9	Data not available
10-14	Not used
15	Missing

II-3 For SAREP

0 19 107

Time interval of the tropical cyclone analysis

Code figure	
0	Less than 1 hour
1	1 to less than 2 hours
2	2 to less than 3 hours
3	3 to less than 6 hours
4	6 to less than 9 hours
5	9 to less than 12 hours
6	12 to less than 15 hours
7	15 to less than 18 hours
8	18 to less than 21 hours
9	21 to less than 30 hours
10-14	Not used
15	Missing value

0 19 108

Accuracy of geographical position of the tropical cyclone

Code figure

0	Cyclone centre within 10 km of the transmitted position
1	Cyclone centre within 20 km of the transmitted position
2	Cyclone centre within 50 km of the transmitted position
3	Cyclone centre within 100 km of the transmitted position
4	Cyclone centre within 200 km of the transmitted position
5	Cyclone centre within 300 km of the transmitted position
6	Cyclone centre undetermined
7	Missing value

0 19 109

Mean diameter of the overcast cloud of the tropical cyclone

Code figure

0	Less than 1° of latitude
1	1° to less than 2° of latitude
2	2° to less than 3° of latitude
3	3° to less than 4° of latitude
4	4° to less than 5° of latitude
5	5° to less than 6° of latitude
6	6° to less than 7° of latitude
7	7° to less than 8° of latitude
8	8° to less than 9° of latitude
9	9° of latitude or more
10	Undetermined
11-14	Not used
15	Missing value

0 19 110

Apparent 24-hour change in intensity of the tropical cyclone

Code figure

0	Much weakening
1	Weakening
2	No change
3	Intensification
4	Strong Intensification
5-8	Reserved
9	Not observed previously
10	Undetermined
11-14	Not used
15	Missing value

0 19 113

Cloud pattern type of the DT-number

Code figure	Type
1	Curved Band
2	Shear
3	Eye
4	Banding Eye
5	Central Dense Overcast (CDO)
6	Embedded Center
7	Center Cold Cover (CCC)
8-14	Reserved
15	Missing value

0 19 117

Cloud picture type of the PT-number

Code figure	Type
1	A (Curved Band)
2	B (CDO)
3	C (Shear)
4-6	Reserved
7	Missing value

0 19 119

Type of the final T-number

Code figure	Type
1	DT-number
2	PT-number
3	MET-number
4-6	Reserved
7	Missing value

0 25 150

Satellite intensity analysis method of tropical cyclone

Code figure	Method
1	The Dvorak's VIS (visual imagery) intensity analysis
2	The Dvorak's EIR (Enhanced Infrared imagery) intensity analysis
3-14	Reserved
15	Missing value

ADD THE FOLLOWING TABLE B ENTRY FOR NUMERICAL MODEL IDENTIFIER :

0 01 030 Numerical model identifier, CCITTIA5, Scale=0, Reference=0,Data bit width=128

Note: The value of this feature could be a string of characters which contains the name of the model and other useful elements such as the model mesh.

For SIGMET, pre-operational:

Proposed Table B entries

Table Reference	Element name	BUFR				CREX		
		Unit	Scale	Ref. value	Data width	Unit	Scale	Data width
0 01 037	SIGMET sequence identifier	CCITT IA5	0	0	24	Character	0	3
0 01 065	ICAO region identifier	CCITT IA5	0	0	256	Character	0	32
0 08 019	Qualifier for following centre identifier	Code table	0	0	4	Code table	0	2
0 08 079	Product status	Code table	0	0	4	Code table	0	2
0 10 064	SIGMET cruising level	Code table	0	0	3	Code table	0	1
0 20 028	Expected change in intensity	Code table	0	0	3	Code table	0	1

Add the following new categories to Table A within BUFR and CREX:

- 13 Forecasts
- 14 Warnings

Add the following new code table values for BUFR/CREX Table B descriptors:

0 08 011

- 21 Thunderstorm
- 22 Tropical Cyclone
- 23 Mountain Wave
- 24 Duststorm
- 25 Sandstorm

0 20 008

- 15 Obscured (OBSC)
- 16 Embedded (EMBD)

0 20 024

- 5 Severe

Code tables for proposed new Table B descriptors:

Code figure	0 08 019 Qualifier for following centre identifier
0	Reserved
1	ATS (Air Traffic Service) unit serving FIR (Flight Information Region)
2	FIR (Flight Information Region)
3	UIR (Upper Information Region)
4	CTA (Control Area)
5	VAAC (Volcanic Ash Advisory Centre)
6	MWO (Meteorological Watch Office) issuing SIGMET
7-14	Reserved
15	Missing value

Code figure	0 08 079 Product status
0	Normal issue
1	Correction to a previously issued product (COR)
2	Amendment to a previously issued product (AMD)
3	Correction to a previously issued amended product (COR AMD)
4	Cancellation of a previously issued product (CNL)
5	No product available (NIL)
6-14	Reserved
15	Missing

Code figure	0 10 064 SIGMET cruising level
0	Subsonic
1	Transonic
2	Supersonic
3-6	Reserved
7	Missing value

Code figure	0 20 028 Expected change in intensity
0	No change (NC)
1	Forecast to weaken (WKN)
2	Forecast to intensify (INTSF)
3	Unknown (*)
4-6	Reserved
7	Missing value

Note: (*) This entry is not allowed in SIGMET messages.

New Table D descriptors:

		(Time period)
3 01 014	1 02 002	Replication of 2 descriptors 2 times
	3 01 011	Year, Month, Day
	3 01 012	Hour, Minute
		(Description of a feature in 3-D or 2-D)
3 01 027	0 08 007	Dimensional significance, 0=Point, 1=Line, 2=Area, 3=Volume
	1 01 000	Delayed replication of 1 descriptor
	0 31 001	Replication factor ¹
	3 01 028	Description of horizontal section
	0 08 007	Dimensional significance, Missing=Cancel
		(Horizontal section of a feature described as a polygon, circle, line or point)
3 01 028	0 08 040	Flight level significance
	0 33 042	Type of limit represented by following (flight level) value
	0 07 010	Flight level
	1 01 000	Delayed replication of 1 descriptor
	0 31 002	Extended replication factor ²
	3 01 023	Location
	0 19 007	Radius of feature ³
	0 08 040	Flight level significance, Missing=Cancel

¹ This replication factor shall have a value of “1” when a 2-D feature is being described, whereas 3-D features may be described via any one of the following methods:

- (a) Via two or more horizontal sections in successive ascending flight levels. In this case, each section shall be described by an identical number of latitude/longitude points listed in identical order (i.e. where each point x of section n is to be joined via a straight line to point x of section n+1), in order to ensure that the overall shape of the 3-D feature is unambiguously described. In this case, all values reported for 0 33 042 shall be “missing”.
- (b) Via a single horizontal section with an appropriate value reported for 0 33 042, as follows. In all such cases, the corresponding horizontal section description applies throughout the entire region.
 - a. A value of “0” to indicate a region above (but not including) the reported flight level and with unspecified upper bound.
 - b. A value of “1” to indicate a region above (and including) the reported flight level and with unspecified upper bound.
 - c. A value of “2” to indicate a region below (but not including) the reported flight level and extending to the surface.
 - d. A value of “3” to indicate a region below (and including) the reported flight level and extending to the surface.
- (c) Via two replications of the same horizontal section at the same reported flight level, in order to indicate a region extending both below and above (and including!) the reported flight level. In this case, the values reported for the two replications of 0 33 042 shall be as follows:
 - a. Values of “3” and “1”, respectively, to indicate a region beginning from below a reported flight level, but continuing through that level upward to some unspecified point above (e.g. TOP ABV FL100).
 - b. Values of “1” and “3”, respectively, to indicate a region beginning from above a reported flight level, but continuing through that level downward to some unspecified point below (e.g. CIGS BLW FL010).

² This replication factor shall have a value of “1” when a circle or point is being described, and it shall have a value of “2” when a line is being described. A polygon, on the other hand, shall be described via a sequence of three or more contiguous points in accordance with the note to code table 0 08 007.

³ The value reported for 0 19 007 shall be “missing” unless the horizontal section being described is a circle.

		(SIGMET header)
3 16 030	3 01 014	Time period (for which SIGMET is valid)
	0 01 037	SIGMET sequence identifier
	0 10 064	SIGMET cruising level
	0 08 019	Qualifier for location identifier, 1=ATS unit serving FIR
	0 01 062	Short ICAO location identifier
	0 08 019	Qualifier for location identifier, 2=FIR, 3=UIR, 4=CTA
	0 01 065	ICAO region identifier
	0 08 019	Qualifier for location identifier, 6=MWO
	0 01 062	Short ICAO location identifier
	0 08 019	Qualifier for location identifier, Missing=Cancel

		(SIGMET, Observed or forecast location and motion)
3 16 031	0 08 021	Time Significance, 16=Analysis, 4=Forecast
	3 01 011	Year, Month, Day
	3 01 012	Hour, Minute
	3 01 027	Description of feature
	0 19 005	Direction of motion
	0 19 006	Speed of motion
	0 20 028	Expected change in intensity
	0 08 021	Time significance, Missing=Cancel

		(SIGMET, Forecast position)
3 16 032	0 08 021	Time Significance, 4=Forecast
	3 01 011	Year, Month, Day
	3 01 012	Hour, Minute
	3 01 027	Description of feature
	0 08 021	Time significance, Missing=Cancel

		(SIGMET, Outlook)
3 16 033	0 08 021	Time Significance, 4=Forecast
	3 01 011	Year, Month, Day
	3 01 012	Hour, Minute
	1 01 000	Delayed replication of 1 descriptor
	0 31 001	Replication factor
	3 01 027	Description of feature
	0 08 021	Time significance, Missing=Cancel

		(Volcanic Ash SIGMET)
3 16 034	0 08 079	Product status, 0=Normal Issue, 1=Correction
	3 16 030	SIGMET Header
	0 08 011	Meteorological feature, 17=Volcano
	0 01 022	Name of feature
	0 08 007	Dimensional significance, 0=Point
	3 01 023	Location
	0 08 007	Dimensional significance, Missing=Cancel
	0 20 090	Special Clouds, 5=Clouds from volcanic eruptions
	3 16 031	SIGMET Observed or forecast location and motion
	1 01 000	Delayed replication of 1 descriptor
	0 31 000	Short replication factor
	3 16 032	SIGMET Forecast position
	1 01 000	Delayed replication of 1 descriptor
	0 31 001	Replication factor
	3 16 033	SIGMET Outlook
	0 08 011	Meteorological feature, Missing=Cancel
	0 08 079	Product status, Missing=Cancel
		(Thunderstorm SIGMET)
3 16 035	0 08 079	Product status, 0=Normal Issue, 1=Correction
	3 16 030	SIGMET Header
	0 08 011	Meteorological feature, 21=Thunderstorm
	0 20 023	Other weather phenomenon, bit 2=Squalls or all 18 bits = Missing
	0 20 021	Type of precipitation, bit 14=Hail or all 30 bits=Missing
	0 20 008	Cloud distribution 15=OBSC, 16=EMBD, 12=FRQ, 31=Missing
	3 16 031	SIGMET Observed or forecast location and motion
	0 08 011	Meteorological feature, Missing=Cancel
	0 08 079	Product status, Missing=Cancel
		(Tropical Cyclone SIGMET)
3 16 036	0 08 079	Product status, 0=Normal Issue, 1=Correction
	3 16 030	SIGMET Header
	0 08 011	Meteorological feature, 22=Tropical Cyclone
	0 01 027	WMO storm name
	3 16 031	SIGMET Observed or forecast location and motion
	1 01 000	Delayed replication of 1 descriptor
	0 31 000	Short replication factor
	3 16 032	SIGMET Forecast position
	1 01 000	Delayed replication of 1 descriptor
	0 31 001	Replication factor
	3 16 033	SIGMET Outlook
	0 08 011	Meteorological feature, Missing=Cancel
	0 08 079	Product status, Missing=Cancel

		(Turbulence SIGMET)
3 16 037	0 08 079	Product status, 0=Normal Issue, 1=Correction
	3 16 030	SIGMET Header
	0 08 011	Meteorological feature, 13=Turbulence
	0 11 031	Degree of turbulence, 10=Moderate, 11=Severe
	3 16 031	SIGMET Observed or forecast location and motion
	0 08 011	Meteorological feature, Missing=Cancel
	0 08 079	Product status, Missing=Cancel
		(Icing SIGMET)
3 16 038	0 08 079	Product status, 0=Normal Issue, 1=Correction
	3 16 030	SIGMET Header
	0 08 011	Meteorological feature, 15=Airframe Icing
	0 20 041	Airframe icing, 7=Severe
	0 20 021	Type of precipitation, bit 3=Liquid freezing or all 30 bits = Missing
	3 16 031	SIGMET Observed or forecast location and motion
	0 08 011	Meteorological feature, Missing=Cancel
	0 08 079	Product status, Missing=Cancel
		(Mountain Wave, Duststorm or Sandstorm SIGMET)
3 16 039	0 08 079	Product status, 0=Normal Issue, 1=Correction
	3 16 030	SIGMET Header
	0 08 011	Meteorological feature, 23=MountainWave, 24=Duststorm, 25=Sandstorm
	0 20 024	Intensity of phenomena, 3=Heavy, 5=Severe
	3 16 031	SIGMET Observed or forecast location and motion
	0 08 011	Meteorological feature, Missing=Cancel
	0 08 079	Product status, Missing=Cancel

		(Cancellation of SIGMET)
3 16 040	3 16 030	SIGMET header
	0 08 079	Product status, 4=Cancellation
	3 01 014	Time period (of the SIGMET to be cancelled)
	0 01 037	SIGMET sequence identifier (of the SIGMET to be cancelled)
	0 10 064	SIGMET cruising level (of the SIGMET to be cancelled)
	0 08 079	Product status, Missing=Cancel

For pollutant

Add the following new entry to BUFR/CREX Class 15:

TABLE REFERENCE			TABLE ELEMENT NAME	BUFR				CREX		
F	X	Y		UNIT	SCALE	REFERENCE VALUE	DATA WIDTH (Bits)	UNIT	SCALE	DATA WIDTH (Characters)
0	15	027	Concentration of pollutant	Kg m ⁻³	9	0	10	Kg m ⁻³	9	4

Add the following new entries to existing BUFR/CREX code table 0-15-025/B-15-025 (i.e. “type of pollutant”):

- 11 Fine particulate matter (diameter < 2.5 microns)
- 12 Fine particulate matter (diameter < 10 microns)

In addition, and on a related note, we would like to point out the following typographical errors in the English translation of the current WMO Manual 306, Part B for BUFR/CREX Class 15:

- *For both 0-15-025 and 0-15-026, the “ELEMENT NAME” contains the word “pollutant” misspelled as “polluant”.*

The units of 0-15-026 should be “mol mol⁻¹” (i.e. one included space) rather than “molmol⁻¹”, which seems to imply the reciprocal of some heretofore unknown unit of measure!

Proposed Table D descriptors which correspond with whole sequences of RADOB, TRACKOB and SAREP

1. RADOB Template (part A: Information on tropical cyclone)

Proposal:

[3 16 050] = 3 01 001 + 3 01 011 + 3 01 012 + 0 02 160 + 0 08 005 + 0 05 002
 + 0 06 002 + 0 08 005 + 0 19 100 + 0 19 005 + 0 19 006 + 0 19 101
 + 0 19 102 + 0 19 103 + 0 19 104 + 0 19 105

Table reference		Element name	Unit	Scale	Reference value	Data width (bits)
		Station identification and time				
3 01 001	0 01 001	WMO block number	Numeric	0	0	7
	0 01 002	WMO station number	Numeric	0	0	10
3 01 011	0 04 001	Year	Year	0	0	12
	0 04 002	Month	Month	0	0	4
	0 04 003	Day	Day	0	0	6
3 01 012	0 04 004	Hour	Hour	0	0	5
	0 04 005	Minute	Minute	0	0	6
		Radar information				
0 02 160	<i>NEW</i>	Wave length of the radar	Code table	0	0	4
		Tropical Cyclone				
0 08 005		Meteorological attribute significance (=1)	Code table	0	0	4
0 05 002		Latitude (coarse accuracy)	Degree	2	-9000	15
0 06 002		Longitude (coarse accuracy)	Degree	2	-18000	16
0 08 005		Meteorological attribute significance (set to missing to cancel the previous value)	Code table	0	0	4
0 19 100	<i>NEW</i>	Time interval to calculate the movement of the tropical cyclone	Code table	0	0	4
0 19 005		Direction of motion of feature	Degree true	0	0	9
0 19 006		Speed of motion of feature	m s ⁻¹	2	0	14
0 19 101	<i>NEW</i>	Accuracy of the position of the centre of the tropical cyclone	Code table	0	0	4
0 19 102	<i>NEW</i>	Shape and definition of the eye of the tropical cyclone	Code table	0	0	3
0 19 103	<i>NEW</i>	Diameter of major axis of the eye of the tropical cyclone	Code table	0	0	4
0 19 104	<i>NEW</i>	Change in character of the eye during the 30 minutes	Code table	0	0	4
0 19 105	<i>NEW</i>	Distance between the end of spiral band and the centre	Code table	0	0	4

2. TRACKOB Template

Proposal:

[3 08 010] = 0 01 011 + 1 13 000 + 0 31 001 + 3 01 011 + 3 01 012 + 3 01 021
 + 0 04 080 + 0 22 049 + 0 04 080 + 0 22 059 + 0 04 080 + 0 22 005
 + 0 02 042 + 0 22 032 + 0 02 042 + 0 04 080

Table reference		Element name	Unit	Scale	Reference value	Data width (bits)
0 01 011		Ship or mobile land station identifier	CCITT IA5	0	0	72
1 13 000		Delayed replication of 13 descriptors				
0 31 001		Delayed descriptor replication factor	Numeric	0	0	8
3 01 011	0 04 001	Year	Year	0	0	12
	0 04 002	Month	Month	0	0	4
	0 04 003	Day	Day	0	0	6
3 01 012	0 04 004	Hour	Hour	0	0	5
	0 04 005	Minute	Minute	0	0	6
3 01 021	0 05 001	Latitude (high accuracy)	Degree	5	-9000000	25
	0 06 001	Longitude (high accuracy)	Degree	5	-18000000	26
0 04 080	NEW	Averaging period for following value	Code table	0	0	4
0 22 049	NEW	Sea surface temperature	K	2	0	15
0 04 080	NEW	Averaging period for following value	Code table	0	0	4
0 22 059	NEW	Sea surface salinity	Part per thousand	2	0	14
0 04 080	NEW	Averaging period for following value	Code table	0	0	4
0 22 005	NEW	Direction of sea surface current	Degree true	0	0	9
0 02 042	NEW	Indicator for sea surface current speed	Code table	0	0	2
0 22 032	NEW	Speed of sea surface current	ms-1	2	0	13
0 02 042	NEW	Indicator for sea surface current speed (cancel)	Code table	0	0	2
0 04 080	NEW	Averaging period for following value (cancel)	Code table	0	0	4

3. SAREP Template (part A: Information on tropical cyclone)

Proposal:

[3 16 052] = 3 01 005 + 3 01 011 + 3 01 012 + 0 01 007 + 0 25 150 + 1 22 000
 +0 31 001 + 0 01 027 + 0 19 150 + 0 19 106 + 0 08 005 + 0 05 002
 +0 06 002 + 0 08 005 + 0 19 107 + 0 19 005 + 0 19 006 + 0 19 108
 +0 19 109 + 0 19 110 + 0 19 111 + 0 19 112 + 0 19 113 + 0 19 114
 +0 19 115 + 0 19 116 + 0 19 117 + 0 19 118 + 0 19 119

Table reference		Element name	Unit	Scale	Reference value	Data width (bits)
		(Station identification and time)				
3 01 005 NEW	0 01 035	Originating centre	Common code table C-11	0	0	16
	0 01 034	Identification of originating/generating sub-centre	Common code table C-12	0	0	8
3 01 011	0 04 001	Year	Year	0	0	12
	0 04 002	Month	Month	0	0	4
	0 04 003	Day	Day	0	0	6
3 01 012	0 04 004	Hour	Hour	0	0	5
	0 04 005	Minute	Minute	0	0	6
		(Satellite information)				
0 01 007		Satellite identifier	Code table	0	0	10
0 25 150	NEW	Satellite intensity analysis method of tropical cyclone	Code table	0	0	4
		(Tropical cyclone information)				
1 22 000		Delayed replication of 22 descriptors				
0 31 001		Delayed descriptor replication factor	Numeric	0	0	8
0 01 027		WMO long storm name	CCITT IA5	0	0	80
0 19 150	NEW	Typhoon International Common Number (Typhoon Committee)	CCITT IA5	0	0	32
0 19 106	NEW	Identification number of tropical cyclone	Numeric	0	0	7
0 08 005		Meteorological attribute significance (=1)	Code table	0	0	4
0 05 002		Latitude (coarse accuracy)	Degree	2	-9000	15
0 06 002		Longitude (coarse accuracy)	Degree	2	-18000	16
0 08 005		Meteorological attribute significance (set to missing to cancel the previous value)	Code table	0	0	4
0 19 107	NEW	Time interval of the tropical cyclone analysis	Code table	0	0	4
0 19 005		Direction of motion of feature	Degree true	0	0	9
0 19 006		Speed of motion of feature	m s ⁻¹	2	0	14
0 19 108	NEW	Accuracy of geographical position of the tropical cyclone	Code table	0	0	3
0 19 109	NEW	Mean diameter of the overcast cloud of the tropical cyclone	Code table	0	0	4
0 19 110	NEW	Apparent 24-hour change in intensity of the tropical cyclone	Code table	0	0	4
0 19 111	NEW	Current Intensity (CI) number of the tropical cyclone	Numeric	1	0	7
0 19 112	NEW	Data tropical (DT) number of the tropical cyclone	Numeric	1	0	7
0 19 113	NEW	Cloud pattern type of the DT-number	Code table	0	0	4

0 19 114	NEW	Model Expected tropical (MET) number of the tropical cyclone	Numeric	1	0	7
0 19 115	NEW	Trend of the past 24-hour change (+: Developed, -: Weakened)	Numeric	1	-30	6
0 19 116	NEW	Pattern tropical (PT) number of the tropical cyclone	Numeric	1	0	7
0 19 117	NEW	Cloud picture type of the PT-number	Code table	0	0	3
0 19 118	NEW	Final tropical (T) number of the tropical cyclone	Numeric	1	0	7
0 19 119	NEW	Type of the final T-number	Code table	0	0	3

Table D descriptors which correspond with whole sequences of RADOB, TRACKOB and SAREP:

1. RADOB Template (part A: Information on tropical cyclone)

3 16 050 3 01 001 WMO block and station number
3 01 011 Date
3 01 012 Time
0 02 160 Wave length of the radar
0 08 005 Meteorological attribute significance (=1)
0 05 002 Latitude (coarse accuracy)
0 06 002 Longitude (coarse accuracy)
0 08 005 Cancel Meteorological attribute significance
0 19 100 Time interval to calculate the movement of the tropical cyclone
0 19 005 Direction of motion of feature
0 19 006 Speed of motion of feature
0 19 101 Accuracy of the position of the centre of the tropical cyclone
0 19 102 Shape and definition of the eye of the tropical cyclone
0 19 103 Diameter of major axis of the eye of the tropical cyclone
0 19 104 Change in character of the eye during the 30 minutes
0 19 105 Distance between the end of spiral band and the centre

2. TRACKOB Template

BUFR template

3 08 010 0 01 011 Ship or mobile land station identifier
1 13 000 Delayed replication of 13 descriptors
0 31 001 Delayed descriptor replication factor
3 01 011 Date
3 01 012 Time
3 01 021 Latitude/Longitude (high accuracy)
0 04 080 Averaging period for following value
0 22 049 Sea surface temperature

0 04 080 Averaging period for following value
0 22 059 Sea surface salinity
0 04 080 Averaging period for following value
0 22 005 Direction of sea surface current
0 02 042 Indicator for sea surface current speed
0 22 032 Speed of sea surface current
0 02 042 Indicator for sea surface current speed (cancel)
0 04 080 Averaging period for following value (cancel)

CREX template

D 08 010 B 01 011 Ship or mobile land station identifier
R 13 000 Delayed replication of 13 descriptors
D 01 011 Date
D 01 012 Time
D 01 021 Latitude/Longitude (high accuracy)
B 04 080 Averaging period for following value
B 22 049 Sea surface temperature
B 04 080 Averaging period for following value
B 22 059 Sea surface salinity
B 04 080 Averaging period for following value
B 22 005 Direction of sea surface current
B 02 042 Indicator for sea surface current speed
B 22 032 Speed of sea surface current
B 02 042 Indicator for sea surface current speed (cancel)
B 04 080 Averaging period for following value (cancel)

3. SAREP Template (part A: Information on tropical cyclone)

BUFR template

3 16 052 3 01 005 Originating centre/sub-centre
3 01 011 Date
3 01 012 Time
0 01 007 Satellite identifier
0 25 150 Satellite intensity analysis method of tropical cyclone
1 22 000 Delayed replication of 22 descriptors
0 31 001 Delayed descriptor replication factor
0 01 027 WMO long storm name
0 19 150 Typhoon International Common Number (Typhoon Committee)
0 19 106 Identification number of tropical cyclone
0 08 005 Meteorological attribute significance (=1)

- 0 05 002 Latitude (coarse accuracy)
- 0 06 002 Longitude (coarse accuracy)
- 0 08 005 Cancel Meteorological attribute significance
- 0 19 107 Time interval of the tropical cyclone analysis
- 0 19 005 Direction of motion of feature
- 0 19 006 Speed of motion of feature
- 0 19 108 Accuracy of geographical position of the tropical cyclone
- 0 19 109 Mean diameter of the overcast cloud of the tropical cyclone
- 0 19 110 Apparent 24-hour change in intensity of the tropical cyclone
- 0 19 111 Current Intensity (CI) number of the tropical cyclone
- 0 19 112 Data tropical (DT) number of the tropical cyclone
- 0 19 113 Cloud pattern type of the DT-number
- 0 19 114 Model Expected tropical (MET) number of the tropical cyclone
- 0 19 115 Trend of the past 24-hour change (+: Developed, -: Weakened)
- 0 19 116 Pattern tropical (PT) number of the tropical cyclone
- 0 19 117 Cloud picture type of the PT-number
- 0 19 118 Final tropical (T) number of the tropical cyclone
- 0 19 119 Type of the final T-number

CREX template

- D 16 052 D 01 005 Originating centre/sub-centre
 - D 01 011 Date
 - D 01 012 Time
- B 01 007 Satellite identifier
- B 25 150 Satellite intensity analysis method of tropical cyclone
- R 22 000 Delayed replication of 22 descriptors
- B 01 027 WMO long storm name
- B 19 150 Typhoon International Common Number (Typhoon Committee)
- B 19 106 Identification number of tropical cyclone
- B 08 005 Meteorological attribute significance (=1)
- B 05 002 Latitude (coarse accuracy)
- B 06 002 Longitude (coarse accuracy)
- B 08 005 Cancel Meteorological attribute significance
- B 19 107 Time interval of the tropical cyclone analysis
- B 19 005 Direction of motion of feature
- B 19 006 Speed of motion of feature
- B 19 108 Accuracy of geographical position of the tropical cyclone
- B 19 109 Mean diameter of the overcast cloud of the tropical cyclone
- B 19 110 Apparent 24-hour change in intensity of the tropical cyclone
- B 19 111 Current Intensity (CI) number of the tropical cyclone
- B 19 112 Data tropical (DT) number of the tropical cyclone
- B 19 113 Cloud pattern type of the DT-number

- B 19 114 Model Expected tropical (MET) number of the tropical cyclone
- B 19 115 Trend of the past 24-hour change (+: developed, -: weakened)
- B 19 116 Pattern tropical (PT) number of the tropical cyclone
- B 19 117 Cloud picture type of the PT-number
- B 19 118 Final tropical (T) number of the tropical cyclone
- B 19 119 Type of the final T-number

Representation of nominal values

To represent any nominal value in BUFR a new descriptor in class 8 of the BUFR Table B is to be used to indicate the cause of nominal value.

Ref number	Name	Unit	Scale	Reference	Data width
008083	Nominal value indicator	Flag table	0	0	15

008083 Nominal value indicator

Bit No.	Meaning
1	Adjusted with respect to representative height of sensor above local ground (or Deck of marine platform)
2	Adjusted with respect to representative height of sensor above water surface
3	Adjusted with respect to standard surface roughness
4	Adjusted with respect to wind speed
5	Adjusted with respect to temperature
6	Adjusted with respect to pressure
7	Adjusted with respect to humidity
8	Adjusted with respect to evaporation
9	Adjusted with respect to wetting losses
10-14	Reserved
All 15	Missing value

The mechanism to represent any nominal value for any element in any BUFR template is by using 223000 Operator (substituted values follow):

223000	Substituted values follow
236000	Bit map follow
101000	Delayed replication operator
031001	Delayed replication
031031	Data present indicator
001033	Originating centre
001032	Originating application
008083	Nominal value indicator
101000	Delayed replication operator
031001	Delayed replication
223255	Substituted value marker operator

There may be one or more blocks similar as one above in the BUFR message. For an example the following block could follow in the case of re-using the bit map.

108000	Delayed replication operator
031001	Delayed replication
223000	Substituted values follow
237000	Use previously defined bit map
001033	Originating centre
001032	Originating application
008083	Nominal value indicator
101000	Delayed replication operator
031001	Delayed replication
223255	Substituted value marker operator

FOR SEA SURFACE TEMPERATURE MEASUREMENT

New entries indicated in blue are proposed for addition in code/flag table 002038 *Operational*

0 02 038

Method of water temperature and/or salinity measurement

Code	
Figure	
0	Ship intake
1	Bucket
2	Hull contact sensor
3	Reversing Thermometer
4	STD/CTD sensor
5	Mechanical BT
6	Expendable BT
7	Digital BT
8	Thermistor chain
9	Infra-red scanner
10	Micro-wave scanner
11	Infrared radiometer
12	In line thermosalinograph
13	Towed body
14	Other
15	Missing value

Proposed new descriptor for Depth below sea water surface (High resolution)

TABLE REFERENCE			TABLE ELEMENT NAME	BUFR				CREX		
				UNIT	SCALE	REF. VALUE	DATA WIDTH (Bits)	UNIT	SCALE	DATA WIDTH (Charac.)
F	X	Y								
0	07	063	Depth below sea/water surface	m	2	0	20	m	2	7

Operational

Add the following new entries to BUFR/CREX Class 0:

0 00 004	BUFR/CREX Master Table (see Note (2))	CCITT IA5 0 Character 0	0	16 2
0 00 006	BUFR Master Table Version Number (see Note (3))	CCITT IA5 0 Character 0	0	16 2
0 00 007	CREX Master Table Version Number (see Note (4))	CCITT IA5 0 Character 0	0	16 2
0 00 008	BUFR Local Table Version Number (see Note (5))	CCITT IA5 0 Character 0	0	16 2

Add the following new notes to BUFR/CREX Class 0:

- (2) Master Tables are described in Note (2) to Section 1 of the BUFR regulations.
- (3) BUFR Master Table Version Numbers are described in Notes (2) and (4) to Section 1 of the BUFR regulations for edition 3, and in Notes (2) and (5) to Section 1 of the BUFR regulations for edition 4.
- (4) CREX Master Table Version Numbers are described in Note (1) to Section 1 of the CREX regulations.
- (5) Local Table version number (see Note (2) to Section 1 of the BUFR regulations)

Revise Note (2) under Section 1 of the BUFR regulations (for both editions 3 and 4) to read:

A BUFR master table may be defined for a scientific discipline other than meteorology. This shall be indicated by a non-zero numeric value in octet 4. Such a table will be developed, in coordination with the ET/DR+C, when a recognized organization exists with the necessary expertise to maintain such a master table, and when at least one of the following situations also exists:

- Requirements cannot be met using Master Table 0.
- There is expected to be a minimal amount of overlap with respect to the entries in Master Table 0.

The current list of master tables, along with their associated values in octet 4, is as follows:

0	Meteorology maintained by World Meteorological Organization (WMO)
10	Oceanography maintained by International Oceanographic Commission

(IOC)

Whenever a new master table is developed, the following criteria shall apply:

- Table C may not be changed, nor may Classes 00 and 31 of Table B. These would remain identical for any of the master tables.
- For Classes 01 through 09 (coordinate classes) and Class 33 of Table B, and for Categories 00 and 01 of Table D, these Classes and Categories must have the same name and be used for the same types of descriptors as in Master Table 0; however, individual descriptors within these Classes and Categories would be left to the discretion of the organization defining the particular master table in question.

- For Table A and all remaining Classes of Table B and Categories of Table D, these would be left to the discretion of the organization defining the particular master table in question.

For all master tables (including Master Table 0):

- Each revision of the master table shall be given a new version number.
- Local tables shall define those parts of the master table which are reserved for local use, thus version numbers of local tables may be changed at will by the originating centre.

Revise octet 11 under Section 1 of the BUFR regulations for edition 3 to read:

11 Version number of master table used – see Notes (2) and (4)

Revise octet 14 under Section 1 of the BUFR regulations for edition 4 to read:

14 Version number of master table used – see Notes (2) and (5)

Add the following as new Note (4) under Section 1 of the BUFR regulations for edition 3 (and as new Note (5) for edition 4):

For Master Table 0, the master table version numbers are as follows:

0	Experimental
1	Version implemented on 1 November 1988
2	Version implemented on 1 November 1993
3	Version implemented on 2 November 1994
4	Version implemented on 8 November 1995
5	Version implemented on 6 November 1996
6	Version implemented on 5 November 1997
7	Version implemented on 4 November 1998
8	Version implemented on 3 May 2000
9	Version implemented on 8 November 2000
10	Version implemented on 7 November 2001
11	Version implemented on 5 November 2003
12	Version implemented on 2 November 2005
13	Pre-operational to be implemented by next amendment

Change vv definition in CREX Section 1 Edition 1 and Edition 2 to:

vv: CREX Master Table version number (see Note 1)

Change bb definition in CREX Section 1 Edition 2 to:

bb: BUFR Master Table version number (see Note (5) under Section 1 of the BUFR regulations for Edition 4)

Add the following as new Note (1) under Section 1 of the CREX regulations:

For Master Table 0, the master table version numbers are as follows:

- 0 Experimental
- 1 Version implemented on 3 May 2000
- 2 Version implemented on 7 November 2001
- 3 Version implemented on 4 November 2003
- 4 Version implemented on 2 November 2005
- 5 Pre-operational to be implemented by next amendment

NEW CODE TABLE ENTRIES FOR POLAR SATELLITE DATA

1 MHS

The MHS instrument replaces the AMSU-B instrument in the ATOVS package operated by EUMETSAT and NOAA. The level 1b data from the MHS can be represented in BUFR using exactly the same sequence of descriptors, which was used for AMSU-B.

The following changes are required to standardize the representation of MHS data:

Code Table 0-02-048

Add: 11, Parameter = MHS
Change: 11 to 14, Parameter = Reserved
to: 12 to 14, Parameter = Reserved

Code Table 0-02-150

Change: 43, Parameter = AMSU-B 1
to: 43, Parameter = AMSU-B 1 / MHS 1
Change: 44, Parameter = AMSU-B 2
to: 44, Parameter = AMSU-B 2 / MHS 2
Change: 45, Parameter = AMSU-B 3
to: 45, Parameter = AMSU-B 3 / MHS 3
Change: 46, Parameter = AMSU-B 4
to: 46, Parameter = AMSU-B 4 / MHS 4
Change: 47, Parameter = AMSU-B 5
to: 47, Parameter = AMSU-B 5 / MHS 5

Code Table 0-02-151

Add: 9, Parameter = MHS
Change: 8 to 2046, Parameter = Reserved
to: 10 to 2046, Parameter = Reserved

Sequence Descriptor 3-10-010

Change: Title = "ATOVS AMSU-B report"
to: Title = "ATOVS AMSU-B / MHS report"

2. IASI

The IASI instrument is a hyperspectral sounder, which will fly on the Metop spacecraft operated by EUMETSAT. The level 1c data from IASI will be exchanged in BUFR. The details of the representation of the data have been discussed by many parties (ECMWF, UK Met Office, NOAA, MétéoFrance, DWD) in great detail and presented at several international meetings (including the 14th International TOVS Study Conference in Beijing). Synthetic IASI data are being generated in near real time by NOAA using the descriptors proposed here. These data have been successfully encoded and decoded by independent software.

The new element and sequence descriptors given here are from the range of local values and are shown in parentheses. It is proposed to assign descriptors from Classes and Categories 40, 41 and 42 of BUFR Tables B and D.

The following changes are required to standardize the representation of IASI data:

New Sequence Descriptor (3-40-001): "IASI Level 1c data"

0-01-007 Satellite identifier
 0-01-031 Identification of originating/generating centre
 0-02-019 Satellite instruments
 0-02-020 Satellite classification
 0-04-001 Year
 0-04-002 Month
 0-04-003 Day
 0-04-004 Hour
 0-04-005 Minute
 2-02-131 Add 3 to scale
 2-01-138 Add 10 to width
 0-04-006 Second
 2-01-000 Reset width
 2-02-000 Reset scale
 0-05-001 Latitude (high accuracy)
 0-06-001 Longitude (high accuracy)
 0-07-024 Satellite zenith angle
 0-05-021 Bearing or azimuth
 0-07-025 Solar zenith angle
 0-05-022 Solar azimuth
 0-05-043 Field of view number
 0-05-040 Orbit number
 2-01-133 Add 5 to width
 0-05-041 Scan line number
 2-01-000 Reset width
 2-01-132 Add 4 to width
 0-25-070 Major frame count
 2-01-000 Reset width
 2-02-126 Subtract 2 from scale
 0-07-001 Height of station
 2-02-000 Reset scale
 (0-33-060) GQisFlagQual
 (0-33-061) QGisQualIndex
 (0-33-062) QGisQualIndexLoc
 (0-33-063) QGisQualIndexRad
 (0-33-064) QGisQualIndexSpect
 (0-33-065) GQisSysTecSondQual
 1-01-010 Repeat next 1 descriptor 10 times
 (3-40-002) IASI Level 1c band description
 1-01-087 Repeat next 1 descriptor 87 times
 (3-40-003) IASI Level 1c 100 channel sequence
 0-02-019 Satellite instruments
 0-25-051 AVHRR channel combination
 1-01-007 Repeat next 1 descriptor 7 times
 (3-40-004) IASI Level 1c AVHRR single scene sequence

New Sequence Descriptor: (3-40-002) "IASI Level 1c band description"

(0-25-140) Start channel
 (0-25-141) End channel
 (0-25-142) Channel scale factor

New Sequence Descriptor: (3-40-003) "IASI Level 1c 100 channel sequence"

- 1-04-100 Repeat next 4 descriptor 100 times
- 2-01-136 Add 8 to width
- 0-05-042 Channel number
- 2-01-000 Reset width
- (0-14-046) Scaled IASI radiance

New Sequence Descriptor: (3-40-004) "IASI Level 1c AVHRR single scene sequence"

- (0-05-060) Y angular position from centre of gravity
- (0-05-061) Z angular position from centre of gravity
- 0-25-085 Fraction of clear pixels in HIRS FOV
- 1-05-006 Repeat next 5 descriptor 6 times
- 0-05-042 Channel number
- (0-25-142) Channel scale factor
- (0-14-047) Scaled mean AVHRR radiance
- (0-25-142) Channel scale factor
- (0-14-048) Scaled std dev AVHRR radiance

New Element Descriptors:

Descriptor	Name	Units	Scale	Reference	Width
(0-05-060)	Y angular position from centre of gravity	Degree	6	-8000000	24
(0-05-061)	Z angular position from centre of gravity	Degree	6	-8000000	24
(0-14-046)	Scaled IASI radiance	$Wm^{-2}sr^{-1}m^{-1}$	0	-5000	16
(0-14-047)	Scaled mean AVHRR radiance	$Wm^{-2}sr^{-1}m^{-1}$	0	0	31
(0-14-048)	Scaled std dev AVHRR radiance	$Wm^{-2}sr^{-1}m^{-1}$	0	0	31
(0-25-140)	Start channel	Numeric	0	0	14
(0-25-141)	End channel	Numeric	0	0	14
(0-25-142)	Channel scale factor	Numeric	0	0	6
(0-33-060)	GqisFlagQual - individual IASI-System quality flag	Code Table	0	0	2
(0-33-061)	GqisQualIndex - indicator for instrument noise performance (contributions from spectral and radiometric)	%	0	0	7
(0-33-062)	GqisQualIndexLoc - indicator for geometric quality index	%	0	0	7
(0-33-063)	GqisQualIndexRad - indicator for instrument noise performance (contributions from radiometric calibration)	%	0	0	7
(0-33-064)	GqisQualIndexSpect - indicator for instrument noise performance (contributions from spectral calibration)	%	0	0	7
(0-33-065)	GqisSysTecSondQual - output of system TEC (Technical Expertise Centre) quality function	Numeric	0	0	24

New Code Table (0-33-060) "GQisFlagQual - individual IASI-System quality flag"

0,	Parameter = Good
1,	Parameter = Bad
2,	Parameter = Reserved
3,	Parameter = Missing

An offset has been introduced for the scaled IASI radiances (0-14-046). This is to accommodate the negative radiances which can be measured at some wave numbers, either due to effects of noise or remaining after apodisation. The offset is an order of magnitude larger than the expected maximum negative excursion based on instrument noise, and so would leave sufficient margin. At the same time the dynamic range is not significantly degraded.

3 ASCAT

EUMETSAT will produce level 1b ASCAT products at its headquarters in Darmstadt, Germany. These data will be encoded in BUFR and disseminated via EUMETCast (DVB satellite multicast service) and on the GTS. EUMETSAT's Ocean and Sea Ice Satellite Application Facility (OSI-SAF), hosted by KNMI, will produce level 2 products from the level 1b data. It is also foreseen to add soils moisture to the level 2 ASCAT product in the future.

The new element and sequence descriptors given here have been developed by close co-operation between EUMETSAT, the OSI-SAF and the ASCAT Science Advisory Group (SAG). The proposed sequence will accommodate both the level 1b and the level 2 data simultaneously. When the level 1b data leave EUMETSAT, the parts of the sequence relating to level 2 processing will be set to "missing". This approach will allow users to ingest the same sequence, whether they are receiving level 1b data or level 2 data.

The new element and sequence descriptors are from the range of local values and are shown in parentheses. It is proposed to assign descriptors from Classes and Categories 40, 41 and 42 of BUFR Tables B and D within Master Tables 0, as per Section 3.5 of the Final Report of the 2004 meeting of the ET/DR&C.

The following changes are required to standardize the representation of ASCAT data:

New Sequence Descriptor: (3-12-061) "ASCAT Level 1b and level 2 data sequence"

- (3-12-058) ASCAT level 1b data
- (3-12-060) Scatterometer soil moisture data
- (3-12-059) Scatterometer wind data

New Sequence Descriptor: (3-12-058) "ASCAT level 1b data sequence"

- (3-01-125) ASCAT header information
 - 3-01-011 Date information
 - 3-01-013 Time information
 - 3-01-021 Position information
- (3-12-055) ASCAT level 1b cell information
- (0-21-150) Beam co-location
- 1-01-003 Repeat next 1 descriptor 3 times
- (3-21-030) ASCAT sigma-0 information

New Sequence Descriptor: (3-12-060) "Scatterometer soil moisture data sequence"

- 0-25-060 Software identification
- (0-25-062) Database identification
- (0-40-001) Surface soil moisture (ms)
- (0-40-002) Estimated error in surface soil moisture
- 0-21-062 Extrapolated backscatter at 40deg incidence angle (sigma0_40)
- (0-21-151) Estimated error in sigma0 at 40deg incidence angle
- (0-21-152) Slope at 40deg incidence angle
- (0-21-153) Estimated error in slope at 40deg incidence angle
- (0-21-154) Soil moisture sensitivity
- 0-21-062 Dry backscatter
- (0-21-088) Wet backscatter
- (0-40-003) Mean surface soil moisture
- (0-40-004) Rain fall detection
- (0-40-005) Soil moisture correction flag
- (0-40-006) Soil moisture processing flag
- (0-40-007) Soil moisture quality
- 0-20-065 Snow cover
- (0-40-008) Frozen land surface fraction
- (0-40-009) Inundation and wetland fraction
- (0-40-010) Topographic complexity

New Sequence Descriptor: (3-12-059) "Scatterometer wind data sequence"

- (3-12-056) Scatterometer wind cell information
- 1-01-000 Delayed replication of next 1 descriptor
- 0-31-001 Delayed replication factor
- (3-12-057) Ambiguous wind data

New Sequence Descriptor: (3-01-125) "ASCAT header information sequence"

- 0-01-033 Identification of originating/generating centre
- 0-01-034 Identification of originating/generating sub-centre
- 0-25-060 Software identification
- 0-01-007 Satellite identifier
- 0-02-019 Satellite instruments
- 0-01-012 Direction of motion of moving observing platform

New Sequence Descriptor: (3-12-055) "ASCAT level 1b cell information"

- 0-05-033 Pixel size on horizontal-1
- 0-05-040 Orbit number
- 0-06-034 Cross track cell number
- (0-10-095) Height of atmosphere used
- (0-21-157) Loss per unit length of atmosphere used

New Sequence Descriptor: (3-21-030) "ASCAT sigma-0 information"

- (0-08-085) Beam identifier
- 2-02-129 Increase scaling by 10^1
- 2-01-131 Increase data width by 3 bits
- 0-02-111 Radar incidence angle
- 2-01-000 Cancel change data width
- 2-02-000 Cancel change scaling
- 0-02-134 Antenna beam azimuth
- 0-21-062 Backscatter
- 0-21-063 Radiometric resolution (noise value)
- (0-21-158) ASCAT kp estimate quality
- (0-21-159) ASCAT sigma-0 usability
- (0-21-160) ASCAT synthetic data quality
- (0-21-161) ASCAT synthetic data quantity
- (0-21-162) ASCAT satellite orbit and attitude quality
- (0-21-163) ASCAT solar array reflection contamination
- (0-21-164) ASCAT telemetry presence and quality
- (0-21-165) ASCAT extrapolated reference function
- (0-21-166) ASCAT land fraction

New Sequence Descriptor: (3-12-056) "Scatterometer wind cell information sequence"

- 0-25-060 Software identification
- 0-01-032 Generating application
- 0-11-082 Model wind speed at 10 m
- 0-11-081 Model wind direction at 10 m
- (0-20-095) Ice probability
- (0-20-096) Ice age (a-parameter)
- (0-21-155) Wind vector cell quality
- 2-01-133 Increase data width by 5 bits
- 0-21-101 Number of vector ambiguities
- 0-21-102 Index of selected wind vector
- 2-01-000 Cancel change data width

New Sequence Descriptor: (3-12-057) "Ambiguous wind data"

- 2-01-130 Increase data width by 2 bits
- 2-02-129 Increase scaling by 10^1
- 0-11-012 Wind speed at 10 m
- 2-02-000 Cancel change scaling
- 2-01-000 Cancel change data width
- 2-01-131 Increase data width by 3 bits
- 2-02-129 Increase scaling by 10^1
- 0-11-011 Wind direction at 10 m
- 2-02-000 Cancel change scaling
- 2-01-000 Cancel change data width
- (0-21-156) Backscatter distance
- 0-21-104 Likelihood computed for solution

New Element Descriptors:

Descriptor	Name	Units	Scale	Reference	Width
(0-10-095)	Height of atmosphere used	m	0	0	16
(0-08-085)	Beam identifier	Code table	0	0	3
(0-20-095)	Ice probability	Numeric	3	0	10
(0-20-096)	Ice age ("A" parameter)	dB	2	-4096	13
(0-21-088)	Wet backscatter	dB	2	-5000	13
(0-21-150)	Beam collocation	Code table	0	0	2
(0-21-151)	Estimated error in sigma0 at 40deg incidence angle	dB	2	0	9
(0-21-152)	Slope at 40deg incidence angle	dB/Deg	2	-80	7
(0-21-153)	Estimated error in slope at 40deg incidence angle	dB/Deg	2	-40	6
(0-21-154)	Soil moisture sensitivity	dB	2	0	12
(0-21-155)	Wind vector cell quality	Flag table	0	0	24
(0-21-156)	Backscatter distance	Numeric	1	-4096	13
(0-21-157)	Loss per unit length of atmosphere used	dB m-1	10	0	22
(0-21-158)	ASCAT kp estimate quality	Code table	0	0	2
(0-21-159)	ASCAT sigma-0 usability	Code table	0	0	2
(0-21-160)	ASCAT use of synthetic data	Numeric	3	0	10
(0-21-161)	ASCAT synthetic data quality	Numeric	3	0	10
(0-21-162)	ASCAT satellite orbit and attitude quality	Numeric	3	0	10
(0-21-163)	ASCAT solar array reflection contamination	Numeric	3	0	10
(0-21-164)	ASCAT telemetry presence and quality	Numeric	3	0	10
(0-21-165)	ASCAT extrapolated reference function presence	Numeric	3	0	10
(0-21-166)	ASCAT land fraction	Numeric	3	0	10
(0-25-062)	Database identification	Numeric	0	0	14
(0-40-001)	Surface soil moisture (ms)	%	1	0	10
(0-40-002)	Estimated error in surface soil moisture	%	1	0	10
(0-40-003)	Mean surface soil moisture	Numeric	3	0	10
(0-40-004)	Rain fall detection	Numeric	3	0	10
(0-40-005)	Soil moisture correction flag	Flag table	0	0	8
(0-40-006)	Soil moisture processing flag	Flag table	0	0	16
(0-40-007)	Soil moisture quality	%	1	0	10
(0-40-008)	Frozen land surface fraction	%	1	0	10
(0-40-009)	Inundation and wetland fraction	%	1	0	10
(0-40-010)	Topographic complexity	%	1	0	10

New Code Table (0-08-085) "Beam identified"

0,	Parameter = Fore beam
1,	Parameter = Mid beam
2,	Parameter = Aft beam
3 to 6,	Parameter = Reserved
7,	Parameter = Missing

New Code Table (0-21-150) "Beam co-location"

0,	Parameter = Data from single ground station (no co-location)
1,	Parameter = Data from multiple ground station (co-located data)
2,	Parameter = Reserved
3,	Parameter = Missing

New Flag Table (0-21-155) "Wind vector cell quality"

Bit 1:	Not enough good sigma-0 available for wind retrieval
Bit 2:	Poor azimuth diversity among sigma-0 for wind retrieval
Bit 3:	Any beam noise content above threshold
Bit 4:	Product monitoring not used
Bit 5:	Product monitoring flag
Bit 6:	KNMI quality control fails
Bit 7:	Variational quality control fails
Bit 8:	Some portion of wind vector cell is over land
Bit 9:	Some portion of wind vector cell is over ice
Bit 10:	Wind retrieval not performed for wind vector cell
Bit 11:	Reported wind speed is greater than 30 m/s
Bit 12:	Reported wind speed is less than or equal to 3 m/s
Bit 13:	Rain flag for the wind vector cell is not usable
Bit 14:	Rain flag algorithm detects rain
Bit 15:	No meteorological background used
Bit 16:	Data are redundant
Bit 17-23:	Reserved
All 24:	Missing

New Code Table (0-21-158) "ASCAT KP quality estimate"

0,	Parameter = Acceptable
1,	Parameter = Not acceptable
2,	Parameter = Reserved
3,	Parameter = Missing

New Code Table (0-21-159) "ASCAT sigma-0 usability"

0,	Parameter = Good
1,	Parameter = Usable
2,	Parameter = Bad
3,	Parameter = Missing

New Flag Table (0-40-005) "Soil moisture correction flags"

Bit 1:	Soil moisture between -20% and 0%
Bit 2:	Soil moisture between 100% and 120%
Bit 3:	Correction of wet backscatter reference
Bit 4:	Correction of dry backscatter reference
Bit 5:	Correction of volume scattering in sand
Bits 6-7:	Reserved
All 8:	Missing

New Flag Table (0-40-006) "Soil moisture processing flags"

Bit 1:	Not soil
Bit 2:	Sensitivity to soil moisture below limit
Bit 3:	Azimuthal noise above limit
Bit 4:	Backscatter Fore-Aft beam out of range
Bit 5:	Slope Mid-Fore beam out of range
Bit 6:	Slope Mid-Aft beam out of range
Bit 7:	Soil moisture below -20%
Bit 8:	Soil moisture above 120%
Bits 9-16:	Reserved

Code Table 0-02-048

Add:	12, Parameter = ASCAT
Change:	12 to 14, Parameter = Reserved
to:	13 to 14, Parameter = Reserved

Operational - Editorial

Proposals

1 Addition of a Note under Class 20

Cloud cover (total) 0 20 010 is defined in BUFR/CREX Table B with UNIT = %. The corresponding Code table 2700 for N (Total cloud cover) in [1] allows to make a difference between N = 9 "Sky obscured by fog and/or other meteorological phenomena" and N = / (Cloud cover is indiscernible for reasons other than fog or other meteorological phenomena, or observation is not made). In the Regulations for reporting TAC data in TDCF, Cloud cover (total) 0 20 010 is recommended to be set to a missing value in both cases, which has been found not satisfactory.

It is proposed to add a Note under Class 20:

A cloud cover (total) value 113 shall indicate "Sky obscured by fog and/or other meteorological phenomena".

2 Modification of the text of entry 62 in 0 08 002

In Regulation B/C 1.4.4.2 (e) for reporting SYNOP data in TDCF (and elsewhere), Vertical significance 0 08 002 is recommended to be set to "63 (Missing value)" if sky clear is observed. This might be confusing as the actual meaning is "not applicable".

It is proposed to modify the text of the code figure 62 in 0 08 002 to read:

62 Value not applicable.

3 Addition of another Note under Class 20

Bearing of ice edge 0 20 038 is defined in BUFR/CREX Table B with UNIT = Degree true. The Regulations for reporting SHIP data in TDCF require usage 0 20 038 set to 0, corresponding to the code figure 0 = "Ship in shore or flaw lead" in the Code table 0739 for D_i (True bearing of principal ice edge).

It is proposed to add a Note under Class 20:

A bearing of ice edge value 0 shall indicate "Ship in shore or flaw lead".

PROPOSAL FOR REGIONAL PRACTICES

New descriptors and a Note under the Class 13

F X Y	Element name	BUFR				CREX		
0 11 054	Mean wind direction for 1500 m – 3000 m	Degree true	0	0	9	Degree true	0	3
0 11 055	Mean wind speed for 1500 m – 3000 m	m s ⁻¹	1	0	12	m s ⁻¹	1	4
0 13 047	Modified Showalter stability index	K	0	-60	6	°C	0	2

It is proposed to add a Note under Class 13:

The “Modified Showalter stability index” is defined as the temperature difference between the ambient 500 hPa temperature and the temperature a parcel of air, initially at a selected base level, would have if brought from its condensation level to the 500 hPa surface by a moist adiabatic process. Positive values denote stable conditions, while negative values denote unstable conditions. The base level is 850 hPa, 800hPa or 750 hPa if the station elevation is less than 1000, 1000 to 1400 or 1401 to 2000 gpm above mean sea level, respectively.

RA IV BUFR template for TEMP and TEMP SHIP data:

Sequence for representation of TEMP, TEMP SHIP and TEMP MOBIL observation type data on global scale is defined by **3 09 052**. It is proposed to add the following entries to allow representation of data in the groups 101A_{df}A_{df}.

3 09 052	Sequence for representation of TEMP, TEMP SHIP and TEMP MOBIL observation type data	
	may be supplemented by:	
	Reason for no report or incomplete report	
0 35 035	Reason for termination	Code table
	Corrected data	
1 04 000	Delayed replication of 4 descriptors	
0 31 001	Delayed descriptor replication factor	Numeric
2 04 001	Add associated field of 1 bit in length	
0 31 021	Associated field significance = 21 (indicator of correction)	Code table
	Associated field set to 1 (corrected value)	
3 03 054	Temperature, dew-point, wind at a pressure level with radiosonde position	
2 04 000	Cancel Add associated field	
0 08 042	Extended vertical sounding significance = missing (to cancel the previous value)	Flag table
	Stability index and mean wind data	
0 13 047	Modified Showalter stability index	K
0 11 044	Mean wind direction for surface – 1500 m	Degree true

0 11 045	Mean wind speed for surface – 1500 m	m s ⁻¹ , scale 1
0 11 054	Mean wind direction for 1500 m – 3000 m	Degree true
0 11 055	Mean wind speed for 1500 m – 3000 m	m s ⁻¹ , scale 1
	Doubtful data	
1 12 000	Delayed replication of 12 descriptors	
0 31 001	Delayed descriptor replication factor	Numeric
1 11 002	Replicate next 11 descriptors 2 times	
0 04 086	Long time period or displacement (since launch time)	Second
0 08 040	Flight level significance In the 1 st replication = 4 (Begin doubtful temperature, height data), in the 2 nd replication = 9 (End doubtful temperature, height data).	Code table
0 07 004	Pressure	Pa, scale –1
0 05 015	Latitude displacement since launch site (high accuracy)	Degree, scale 5
0 06 015	Longitude displacement since launch site (high accuracy)	Degree, scale 5
1 01 000	Delayed replication of 1 descriptor	
0 31 000	Short delayed descriptor replication factor	Numeric
0 10 009	Geopotential height	gpm
1 01 000	Delayed replication of 1 descriptor	
0 31 000	Short delayed descriptor replication factor	Numeric
0 12 101	Temperature/dry-bulb temperature (scale 2)	K, scale 2
	Extrapolated geopotential data	
1 08 000	Delayed replication of 8 descriptors	
0 31 001	Delayed descriptor replication factor	Numeric
0 04 086	Long time period or displacement (since launch time)	Second
0 08 040	Flight level significance = 31 (Incremented height level (generated))	Code table
0 07 004	Pressure	Pa, scale –1
0 05 015	Latitude displacement since launch site (high accuracy)	Degree, scale 5
0 06 015	Longitude displacement since launch site (high accuracy)	Degree, scale 5
0 10 009	Geopotential height	gpm
0 11 001	Wind direction	Degree true
0 11 002	Wind speed	m s ⁻¹ , scale 1

TM 309054 - BUFR template for reports of monthly aerological means suitable for CLIMAT TEMP and CLIMAT TEMP SHIP data

3 09 054	Sequence for representation CLIMAT TEMP and CLIMAT TEMP SHIP data
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Sequence BUFR descriptor <3 09 054> expands as it is shown in the leftmost column below:

		Identification of launch site	Unit, scale
3 01 001	0 01 001	WMO block number	Numeric, 0
	0 01 002	WMO station number	Numeric, 0
0 01 011		Ship's call sign	CCITT IA5, 0
		Date/time⁽¹⁾	
3 01 011	0 04 001	Year ⁽¹⁾	Year, 0
	0 04 002	Month ⁽¹⁾	Month, 0
	0 04 003	Day (= 1) ⁽¹⁾	Day, 0
3 01 012	0 04 004	Hour (= 0) ⁽¹⁾	Hour, 0
	0 04 005	Minute (= 0) ⁽¹⁾	Minute, 0
		Horizontal and vertical coordinates	
3 01 021	0 05 001	Latitude (high accuracy)	Degree, 5
	0 06 001	Longitude (high accuracy)	Degree, 5
0 07 030		Height of station ground above mean sea level	m, 1
0 07 031		Height of barometer above mean sea level	m, 1
0 07 007		Height release of sonde above mean sea level	m, 0
		Monthly mean data	
0 04 023		Time period (= number of days in the month)	Day, 0
0 04 059		Times of observations used to compute the reported mean values	Flag table, 0
1 15 000		Delayed replication of 15 descriptors	
0 31 001		Delayed descriptor replication factor	Numeric, 0
0 08 001		Vertical sounding significance	Flag table, 0
0 08 023		First order statistics (= 4; mean value)	Code table, 0
0 07 004		Pressure	Pa, -1
0 10 009		Geopotential height	gpm, 0
0 12 101		Temperature/dry-bulb temperature	K, 2
0 12 103		Dew-point temperature	K, 2
0 08 023		First order statistics (= 32; vector mean)	Code table, 0
0 11 001		Wind direction	Degree true, 0
0 11 002		Wind speed	m s ⁻¹ , 1
0 08 023		First order statistics (= 63; missing value)	Code table, 0
0 11 019		Steadiness of wind	%, 0
0 08 050		Qualifier for number of missing values in calculation of statistic (= 2; temperature)	Code table, 0
0 08 020		Total number of missing entities (days)	Numeric, 0
0 08 050		Qualifier for number of missing values in calculation of statistic (= 9; wind)	Code table, 0
0 08 020		Total number of missing entities (days)	Numeric, 0

Note:

(1) The time identification refers to the beginning of the one-month period.

CODING OF SQUALL LINES IN WEST AFRICA IN CREX

1. West African Track and Trajectory CREX Code (WATTCC) type 1

For squall lines observations (3 points) and forecasted trajectory and evolution:

CREX++

**T00020412// A007001 P00012000 U00 S001 Y20050823 H1830 D16060++
2005 08 23 17 50 1500 -01000 070 00010 1900 -00840 1100 -01220 02 0038 0300++
7777**

T00020412// = 00 = Master table for meteorology
02 = CREX edition number
04 = BUFR edition number
12 = version table of BUFR/CREX
// = No local table

A007001 = 007 = Synoptic features
001 = Squall Line

P00012000 = 00012 = Originating Centre = Dakar
000 = No sub-centre

U00 = 00 = Sequence number of message, = 0 = first

S001 = 001 = number of sub-sets in the report = 1

Y20050823 = Date of the message = year, month, day
H1830 = Hour of the message = hour, minute

D16060 Common sequence defining Squall line (type 1)

Time of observation:

D01011 Date:

2005 = Year

08 = Month

23 = Day

D01012 Hour:

17 = Hour

50 = Minute

Position of Squall Line Centre:

B05002 Latitude:

1500 = 15 deg. North

B06002 Longitude:

-01000 = 10 deg. West

B19005 Direction of moving feature:

070 = 070 degrees

B19006 Speed of moving feature:

00010 = 10 m/s

Amplitude of feature, from most external point to centre point:

North side:

B05002 Latitude:

1900 = 19 deg. North

B06002 Longitude:

-00840 = 8 deg. 40 West

South side:

B05002 Latitude:

1100 = 11 deg. North

B06002 Longitude:

-01220 = 12 deg. 20 West

B20048 Evolution of feature:

02 = Intensification

B11041 maximum burst expected:

0038 = 38 m/s

B13055 intensity of rain expected:

0300 = 300 mm/h

0 20 048

Evolution of feature

Code figure

0	Stability
1	Diminution
2	Intensification
3	Unknown
4-14	Reserved
15	Missing value

2. West African Track and Trajectory CREX Code (WATTCC) type 2

For squall lines (defined with more than 3 points) observations and forecasted trajectory and evolution:

CREX++

T00020412// A007001 P00012000 U00 S001 Y20050823 H1830 D16061++
2005 08 23 17 50 1500 -01000 070 00010 0002 1900 -00840 1700 -00940 0001 1100 -01220 02
0038 0300++
7777

T00020412// =00 = Master table for meteorology
02 = CREX edition number
04 = BUFR edition number
12 = version table of BUFR/CREX
// = No local table

A007001 = 007 = Synoptic features
001 = Squall Line

P00012000 = 00012 = Originating Centre = Dakar
000 = No sub-centre

U00 = 00 = Sequence number of message, = 0 = first

S001 = 001 = number of sub-sets in the report = 1

Y20050823 = Date of the message = year, month, day
H1830 = Hour of the message = hour, minute

D16061 Common sequence defining Squall line (type 2)

Time of observation:

D01011 Date:

2005 = Year

08 = Month

23 = Day

D01012 Hour:

17 = Hour

50 = Minute

Position of Centre:

B05002 Latitude:

1500 = 15 deg. North

B06002 Longitude:

-01000 = 10 deg. West

B19005 Direction of moving feature:

070 = 070 degrees

B19006 Speed of moving feature:

00010 = 10 m/s

Amplitude of feature, from most external point to centre point:

North side:

R02000 define replication of next 2 descriptors:

0002 = twice (*for 2 points*)

First point:

B05002 Latitude:

1900 = 19 deg. North

B06002 Longitude:

-00840 = 8 deg. 40 West

Second point:

B05002 Latitude:

1700 = 17 deg. North

B06002 Longitude:

-00940 = 9 deg. 40 West

South side:

R02000 define replication of next 2 descriptors:

0001 = no replication (*1 point only*)

B05002 Latitude:

1100 = 11 deg. North

B06002 Longitude:

-01220 = 12 deg. 20 West

B20048 Evolution of feature:

02 = Intensification

B11041 maximum burst expected:

0038 = 38 m/s

B13055 intensity of rain expected:

0300 = 300 mm/h

ADDITIONS TO CODE TABLES (OPERATIONAL)

Common Code Table C 1 and Common Code Table C 11

63 IRI (International Research Institute for Climate and Society)

Common Code Table C 2

Modify:

- 58 AVK-BAR (Russian Federation)
- 68 AVK-MRZ-UAP(Russian Federation)
- 69 AVK-BAR-UAP(Russian Federation)
- 88 MARL-A-MRZ (Russian Federation)
- 89 MARL-A-BAR (Russian Federation)

To use alternative words for their definition:

- 58 AVK - MRZ* (Russian Federation)
- 68 AVK - RZM-2 (Russian Federation)
- 69 MARL-A or Vektor-M - RZM-2 (Russian Federation)
- 88 MARL-A or Vektor-M - MRZ (Russian Federation)
- 89 MARL-A or Vektor-M - MRZ* (Russian Federation)

Note: MRZ* is the new brand-name for BAR radiosonde.

Common Code Table C 3: Instrument type for water temperature profile measurement with fall rate equation coefficients

081 Sippican AXBT (300 m probes) coefficients: 1.52, 0.0

- 859 Profiling Float, NEMO, no conductivity
- 860 Profiling Float, NEMO, SBE conductivity sensor
- 861 Profiling Float, NEMO, FSI conductivity sensor

Change meaning of 900 for: LMP-5 XBT (previously named T-12)

Entries for animal instruments as listed below:

- 995 Mammal animals
- 996 Other animals

Common Code Table C 4: Water temperature profile recorder types

08 Sippican MK-10

- 64 Iridium communications, sampling on up transit
- 65 Iridium communications, sampling on down transit

Common Code Table C-5: Satellite identifier

172	MTSAT-2
257	GOES 13
258	GOES 14
259	GOES 15
283	CORIOLIS
785	AURA

In Common Table C-12:

Add the following 2 new sub-centres to existing Common Code Table C-12 for originating center number 254 (EUMETSAT):

140	Lannion, France
150	Svalbard, Norway

Add the following 2 new sub-centres to existing Common Code Table C-12 for originating center number 7 (U.S/NCEP):

15	North American Regional Reanalysis Project
16	Space Environment Center

Rename the following entry in Common Code Table C-12, in order to reflect the changed name of the underlying sub-center:

6	Ocean Prediction Center
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Common Code Table C-13: Data sub-categories of categories defined by entries in BUFR Table A

Add in: 007 Synoptic features 001 Squall Line

Code Table 0 02 152 Satellite instrument data used in processing

12	Multi-channel scanning radiometer
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SEQUENCE FOR REPRESENTATION OF MONTHLY VALUES SUITABLE FOR CLIMAT DATA

It is proposed to represent the complete template for CLIMAT data by a descriptor 3 07 073 that would be composed of 3 07 071 and 3 07 072 for representation of CLIMAT data of the actual month and for monthly normals (data of CLIMAT Section 2), respectively.

$$3\ 07\ 073 = 3\ 07\ 071 + 3\ 07\ 072$$

3 07 071		Monthly values of a land station Data of the month (data of CLIMAT Sections 0, 1, 3 and 4)	
3 01 090		Surface station identification; time, horizontal and vertical co-ordinates 3 01 090 = 3 01 004 + 3 01 011 + 3 01 012 + 3 01 021 + 0 07 030 + 0 07 031	
3 01 004		Surface station identification	
	0 01 001	WMO block number	Numeric
	0 01 002	WMO station number	Numeric
	0 01 015	Station or site name	CCITT IA5
	0 02 001	Type of station	Code table
3 01 011	0 04 001	Year	Year
	0 04 002	Month	Month
	0 04 003	Day	(= 1) ⁽¹⁾ Day
3 01 012	0 04 004	Hour	(= 0) ⁽¹⁾ Hour
	0 04 005	Minute	(= 0) ⁽¹⁾ Minute
3 01 021	0 05 001	Latitude (high accuracy)	Degree, scale 5
	0 06 001	Longitude (high accuracy)	Degree, scale 5
0 07 030		Height of station ground above msl	m, scale 1
0 07 031		Height of barometer above msl	m, scale 1
0 04 074		Short time displacement (= UTC – LST) ⁽¹⁾	Hour
0 04 023		Time period (= number of days in the month)	Day
		Monthly mean values of pressure, temperature, extreme temperatures and vapour pressure	
0 08 023		First order statistics = 4; mean value	Code table
0 10 004		Pressure (= $\overline{P_o P_o P_o P_o}$ - s.1, gr. 1 in CLIMAT)	Pa, scale –1
0 10 051		Pressure reduced to msl (= \overline{PPPP} - s.1, gr. 2)	Pa, scale –1
0 07 004		Pressure (standard level) (for lowland stations = missing value)	Pa, scale –1
0 10 009		Geopotential height of the standard level (= \overline{PPPP} - s.1, gr. 2) (for lowland stations = missing value)	gpm
0 07 032		Height of sensor above local ground	m, scale 2
0 12 101		Temperature/dry-bulb temperature (= $\overline{s_n TTT}$ - s.1, gr. 3)	K, scale 2
0 02 051		Indicator to specify observing method for extreme temperatures (= i_y - s. 4, gr. 7)	Code table
0 04 051		Principal time of daily reading of maximum temperature (= $G_x G_x$ - s. 4, gr. 7)	Hour
0 12 118		Maximum temperature at height specified, past 24 hours (= $s_n T_x T_x T_x$ - s. 1, gr. 4)	K, scale 2
0 04 052		Principal time of daily reading of minimum temperature	Hour

		(= $G_n G_n$ - s.4, gr. 7)	
0 12 119		Minimum temperature at height specified, past 24 hours (= $s_n T_n T_n T_n$ - s.1, gr. 4)	K, scale 2
0 13 004		Vapour pressure (= \overline{eee} - s.1, gr. 5)	Pa, scale -1
0 08 023		First order statistics (= 63; missing value)	Code table
0 12 151		Standard deviation of daily mean temperature (= $s_t s_t s_t$ - s.1, gr. 3)	K, scale 2
0 07 032		Height of sensor above local ground (set to missing to cancel the previous value)	m, scale 2
1 02 005		Replicate 2 descriptors 5 times	
0 08 050		Qualifier for number of missing values in calculation of statistic = 1 (pressure) = 2 (temperature) = 4 (vapour pressure) = 7 (maximum temperature) = 8 (minimum temperature)	Code table
0 08 020		Total number of missing entities (days) = $m_p m_p$ - s.1, gr. 8 (pressure) = $m_T m_T$ - s.1, gr. 8 (temperature) = $m_e m_e$ - s.1, gr. 9 (vapour pressure) = m_{Tx} - s.1, gr. 8 (maximum temperature) = m_{Tn} - s.1, gr. 8 (minimum temperature)	Numeric
		Sunshine duration	
0 14 032		Total sunshine (= $S_1 S_1 S_1$ - s.1, gr. 7)	Hour
0 14 033		Total sunshine (= $p_s p_s p_s$ - s.1, gr. 7)	%
0 08 050		Qualifier for number of missing values in calculation of statistic = 6 (sunshine duration)	Code table
0 08 020		Total number of missing entities (days) = $m_s m_s$ - s.1, gr. 9	Numeric
		Number of days of occurrence	
1 02 018		Replicate 2 descriptors 18 times	
0 08 052		Conditions for which number of days of occurrence follows = 0 (wind \geq 10 m/s) = 1 (wind \geq 20 m/s) = 2 (wind \geq 30 m/s) = 3 (max. T $<$ 273.15 K) = 4 (max. T \geq 298.15 K) = 5 (max. T \geq 303.15 K) = 6 (max. T \geq 308.15 K) = 7 (max. T \geq 313.15 K) = 8 (min. T $<$ 273.15 K) = 16 (sss $>$ 0.00 m) = 17 (sss $>$ 0.01 m) = 18 (sss $>$ 0.10 m) = 19 (sss $>$ 0.50 m) = 20 (horizontal visibility $<$ 50 m) = 21 (horizontal visibility $<$ 100 m) = 22 (horizontal visibility $<$ 1000 m) = 23 (hail) = 24 (thunderstorm)	Code table

0 08 022		<p>Total number (of days) = $f_{10}f_{10}$ - s.3 gr.8 (wind ≥ 10 m/s) = $f_{20}f_{20}$ - s.3 gr.8 (wind ≥ 20 m/s) = $f_{30}f_{30}$ - s.3 gr.8 (wind ≥ 30 m/s) = $T_{x0}T_{x0}$ - s.3 gr.2 ($T_x < 273.15$ K) = $T_{25}T_{25}$ - s.3 gr.0 ($T_x \geq 298.15$ K) = $T_{30}T_{30}$ - s.3 gr.0 ($T_x \geq 303.15$ K) = $T_{35}T_{35}$ - s.3 gr.1 ($T_x \geq 308.15$ K) = $T_{40}T_{40}$ - s.3 gr.1 ($T_x \geq 313.15$ K) = $T_{n0}T_{n0}$ - s.3 gr.2 ($T_n < 273.15$ K) = s_0s_0 - s.3 gr.6 (sss > 0.00 m) = s_1s_1 - s.3 gr.6 (sss > 0.01 m) = $s_{10}s_{10}$ - s.3 gr.7 (sss > 0.10 m) = $s_{50}s_{50}$ - s.3 gr.7 (sss > 0.50 m) = V_1V_1 - s.3 gr.9 (h. v. < 50 m) = V_2V_2 - s.3 gr.9 (h. v. < 100 m) = V_3V_3 - s.3 gr.9 (h. v. < 1000 m) = $D_{gr}D_{gr}$ - s.4 gr.6 (hail) = $D_{ts}D_{ts}$ - s.4 gr.6 (thunderstorm)</p>	Numeric
		Occurrence of extreme values of temperature and wind speed	
0 07 032		Height of sensor above local ground	m, scale 2
0 08 053		Day of occurrence qualifier = 0 (on 1 day only) = 1 (on 2 or more days)	Code table
0 04 003		Day (= $y_x y_x$ - s. 4 gr. 0)	Day
0 12 152		Highest daily mean temperature (= $s_n T_{xd} T_{xd} T_{xd}$ - s. 4 gr. 0)	K, scale 2
0 08 053		Day of occurrence qualifier = 0 (on 1 day only) = 1 (on 2 or more days)	Code table
0 04 003		Day (= $y_n y_n$ - s. 4 gr. 1)	Day
0 12 153		Lowest daily mean temperature (= $s_n T_{nd} T_{nd} T_{nd}$ - s. 4 gr. 1)	K, scale 2
0 08 053		Day of occurrence qualifier = 0 (on 1 day only) = 1 (on 2 or more days)	Code table
0 04 003		Day (= $y_{ax} y_{ax}$ - s. 4 gr. 2)	Day
0 08 023		First order statistics (= 2; maximum value)	Code table
0 12 101		Temperature/dry-bulb temperature (= $s_n T_{ax} T_{ax} T_{ax}$ - s. 4 gr. 2)	K, scale 2
0 08 053		Day of occurrence qualifier = 0 (on 1 day only) = 1 (on 2 or more days)	Code table
0 04 003		Day (= $y_{an} y_{an}$ - s. 4 gr. 3)	Day
0 08 023		First order statistics (= 3; minimum value)	Code table
0 12 101		Temperature/dry-bulb temperature (= $s_n T_{an} T_{an} T_{an}$ - s. 4 gr. 3)	K, scale 2
0 08 023		First order statistics (= 63; missing value)	Code table
0 07 032		Height of sensor above local ground	m, scale 2
0 02 002		Type of instrumentation for wind measurement	Flag table
0 08 053		Day of occurrence qualifier = 0 (on 1 day only) = 1 (on 2 or more days)	Code table
0 04 003		Day (= $y_{fx} y_{fx}$ - s. 4 gr. 5)	Day
0 11 046		Maximum instantaneous wind speed (= $f_x f_x f_x$ - s. 4 gr. 5)	ms ⁻¹ , scale 1
0 08 053		Day of occurrence qualifier	Code table

		(set to missing = 3 to cancel the previous value)	
		Precipitation	
0 04 003		Day (= 1) ⁽²⁾	Day
0 04 004		Hour (= 6) ⁽²⁾	Hour
0 04 023		Time period (= number of days in the month) ⁽²⁾	Day
0 07 032		Height of sensor above local ground	m, scale 2
0 13 060		Total accumulated precipitation (= R ₁ R ₁ R ₁ R ₁ -s.1 gr. 6)	kg m ⁻² , scale 1
0 13 051		Frequency group; precipitation (= R _d - s.1 gr. 6)	Code table
0 04 053		Number of days with precipitation equal to or more than 1 mm (= n _r n _r - s.1 gr. 6)	Numeric
0 08 050		Qualifier for number of missing values in calculation of statistic = 5 (precipitation)	Code table
0 08 020		Total number of missing entities (days) = m _R m _R - s.1, gr. 9	Numeric
		Number of days of occurrence	
1 02 006		Replicate 2 descriptors 6 times	
0 08 052		Conditions for which number of days of occurrence follows = 10 (precipitation ≥ 1.0 kg m ⁻²) = 11 (precipitation ≥ 5.0 kg m ⁻²) = 12 (precipitation ≥ 10.0 kg m ⁻²) = 13 (precipitation ≥ 50.0 kg m ⁻²) = 14 (precipitation ≥ 100.0 kg m ⁻²) = 15 (precipitation ≥ 150.0 kg m ⁻²)	Code table
0 08 022		Total number (of days) = R ₁ R ₁ - s.3 gr.3 (precipitation ≥ 1.0 kg m ⁻²) = R ₅ R ₅ - s.3 gr.3 (precipitation ≥ 5.0 kg m ⁻²) = R ₁₀ R ₁₀ - s.3 gr.4 (precipitation ≥ 10.0 kg m ⁻²) = R ₅₀ R ₅₀ - s.3 gr.4 (precipitation ≥ 50.0 kg m ⁻²) = R ₁₀₀ R ₁₀₀ - s.3 gr.5 (precipitation ≥ 100.0 kg m ⁻²) = R ₁₅₀ R ₁₅₀ - s.3 gr.5 (precipitation ≥ 150.0 kg m ⁻²)	Numeric
		Occurrence of extreme precipitation	
0 08 053		Day of occurrence qualifier = 0 (on 1 day only) = 1 (on 2 or more days)	Code table
0 04 003		Day (= y _r y _r - s. 4 gr. 4)	Day
0 13 052		Highest daily amount of precipitation (= R _x R _x R _x - s. 4 gr. 4)	kg m ⁻² , scale 1
0 07 032		Height of sensor above local ground (set to missing to cancel the previous value)	m, scale 2
3 07 072		Monthly normals from a land station (data of CLIMAT Section 2)	
0 04 001		Year (of beginning of the reference period)	Year
0 04 001		Year (of ending of the reference period)	Year
0 04 002		Month	Month
0 04 003		Day (= 1) ⁽¹⁾	Day
0 04 004		Hour (= 0) ⁽¹⁾	Hour
0 04 074		Short time displacement (= UTC- LST) ⁽¹⁾	Hour
0 04 022		Time period (= 1)	Month
		Normals of monthly mean pressure, temperatures, vapour pressure and of standard deviation	
0 08 023		First order statistics (= 4; mean value)	Code table

0 10 004		Pressure (= $\overline{P_o P_o P_o P_o}$ - s.2, gr. 1)	Pa, scale -1
0 10 051		Pressure reduced to msl (= \overline{PPPP} - s.2, gr. 2)	Pa, scale -1
0 07 004		Pressure (standard level)	Pa, scale -1
0 10 009		Geopotential height of the standard level (= \overline{PPPP} - s.2, gr. 2)	gpm
0 07 032		Height of sensor above local ground	m, scale 2
0 12 101		Temperature/dry-bulb temperature (= $\overline{s_n TTT}$ - s.2, gr. 3)	K, scale 2
0 02 051		Indicator to specify observing method for extreme temperatures = 2 (= i_v - s. 4, gr. 7)	Code table
0 04 051		Principal time of daily reading of maximum temperature (= $\overline{G_x G_x}$ - s. 4, gr. 7)	Hour
0 12 118		Maximum temperature at height specified, past 24 h. (= $\overline{s_n T_x T_x T_x}$ - s. 2, gr. 4)	K, scale 2
0 04 052		Principal time of daily reading of minimum temperature (= $\overline{G_n G_n}$ - s.4, gr. 7)	Hour
0 12 119		Minimum temperature at height specified, past 24 h. (= $\overline{s_n T_n T_n T_n}$ - s.2, gr. 4)	K, scale 2
0 13 004		Vapour pressure (= \overline{eee} - s.2, gr. 5)	Pa, scale -1
0 12 151		Standard deviation of daily mean temperature (= $\overline{s_t S_t S_t}$ - s.2, gr. 3)	K, scale 2
0 07 032		Height of sensor above local ground (set to missing to cancel the previous value)	m, scale 2
		Normal of sunshine duration	
0 14 032		Total sunshine (= $\overline{S_1 S_1 S_1}$ - s.2, gr. 7)	Hour
0 08 023		First order statistics (= 63; missing value)	Code table
0 04 001		Year (of beginning of the reference period)	Year
0 04 001		Year (of ending of the reference period)	Year
0 04 002		Month	Month
0 04 003		Day (= 1) ⁽²⁾	Day
0 04 004		Hour (= 6) ⁽²⁾	Hour
0 04 022		Time period (= 1)	Month
		Normals of precipitation	
0 07 032		Height of sensor above local ground	m, scale 2
0 08 023		First order statistics (= 4; mean value)	Code table
0 13 060		Total accumulated precipitation (= $\overline{R_1 R_1 R_1 R_1}$ - s.2 gr. 6)	kg m ⁻² , scale 1
0 04 053		Number of days with precipitation equal to or more than 1 mm (= $\overline{n_r n_r}$ - s.2 gr. 6)	Numeric
0 08 023		First order statistics (= 63; missing value)	Code table
1 02 008		Replicate 2 descriptors 8 times	
0 08 050		Qualifier for number of missing values in calculation of statistic = 1 (pressure), = 2 (temperature),	Code table

		= 3 (extreme temperatures), ⁽⁴⁾ = 4 (vapour pressure), = 5 (precipitation), = 6 (sunshine duration) = 7 (maximum temperature), ⁽⁴⁾ = 8 (minimum temperature), ⁽⁴⁾	
0 08 020		Total number of missing entities (years) = $y_p y_p$ - s.2, gr. 8 (pressure) = $y_T y_T$ - s.2, gr. 8 (temperature) = $y_{Tx} y_{Tx}$ - s.2, gr. 8 (extreme temperatures) ⁽⁴⁾ = $y_e y_e$ - s.2, gr. 9 (vapour pressure) = $y_R y_R$ - s.2, gr. 9 (precipitation) = $y_S y_S$ - s.2, gr. 9 (sunshine duration) = maximum temperature ⁽⁴⁾ = minimum_temperature ⁽⁴⁾	Numeric

Notes:

- 1) The time identification refers to the beginning of the one-month period.
- 2) In case of precipitation measurements, the one-month period begins at 06 UTC on the first day of the month and ends at 06 UTC on the first day of the following month.
- 3) If the height of the sensor was changed during the period specified, the value shall be that which existed for the greater part of the period.
- (4) The number of missing years within the reference period from the calculation of normal for mean extreme air temperature should be given, if available, for both the calculation of normal maximum temperature and for the calculation of normal minimum temperature in addition to the number of missing years for the extreme air temperatures reported under 0 08 020 preceded by 0 08 050 in which Figure 3 is used.

SEQUENCE FOR REPRESENTATION OF MONTHLY VALUES SUITABLE FOR CLIMAT SHIP DATA

It is proposed to represent the complete template for CLIMAT SHIP data by a descriptor 3 08 013 that would be composed of 3 08 011 and 3 08 012 for representation of CLIMAT SHIP data of the actual month and for monthly normals (data of CLIMAT SHIP Section 2), respectively.

3 08 013 = 3 08 011 + 3 08 012

3 08 011		Monthly values from an ocean weather station Data of the month (data of CLIMAT SHIP Section 1)	
0 01 011		Ship's call sign	CCITT IA5
0 02 001		Type of station	Code table
3 01 011	0 04 001	Year	Year
	0 04 002	Month	Month
	0 04 003	Day (= 1) ⁽¹⁾	Day
3 01 012	0 04 004	Hour (= 0) ⁽¹⁾	Hour
	0 04 005	Minute (= 0) ⁽¹⁾	Minute
3 01 023	0 05 002	Latitude (coarse accuracy)	Degree, scale 2
	0 06 002	Longitude (coarse accuracy)	Degree, scale 2
0 07 030		Height of station platform above mean sea level	m, scale 1
0 07 031		Height of barometer above mean sea level	m, scale 1
0 04 074		Short time displacement (= UTC – LST) ⁽¹⁾	Hour
0 04 023		Time period (= number of days in the month)	Day
		Monthly mean values of pressure, temperature, vapour pressure and sea/water temperature	
0 08 023		First order statistics (= 4; mean value)	Code table
0 10 051		Pressure reduced to mean sea level	Pa, scale –1
0 07 032		Height of sensor above marine deck platform (for temperature measurement)	m, scale 2
0 07 033		Height of sensor above water surface (for temperature measurement)	m, scale 1
0 12 101		Temperature/dry-bulb temperature	K, scale 2
0 13 004		Vapour pressure	Pa, scale -1
0 07 032		Height of sensor above marine deck platform (set to missing to cancel the previous value)	m, scale 2
0 07 033		Height of sensor above water surface (set to missing to cancel the previous value)	m, scale 1
3 02 056		Sea surface temperature, method of measurement, and depth below sea surface	
	0 02 038	Method of sea/water temperature measurement	Code table, 0
	0 07 063	Depth below sea/water surface (for sea surface temperature measurement)	m, 2
	0 22 043	Sea/water temperature	K, 2
	0 07 063	Depth below sea/water surface (set to missing to cancel the previous value)	m, 2
0 08 023		First order statistics (= 63; missing value)	Code table
		Precipitation	
0 04 003		Day (= 1) ⁽²⁾	Day
0 04 004		Hour (= 6) ⁽²⁾	Hour

0 04 023		Time period (= number of days in the month) ⁽²⁾	Day
0 07 032		Height of sensor above marine deck platform	m, scale 2
0 13 060		Total accumulated precipitation	kg m ⁻² , scale 1
0 13 051		Frequency group; precipitation	Code table
0 04 053		Number of days with precipitation equal to or more than 1 mm	Numeric
0 07 032		Height of sensor above marine deck platform (set to missing to cancel the previous value)	m, scale 2
3 08 012		Monthly normals from an ocean weather station (data of CLIMAT SHIP Section 2)	
0 04 001		Year (of beginning of the reference period)	Year
0 04 001		Year (of ending of the reference period)	Year
0 04 002		Month	Month
0 04 003		Day (= 1) ⁽¹⁾	Day
0 04 004		Hour (= 0) ⁽¹⁾	Hour
0 04 074		Short time displacement (= UTC – LST) ⁽¹⁾	Hour
0 04 022		Time period (= 1)	Month
		Normals of monthly mean pressure, temperature, vapour pressure and sea/water temperature	
0 08 023		First order statistics (= 4; mean value)	Code table
0 10 051		Pressure reduced to mean sea level	Pa, scale –1
0 07 032		Height of sensor above marine deck platform (for temperature measurement)	m, scale 2
0 07 033		Height of sensor above water surface (for temperature measurement)	m, scale 1
0 12 101		Temperature/dry-bulb temperature	K, scale 2
0 13 004		Vapour pressure	Pa, scale -1
0 07 032		Height of sensor above marine deck platform (set to missing to cancel the previous value)	m, scale 2
0 07 033		Height of sensor above water surface (set to missing to cancel the previous value)	m, scale 1
3 02 056		Sea surface temperature, method of measurement, and depth below sea surface	
	0 02 038	Method of sea/water temperature measurement	Code table, 0
	0 07 063	Depth below sea/water surface (for sea surface temperature measurement)	m, 2
	0 22 043	Sea/water temperature	K, 2
	0 07 063	Depth below sea/water surface (set to missing to cancel the previous value)	m, 2
0 08 023		First order statistics (= 63; missing value)	Code table
0 04 001		Year (of beginning of the reference period)	Year
0 04 001		Year (of ending of the reference period)	Year
0 04 002		Month	Month
0 04 003		Day (= 1) ⁽²⁾	Day
0 04 004		Hour (= 6) ⁽²⁾	Hour
0 04 022		Time period (= 1)	Month
		Normals of precipitation	
0 07 032		Height of sensor above marine deck platform (for precipitation measurement)	m, scale 2

0 08 023		First order statistics (= 4; mean value)	Code table
0 13 060		Total accumulated precipitation	kg m ⁻² , scale 1
0 04 053		Number of days with precipitation equal to or more than 1 mm	Numeric
0 08 023		First order statistics (= 63; missing value)	Code table

Notes:

- 1) The time identification refers to the beginning of the one-month period.
- 2) In case of precipitation measurements, the one-month period begins at 06 UTC on the first day of the month and ends at 06 UTC on the first day of the following month.
- 3) If the height of the sensor was changed during the period specified, the value shall be that which existed for the greater part of the period.

FOR ENCODING MORE SATELLITE DATA:

Add class in BUFR Table B — Classification of elements:

0	40	Satellite data
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Add a new Category of sequences in BUFR Table D:

3	40	Additional satellite report sequences
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FOR EXCHANGE IN BUFR OF TEMPERATURE AND SALINITY PROFILE DATA OBSERVED BY PROFILING FLOATS:

Three ADMT members of the Argo Data Management Team (ADMT): the Japan Meteorological Agency (JMA), Canadian Marine Environmental Data Service (MEDS) and the US Naval Oceanographic Office, successfully completed the validation test of the following sequence for exchange in BUFR of temperature and salinity profile data observed by profiling floats.

Common sequence, Category 15 — Oceanographic report sequences

(Temperature and salinity profile observed by profile floats)

- 3 15 003** 001087 - WMO Marine observing platform extended identifier
001085 - Observing platform manufacturers model
001086 - Observing platform manufacturers serial number
002036 - Buoy type
002148 - Data collection and/or location system
002149 - Type of data buoy
022055 - Float cycle number
022056 - Direction of profile
022067 - Instrument type for water temperature profile measurement
301011 - Date
301012 - Time
301021 - Latitude and longitude (high accuracy)
008080 - Qualifier for quality class
033050 - GTSP quality class
109000 - Delayed replication of 9 descriptors
031002 - Extended delayed descriptor replication factor
007065 - Water pressure
008080 - Qualifier for quality class
033050 - GTSP quality class
022045 - Subsurface sea temperature
008080 - Qualifier for quality class
033050 - GTSP quality class
022064 - Salinity
008080 - Qualifier for quality class
033050 - GTSP quality class