

B/C32 – Regulations for reporting CLIMAT SHIP data in TDCF

TM 308013 – BUFR template for reports of monthly values from an ocean weather station suitable for CLIMAT SHIP data

		Representation of CLIMAT SHIP data of the actual month and for monthly normals
3 08 013	3 08 011	Monthly values from an ocean weather station – CLIMAT SHIP
	3 08 012	Monthly normals for an ocean weather station

			Unit, scale
Monthly values from an ocean weather station (data of CLIMAT SHIP Section 1) Sequence BUFR descriptor <3 08 011> expands as shown in the leftmost column below.			
		Station identification, date/time, horizontal and vertical coordinates	
0 01 011		Ship or mobile land station identifier	CCITT IA5, 0
0 02 001		Type of station	Code table, 0
3 01 011	0 04 001	Year (see Note 1)	Year, 0
	0 04 002	Month (see Note 1)	Month, 0
	0 04 003	Day (= 1) (see Note 1)	Day, 0
3 01 012	0 04 004	Hour (= 0) (see Note 1)	Hour, 0
	0 04 005	Minute (= 0) (see Note 1)	Minute, 0
3 01 023	0 05 002	Latitude (coarse accuracy) $L_a L_a L_a$	Degree, 2
	0 06 002	Longitude (coarse accuracy) $L_o L_o L_o L_o$	Degree, 2
0 07 030		Height of station ground (platform) above mean sea level	m, 1
0 07 031		Height of barometer above mean sea level	m, 1
		Monthly mean values of pressure, temperature, vapour pressure and sea/water temperature	
0 04 074		Short time period or displacement (= UTC – LT) (see Note 1)	Hour, 0
0 04 023		Time period or displacement (= number of days in the month)	Day, 0
0 08 023		First-order statistics (= 4; mean value)	Code table, 0
0 10 051		Pressure reduced to mean sea level \overline{PPPP}	Pa, –1
0 07 032		Height of sensor above local ground (or deck of marine platform) (for temperature measurement) (see Note 2)	m, 2
0 07 033		Height of sensor above water surface (for temperature measurement) (see Note 2)	m, 1
0 12 101		Temperature/air temperature $\overline{s_n TTT}$	K, 2
0 13 004		Vapour pressure \overline{eee}	Pa, –1
0 07 032		Height of sensor above local ground (or deck of marine platform) (set to missing to cancel the previous value)	m, 2
0 07 033		Height of sensor above water surface (set to missing to cancel the previous value)	m, 1

			Unit, scale
		<i>Sea-surface temperature, method of measurement, and depth below sea surface</i>	
3 02 056	0 02 038	Method of water temperature and/or salinity measurement (see Note 2)	Code table, 0
	0 07 063	Depth below sea/water surface (cm) (for sea-surface temperature measurement) (see Note 2)	m, 2
	0 22 043	Sea/water temperature $\overline{s_n T_w T_w T_w}$	K, 2
	0 07 063	Depth below sea/water surface (cm) (set to missing to cancel the previous value)	m, 2
0 08 023		First-order statistics (set to missing to cancel the previous value)	Code table, 0
		Monthly precipitation data	
0 04 003		Day (= 1) (see Note 3)	Day, 0
0 04 004		Hour (= 6) (see Note 3)	Hour, 0
0 04 023		Time period or displacement (= number of days in the month) (see Note 3)	Day, 0
0 07 032		Height of sensor above local ground (or deck of marine platform) (see Note 2)	m, 2
0 13 060		Total accumulated precipitation $R_1 R_1 R_1 R_1$	kg m ⁻² , 1
0 13 051		Frequency group, precipitation R_d	Code table, 0
0 04 053		Number of days with precipitation equal to or more than 1 mm $n_r n_r$	Numeric, 0
0 07 032		Height of sensor above local ground (or deck of marine platform) (set to missing to cancel the previous value)	m, 2
Monthly normals for an ocean weather station (data of CLIMAT SHIP Section 2)			
Sequence BUFR descriptor <3 08 012> expands as shown in the leftmost column below.			
		Normals of pressure, temperature, vapour pressure and sea/water temperature	Unit, scale
0 04 001		Year (of beginning of the reference period)	Year, 0
0 04 001		Year (of ending of the reference period)	Year, 0
0 04 002		Month	Month, 0
0 04 003		Day (= 1) (see Note 1)	Day, 0
0 04 004		Hour (= 0) (see Note 1)	Hour, 0
0 04 074		Short time period or displacement (= UTC – LT) (see Note 1)	Hour, 0
0 04 022		Time period or displacement (= 1)	Month, 0
0 08 023		First-order statistics (= 4; mean value)	Code table, 0
0 10 051		Pressure reduced to mean sea level \overline{PPPP}	Pa, –1
0 07 032		Height of sensor above local ground (or deck of marine platform) (for temperature measurement) (see Note 2)	m, 2
0 07 033		Height of sensor above water surface (for temperature measurement) (see Note 2)	m, 1
0 12 101		Temperature/air temperature $\overline{s_n TTT}$	K, 2
0 13 004		Vapour pressure \overline{eee}	Pa, –1

			Unit, scale
0 07 032		Height of sensor above local ground (or deck of marine platform) (set to missing to cancel the previous value)	m, 2
0 07 033		Height of sensor above water surface (set to missing to cancel the previous value)	m, 1
		<i>Sea-surface temperature, method of measurement, and depth below sea surface</i>	
3 02 056	0 02 038	Method of water temperature and/or salinity measurement (see Note 2)	Code table, 0
	0 07 063	Depth below sea/water surface (cm) (for sea-surface temperature measurement) (see Note 2)	m, 2
	0 22 043	Sea/water temperature $\overline{s_n T_w T_w T_w}$	K, 2
	0 07 063	Depth below sea/water surface (cm) (set to missing to cancel the previous value)	m, 2
0 08 023		First-order statistics (set to missing to cancel the previous value)	Code table, 0
		Normals of precipitation	
0 04 001		Year (of beginning of the reference period)	Year, 0
0 04 001		Year (of ending of the reference period)	Year, 0
0 04 002		Month	Month, 0
0 04 003		Day (= 1) (see Note 3)	Day, 0
0 04 004		Hour (= 6) (see Note 3)	Hour, 0
0 04 022		Time period or displacement (= 1)	Month, 0
0 07 032		Height of sensor above local ground (or deck of marine platform) (for precipitation measurement) (see Note 2)	m, 2
0 08 023		First-order statistics (= 4; mean value)	Code table, 0
0 13 060		Total accumulated precipitation $R_1 R_1 R_1 R_1$	kg m ⁻² , 1
0 04 053		Number of days with precipitation equal to or more than 1 mm $n_r n_r$	Numeric, 0
0 08 023		First-order statistics (set to missing to cancel the previous value)	Code table, 0

Notes:

- (1) The time identification refers to the beginning of the one-month period. Except for precipitation measurements, the one-month period is recommended to correspond to the local time (LT) month.
- (2) If the height/depth of sensors or method of sea/water temperature measurement was changed during the period specified, the value shall be that which existed for the greater part of the period.
- (3) 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.

Regulations:

B/C32.1	Section 1 of BUFR or CREX
B/C32.2	Monthly values from an ocean weather station – CLIMAT SHIP
B/C32.2.1	Station identification, date/time, horizontal and vertical coordinates
B/C32.2.2	Monthly mean values of pressure, temperature, vapour pressure and sea/water temperature
B/C32.2.3	Monthly precipitation data
B/C32.3	Monthly normals for an ocean weather station
B/C32.3.1	Normals of pressure, temperature, vapour pressure and sea/water temperature
B/C32.3.2	Normals of precipitation
B/C32.4	Regional or national reporting practices

B/C32.1 Section 1 of BUFR or CREX

B/C32.1.1 Entries required in Section 1 of BUFR

The following entries shall be included in BUFR Section 1:

- BUFR master table;
- Identification of originating/generating centre;
- Identification of originating/generating sub-centre;
- Update sequence number;
- Identification of inclusion of optional section;
- Data category (001 for CLIMAT SHIP data);
- International data sub-category (see Note 1);
- Local data sub-category;
- Version number of master table;
- Version number of local tables;
- Year (see Notes 2 and 4);
- Month (for which the monthly values are reported) (see Note 2);
- Day (01) (see Note 2);
- Hour (00) (see Note 2);
- Minute (00) (see Note 2);
- Second (00) (see Note 2).

Notes:

- (1) If required, the international data sub-category shall be included for CLIMAT SHIP data as 020.
- (2) The time identification refers to the beginning of the month for which the monthly mean values are reported.
- (3) If an NMHS performs conversion of CLIMAT SHIP data produced by another NMHS, originating centre in Section 1 shall indicate the converting centre and originating sub-centre shall indicate the producer of CLIMAT SHIP bulletins. The producer of CLIMAT SHIP bulletins shall be specified in Common Code table C-12 as a sub-centre of the originating centre, i.e. of the NMHS executing the conversion.
- (4) Date (year, month and day) and time (hour, minute and second) are the most typical time in the BUFR message contents and specified in UTC.

B/C32.1.2 Entries required in Section 1 of CREX

The following entries shall be included in CREX Section 1:

- CREX master table;
- CREX edition number;
- CREX table version number;
- Version number of BUFR master table;
- Version number of local tables;
- Data category (001 for CLIMAT SHIP data);

- International data sub-category (see Note 1);
- Identification of originating/generating centre;
- Identification of originating/generating sub-centre;
- Update sequence number;
- Number of subsets;
- Year (see Notes 2 and 4);
- Month (for which the monthly values are reported) (see Note 2);
- Day (01) (see Note 2);
- Hour (00) (see Note 2);
- Minute (00) (see Note 2).

Notes:

- (1) If inclusion of the international data sub-category is required, Note 1 under Regulation B/C32.1.1 applies.
- (2) Note 2 under Regulation B/C32.1.1 applies.
- (3) If an NMHS performs conversion of CLIMAT SHIP data produced by another NMHS, Note 3 under Regulation B/C32.1.1 applies.
- (4) Date (year, month and day) and time (hour, minute and second) are the most typical time in the BUFR message contents and specified in UTC.

B/C32.2 Monthly values from an ocean weather station – CLIMAT SHIP <3 08 011>

B/C32.2.1 Station identification, date/time, horizontal and vertical coordinates

B/C32.2.1.1 Station identification

Ship identifier (0 01 011) shall be always reported as a non-missing value.

Type of station (0 02 001) shall be reported to indicate the type of the station operation (manned, automatic or hybrid).

B/C32.2.1.2 Date/time (of beginning of the month)

Date <3 01 011> and time <3 01 012> shall be reported, i.e. year (0 04 001), month (0 04 002), day (0 04 003) and hour (0 04 004), minute (0 04 005) of beginning of the month for which the monthly values are reported. Day (0 04 003) shall be set to 1 and both hour (0 04 004) and minute (0 04 005) shall be set to 0.

B/C32.2.1.3 Horizontal and vertical coordinates

Latitude (0 05 002) and longitude (0 06 002) of the station shall be reported in degrees with precision in hundredths of a degree.

Height of station platform above mean sea level (0 07 030) and height of barometer above mean sea level (0 07 031) shall be reported in metres with precision in tenths of a metre.

B/C32.2.2 Monthly mean values of pressure, temperature, vapour pressure and sea/water temperature

The monthly mean values of pressure reduced to mean sea level, temperature, vapour pressure and sea/water temperature shall be reported. Any missing element shall be reported as a missing value.

B/C32.2.2.1 Reference period for the data of the month

Monthly data (with the exception of precipitation data) are recommended to be reported for one-month period, corresponding to the local time (LT) month [*Handbook on CLIMAT and CLIMAT TEMP Reporting* (WMO/TD-No.1188)]. In that case, short time displacement (0 04 074) shall specify the difference

between UTC and LT (set to *non-positive values in the eastern hemisphere, non-negative values in the western hemisphere*).

Time period (0 04 023) represents the number of days in the month for which the data are reported, and shall be expressed as a *positive value* in days.

Note: A BUFR (or CREX) message shall contain reports for one specific month only.
[72.1.3]

B/C32.2.2.2 First-order statistics – Code table 0 08 023

This datum shall be set to 4 (mean value) to indicate that the following entries represent mean values of the elements (pressure reduced to mean sea level, temperature, vapour pressure and sea/water temperature) averaged over the one-month period.

B/C32.2.2.3 Monthly mean value of pressure reduced to mean sea level

Monthly mean value of pressure reduced to mean sea level shall be reported using 0 10 051 (Pressure reduced to mean sea level) in pascals (with precision in tens of pascals).

B/C32.2.2.4 Height of sensor above marine deck platform and height of sensor above water surface

Height of sensor above marine deck platform (0 07 032) for temperature and humidity measurement shall be reported in metres (with precision in hundredths of a metre). This datum represents the actual height of temperature and humidity sensors above marine deck platform at the point where the sensors are located.

Height of sensor above water surface (0 07 033) for temperature and humidity measurement shall be reported in metres (with precision in tenths of a metre). This datum represents the actual height of temperature and humidity sensors above water surface of sea or lake.

Note: If the heights of the sensors were changed during the period specified, the value shall be that which existed for the greater part of the period.

B/C32.2.2.5 Monthly mean value of temperature

Monthly mean value of temperature shall be reported using 0 12 101 (Temperature/air temperature) in kelvin (with precision in hundredths of a kelvin); if produced in CREX, in degrees Celsius (with precision in hundredths of a degree Celsius). Temperature data shall be reported with precision in hundredths of a degree even if they are available with the accuracy in tenths of a degree.

Notes:

- (1) This requirement is based on the fact that conversion from the Kelvin to the Celsius scale has often resulted into distortion of the data values.
- (2) Temperature t (in degrees Celsius) shall be converted into temperature T (in kelvin) using equation: $T = t + 273.15$.

B/C32.2.2.6 Monthly mean value of vapour pressure

Monthly mean value of vapour pressure shall be reported using 0 13 004 (Vapour pressure) in pascals (with precision in tens of pascals).

B/C32.2.2.7 Monthly mean value of sea-surface temperature, method of its measurement and depth below sea/water surface

Method of sea/water temperature measurement shall be reported by Code table 0 02 038; depth below sea/water surface (0 07 063) shall be reported in metres (with precision in hundredths of a metre).

Monthly mean value of sea-surface temperature shall be reported using 0 22 043 (Sea/water temperature) in kelvin (with precision in hundredths of a kelvin); if produced in CREX, in degrees Celsius (with precision in hundredths of a degree Celsius). Sea/water temperature data shall be reported with precision in hundredths of a degree even if they are available with the accuracy in tenths of a degree.

Notes:

- (1) If the method of sea/water temperature measurement or the depth of the sensor below sea/water surface was changed during the period specified, the value shall be that which existed for the greater part of the period.
- (2) Notes 1 and 2 under Regulation B/C32.2.2.5 shall apply.

B/C32.2.2.8 First-order statistics – Code table 0 08 023

This datum shall be set to missing to indicate that the following entries do not represent the monthly mean values.

B/C32.2.3 Monthly precipitation data**B/C32.2.3.1 Date/time (of beginning of the one-month period for precipitation data)**

Day (0 04 003) and hour (0 04 004) of the beginning of the one-month period for monthly precipitation data are reported. Day (0 04 003) shall be set to 1 and hour (0 04 004) *shall be set to 6*.

Notes:

- (1) In case of precipitation measurements, a month begins at 0600 hours UTC on the first day of the month and ends at 0600 hours UTC on the first day of the following month [*Handbook on CLIMAT and CLIMAT TEMP Reporting* (WMO/TD-No.1188)].
- (2) Year (0 04 001), month (0 04 002) and minute (0 04 005) of the beginning of the month specified in Regulation B/C32.2.1.2 apply.

B/C32.2.3.2 Period of reference for precipitation data of the month

Time period (0 04 023) represents the number of days in the month for which the monthly mean data are reported, and shall be expressed as a *positive value* in days.

Note: A BUFR (or CREX) message shall contain reports for one specific month only. [72.1.3]

B/C32.2.3.3 Height of sensor above marine deck platform

Height of sensor above marine deck platform (0 07 032) for precipitation measurement shall be reported in metres (with precision in hundredths of a metre).

This datum represents the actual height of the rain gauge rim above marine deck platform at the point where the rain gauge is located.

Note: 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.

B/C32.2.3.4 Total amount of precipitation of the month

Total accumulated precipitation (0 13 060) which has fallen during the month shall be reported in kilograms per square metre (with precision in tenths of a kilogram per square metre).

Note: Trace shall be reported as “–0.1 kg m⁻²”.

B/C32.2.3.5 Indication of frequency group

Frequency group in which the total amount of precipitation of the month falls shall be reported using Code table 0 13 051 (Frequency group; precipitation).

Note: If for a particular month the total amount of precipitation is zero, the code figure for 0 13 051 shall be given by the highest number of quintile which has 0.0 as lower limit (e.g. in months with no rainfall in the 30-year period, 0 13 051 shall be set to 5). [72.1.4.2]

B/C32.2.3.6 Number of days with precipitation equal to or greater than 1 mm

Number of days in the month with precipitation equal to or greater than 1 kilogram per square metre shall be reported using 0 04 053 (Number of days in the month with precipitation equal to or greater than 1 mm).

Note: When the monthly total precipitation is not available, both 0 13 060 and 0 04 053 shall be set to missing. [72.1.4.1]

B/C32.3 Monthly normals for an ocean weather station <3 08 012>

Meteorological Services shall submit to the Secretariat complete normal data of the elements for stations to be included in the CLIMAT SHIP bulletins. The same shall apply when Services consider it necessary to make amendments to previously published normal values. [72.2.1]

B/C32.3.1 Normals of pressure, temperature, vapour pressure and sea/water temperature

Normal values of pressure reduced to mean sea level, temperature, vapour pressure and sea/water temperature shall be reported. Any missing element shall be reported as a missing value.

B/C32.3.1.1 Reference period for normal data

Reference period for calculation of the normal values of the elements shall be reported using two consecutive entries 0 04 001 (Year). The first 0 04 001 shall express the year of beginning of the reference period and the second 0 04 001 shall express the year of ending of the reference period.

Note: The normal data of pressure, temperature and sea/water temperature reported shall be deduced from observations made over a 30-year normal period. [72.2.2]

B/C32.3.1.2 Specification of the one-month period for which normals are reported

The one-month period for which the normal values are reported shall be specified by month (0 04 002), day (0 04 003) being set to 1, hour (0 04 004) being set to 0, short time displacement (0 04 074) being set to (UTC – LT) and time period (0 04 022) being set to 1, i.e. 1 month.

Short time displacement (0 04 074) shall be set to *non-positive values in the eastern hemisphere, non-negative values in the western hemisphere*.

B/C32.3.1.3 First-order statistics – Code table 0 08 023

This datum shall be set to 4 (mean value) to indicate that the following entries represent mean values of the elements (pressure reduced to mean sea level,

temperature, vapour pressure and sea/water temperature) averaged over the reference period specified in Regulation B/C32.3.1.1.

B/C32.3.1.4 Normal value of pressure reduced to mean sea level

Normal value of pressure reduced to mean sea level shall be reported using 0 10 051 (Pressure reduced to mean sea level) in pascals (with precision in tens of pascals).

B/C32.3.1.5 Height of sensor above marine deck platform and height of sensor above water surface

Regulation B/C32.2.2.4 shall apply.

B/C32.3.1.6 Normal value of temperature

Normal value of temperature shall be reported using 0 12 101 (Temperature/air temperature) in kelvin (with precision in hundredths of a kelvin); if produced in CREX, in degrees Celsius (with precision in hundredths of a degree Celsius).

Note: Notes 1 and 2 under Regulation B/C32.2.2.5 shall apply.

B/C32.3.1.7 Normal value of vapour pressure

Normal value of vapour pressure shall be reported using 0 13 004 (Vapour pressure) in pascals (with precision in tens of pascals).

B/C32.3.1.8 Normal value of sea-surface temperature, method of measurement and depth below sea/water surface

Method of sea/water temperature measurement shall be reported by Code table 0 02 038; depth below sea/water surface (0 07 063) shall be reported in metres (with precision in hundredths of a metre).

Normal value of sea-surface temperature shall be reported using 0 22 043 (Sea/water temperature) in kelvin (with precision in hundredths of a kelvin); if produced in CREX, in degrees Celsius (with precision in hundredths of a degree Celsius).

Notes:

(1) Note 1 under Regulation B/C32.2.2.7 shall apply.

(2) Notes 1 and 2 under Regulation B/C32.2.2.5 shall apply.

B/C32.3.2 Normals of precipitation

Normal values of monthly amount of precipitation and of number of days in the month with precipitation equal to or greater than 1 mm, shall be reported. Any missing element shall be reported as a missing value.

B/C32.3.2.1 Reference period for normal values of precipitation

Reference period for calculation of the normal values of precipitation shall be reported using two consecutive entries 0 04 001 (Year). The first 0 04 001 shall express the year of beginning of the reference period and the second 0 04 001 shall express the year of ending of the reference period.

B/C32.3.2.2 Specification of the one-month period for which normals are reported

The one-month period for which the normals of precipitation are reported shall be specified by month (0 04 002), day (0 04 003) being set to 1, hour (0 04 004) being set to 6 and time period (0 04 022) being set to 1, i.e. 1 month.

Note: Note 1 under Regulation B/C32.2.3.1 shall apply.

B/C32.3.2.3 Height of sensor above local marine deck platform

Regulation B/C32.2.3.3 shall apply.

B/C32.3.2.4 First-order statistics – Code table 0 08 023

This datum shall be set to 4 (mean value) to indicate that the following entries represent mean values of precipitation data, averaged over the reference period specified in Regulation B/C32.3.2.1.

B/C32.3.2.5 Normal value of monthly amount of precipitation

Normal value of monthly amount of precipitation shall be reported in kilograms per square metre (with precision in tenths of a kilogram per square metre) using 0 13 060 (Total accumulated precipitation).

Note: Trace shall be reported as “–0.1 kg m⁻²”.

B/C32.3.2.6 Normal value of number of days with precipitation ≥ 1 mm

Normal value of number of days in the month with precipitation equal to or greater than 1 kilogram per square metre shall be reported using 0 04 053 (Number of days in the month with precipitation equal to or greater than 1 mm).

B/C32.4 Regional or national reporting practices

B/C32.4.1 Data required by regional or national reporting practices

No additional data are currently required by regional or national reporting practices for CLIMAT SHIP data in the *Manual on Codes* (WMO-No. 306), Volume II.

B/C32.4.2 Reference period for the data of the month

If the regional or national reporting practices require reporting monthly data (with the exception of precipitation data) for one-month period different from the local time month as recommended in Regulation B/C32.2.2.1, short time displacement (0 04 074) shall be adjusted accordingly.

B/C32.4.3 Date/time (of beginning of the one-month period for precipitation data)

If the regional or national reporting practices require reporting monthly precipitation data for one-month period different from the period recommended in Note 1 to Regulation B/C32.2.3.1, then hour (0 04 004) shall be adjusted accordingly. This regulation does not apply if the beginning of the period for monthly precipitation data starts on the last day of the previous month in UTC.

B/C32.4.4 Date/time (of beginning of the one-month period for precipitation data on the last day of the previous month)

If the regional or national reporting practices require reporting monthly precipitation data for period which starts on the last day of the previous month in UTC, template TM 308023 should be used. The beginning of the period for monthly precipitation data shall be specified by short time displacement (0 04 074) set to a relevant negative value. The beginning of one-month period for which the normals of precipitation are reported, shall be specified in a similar way.