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### BUFR TABLES RELATIVE TO SECTION 3 (Version 14)

**BUFR TABLE B — CLASSIFICATION OF ELEMENTS**

| F | X  | Class                                    | Comments   |
|---|----|--|--|
| 0 | 00 | BUFR table entries                       |  |
| 0 | 01 | Identification                           | Identifies origin and type of data   |
| 0 | 02 | Instrumentation                          | Defines instrument types used  |
| 0 | 03 | Reserved                                 |  |
| 0 | 04 | Location (time)                          | Defines time and time derivatives  |
| 0 | 05 | Location (horizontal – 1)                | Defines geographical position, including horizontal derivatives, in association with class 06 (first dimension of horizontal space)  |
| 0 | 06 | Location (horizontal – 2)                | Defines geographical position, including horizontal derivatives, in association with class 05 (second dimension of horizontal space) |
| 0 | 07 | Location (vertical)                      | Defines height, altitude, pressure level, including vertical derivatives of position   |
| 0 | 08 | Significance qualifiers                  | Defines special character of data  |
| 0 | 09 | Reserved                                 |  |
| 0 | 10 | Vertical elements and pressure           | Height, altitude, pressure and derivatives observed or measured, <i>not</i> defined as a vertical location                           |
| 0 | 11 | Wind and turbulence                      | Wind speed, direction, etc.  |
| 0 | 12 | Temperature                              |  |
| 0 | 13 | Hydrographic and hydrological elements   | Humidity, rainfall, snowfall, etc.   |
| 0 | 14 | Radiation and radiance                   |  |
| 0 | 15 | Physical/chemical constituents           |  |
| 0 | 19 | Synoptic features                        |  |
| 0 | 20 | Observed phenomena                       | Defines present/past weather, special phenomena, etc.  |
| 0 | 21 | Radar data                               |  |
| 0 | 22 | Oceanographic elements                   |  |
| 0 | 23 | Dispersal and transport                  |  |
| 0 | 24 | Radiological elements                    |  |
| 0 | 25 | Processing information                   |  |
| 0 | 26 | Non-coordinate location (time)           | Defines time and time derivatives that are not coordinates   |
| 0 | 27 | Non-coordinate location (horizontal – 1) | Defines geographical positions, in conjunction with class 28, that are not coordinates   |
| 0 | 28 | Non-coordinate location (horizontal – 2) | Defines geographical positions, in conjunction with class 27, that are not coordinates   |
| 0 | 29 | Map data                                 |  |
| 0 | 30 | Image                                    |  |
| 0 | 31 | Data description operator qualifiers     | Elements used in conjunction with data description operators   |
| 0 | 33 | Quality information                      |  |
| 0 | 35 | Data monitoring                          |  |
| 0 | 40 | Satellite data                           |  |

**Notes:**

- (1) Where a code table or flag table is appropriate, “code table” or “flag table” respectively is entered in the UNITS column.
- (2) The code tables and flag tables associated with Table B are numbered to correspond with the F, X and Y part of the table reference.
- (3) To encode values into BUFR, the data (with units as specified in the UNITS column) must be multiplied by 10 to the power SCALE. Then subtract the REFERENCE VALUE to give the coded value found in Section 4 of the BUFR message. For example, a measured latitude is –45.76 degrees. The coarse accuracy descriptor is 0 05 002 and the encoded value is  $-45.76 \times 10^2 - (-9000) = 4424$ .
- (4) Where UNITS are given as CCITT IA5, data shall be coded as character data left justified within the field width indicated using CCITT International Alphabet No. 5, and blank filled to the full field width indicated.
- (5) Classes 48 to 63 are reserved for local use; all other classes are reserved for future development.
- (6) Entries 192 to 255 within all classes are reserved for local use.
- (7) The use of local descriptors, as defined in Notes (5) and (6), in messages intended for non-local or international exchange is strongly discouraged. They should be kept to the barest minimum possible and must also be by-passed by the use of descriptor 2 06 YYY.
- (8) First-order statistics are included in Table B only when they are produced, as such, by the observing system.
- (9) In all flag tables within the BUFR specification, bits are numbered from 1 to N from the most significant to least significant within a data width of N bits, i.e. bit No.1 is the leftmost and bit No. N is the rightmost bit within the data

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width. The bit No. N (the least significant bit) is set to 1 only if all the bits are set to 1 within the data width of the flag table to represent a missing value.

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### Class 00 - BUFR/CREX<sup>(\*)</sup> table entries

| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME                         | BUFR      |       |                    |                         | CREX      |       |                               |
|--------------------|----|-----|---|-----------|-------|--------------------|-------------------------|-----------|-------|-------------------------------|
|                    |    |     |   | UNIT      | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT      | SCALE | DATA<br>WIDTH<br>(Characters) |
| F                  | X  | Y   |   |           |       |                    |                         |           |       |                               |
| 0                  | 00 | 001 | Table A: entry                                | CCITT IA5 | 0     | 0                  | 24                      | Character | 0     | 3                             |
| 0                  | 00 | 002 | Table A: data category description, line 1    | CCITT IA5 | 0     | 0                  | 256                     | Character | 0     | 32                            |
| 0                  | 00 | 003 | Table A: data category description, line 2    | CCITT IA5 | 0     | 0                  | 256                     | Character | 0     | 32                            |
| 0                  | 00 | 004 | BUFR/CREX Master table (see Note 2)           | CCITT IA5 | 0     | 0                  | 16                      | Character | 0     | 2                             |
| 0                  | 00 | 005 | BUFR/CREX edition number                      | CCITT IA5 | 0     | 0                  | 24                      | Character | 0     | 3                             |
| 0                  | 00 | 006 | BUFR Master table Version number (see Note 3) | CCITT IA5 | 0     | 0                  | 16                      | Character | 0     | 2                             |
| 0                  | 00 | 007 | CREX Master table Version number (see Note 4) | CCITT IA5 | 0     | 0                  | 16                      | Character | 0     | 2                             |
| 0                  | 00 | 008 | BUFR Local table version number (see Note 5)  | CCITT IA5 | 0     | 0                  | 16                      | Character | 0     | 2                             |
| 0                  | 00 | 010 | F descriptor to be added or defined           | CCITT IA5 | 0     | 0                  | 8                       | Character | 0     | 1                             |
| 0                  | 00 | 011 | X descriptor to be added or defined           | CCITT IA5 | 0     | 0                  | 16                      | Character | 0     | 2                             |
| 0                  | 00 | 012 | Y descriptor to be added or defined           | CCITT IA5 | 0     | 0                  | 24                      | Character | 0     | 3                             |
| 0                  | 00 | 013 | Element name, line 1                          | CCITT IA5 | 0     | 0                  | 256                     | Character | 0     | 32                            |
| 0                  | 00 | 014 | Element name, line 2                          | CCITT IA5 | 0     | 0                  | 256                     | Character | 0     | 32                            |
| 0                  | 00 | 015 | Units name                                    | CCITT IA5 | 0     | 0                  | 192                     | Character | 0     | 24                            |
| 0                  | 00 | 016 | Units scale sign                              | CCITT IA5 | 0     | 0                  | 8                       | Character | 0     | 1                             |
| 0                  | 00 | 017 | Units scale                                   | CCITT IA5 | 0     | 0                  | 24                      | Character | 0     | 3                             |
| 0                  | 00 | 018 | Units reference sign                          | CCITT IA5 | 0     | 0                  | 8                       | Character | 0     | 1                             |
| 0                  | 00 | 019 | Units reference value                         | CCITT IA5 | 0     | 0                  | 80                      | Character | 0     | 10                            |
| 0                  | 00 | 020 | Element data width                            | CCITT IA5 | 0     | 0                  | 24                      | Character | 0     | 3                             |
| 0                  | 00 | 030 | Descriptor defining sequence                  | CCITT IA5 | 0     | 0                  | 48                      | Character | 0     | 6                             |

\* For CREX descriptors F = B, not 0.

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

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## Class 01 - Identification

| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME                                 | BUFR              |       |                    |                         | CREX              |       |                               |
|--------------------|----|-----|---|-------------------|-------|--------------------|-------------------------|-------------------|-------|-------------------------------|
|                    |    |     |   | UNIT              | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT              | SCALE | DATA<br>WIDTH<br>(Characters) |
| F                  | X  | Y   |   |                   |       |                    |                         |                   |       |                               |
| 0                  | 01 | 001 | WMO block number                                      | Numeric           | 0     | 0                  | 7                       | Numeric           | 0     | 2                             |
| 0                  | 01 | 002 | WMO station number                                    | Numeric           | 0     | 0                  | 10                      | Numeric           | 0     | 3                             |
| 0                  | 01 | 003 | WMO Region number/geographical area                   | Code table        | 0     | 0                  | 3                       | Code table        | 0     | 1                             |
| 0                  | 01 | 004 | WMO Region sub-area (see Note 9)                      | Numeric           | 0     | 0                  | 3                       | Numeric           | 0     | 1                             |
| 0                  | 01 | 005 | Buoy/platform identifier                              | Numeric           | 0     | 0                  | 17                      | Numeric           | 0     | 5                             |
| 0                  | 01 | 006 | Aircraft flight number                                | CCITT IA5         | 0     | 0                  | 64                      | Character         | 0     | 8                             |
| 0                  | 01 | 007 | Satellite identifier                                  | Code table        | 0     | 0                  | 10                      | Code table        | 0     | 4                             |
| 0                  | 01 | 008 | Aircraft registration number or other identification  | CCITT IA5         | 0     | 0                  | 64                      | Character         | 0     | 8                             |
| 0                  | 01 | 009 | Type of commercial aircraft                           | CCITT IA5         | 0     | 0                  | 64                      | Character         | 0     | 8                             |
| 0                  | 01 | 010 | Stationary buoy platform identifier; e.g. C-MAN buoys | CCITT IA5         | 0     | 0                  | 64                      | Character         | 0     | 8                             |
| 0                  | 01 | 011 | Ship or mobile land station identifier                | CCITT IA5         | 0     | 0                  | 72                      | Character         | 0     | 9                             |
| 0                  | 01 | 012 | Direction of motion of moving observing platform**    | Degree true       | 0     | 0                  | 9                       | Degree true       | 0     | 3                             |
| 0                  | 01 | 013 | Speed of motion of moving observing platform**        | m s <sup>-1</sup> | 0     | 0                  | 10                      | m s <sup>-1</sup> | 0     | 3                             |
| 0                  | 01 | 014 | Platform drift speed (high precision)                 | m s <sup>-1</sup> | 2     | 0                  | 10                      | m s <sup>-1</sup> | 2     | 4                             |
| 0                  | 01 | 015 | Station or site name                                  | CCITT IA5         | 0     | 0                  | 160                     | Character         | 0     | 20                            |
| 0                  | 01 | 018 | Short station or site name                            | CCITT IA5         | 0     | 0                  | 40                      | Character         | 0     | 5                             |
| 0                  | 01 | 019 | Long Station or site name                             | CCITT IA5         | 0     | 0                  | 256                     | Character         | 0     | 32                            |
| 0                  | 01 | 020 | WMO Region sub-area                                   | Numeric           | 0     | 0                  | 4                       | Numeric           | 0     | 2                             |
| 0                  | 01 | 021 | Synoptic feature identifier                           | Numeric           | 0     | 0                  | 14                      | Numeric           | 0     | 4                             |
| 0                  | 01 | 022 | Name of feature (see Note 11)                         | CCITT IA5         | 0     | 0                  | 224                     | Character         | 0     | 28                            |
| 0                  | 01 | 023 | Observation sequence number                           | Numeric           | 0     | 0                  | 9                       | Numeric           | 0     | 3                             |
| 0                  | 01 | 024 | Wind Speed source                                     | Code table        | 0     | 0                  | 5                       | Code table        | 0     | 2                             |
| 0                  | 01 | 025 | Storm identifier                                      | CCITT IA5         | 0     | 0                  | 24                      | Character         | 0     | 3                             |
| 0                  | 01 | 026 | WMO storm name*                                       | CCITT IA5         | 0     | 0                  | 64                      | Character         | 0     | 8                             |
| 0                  | 01 | 027 | WMO long storm name                                   | CCITT IA5         | 0     | 0                  | 80                      | Character         | 0     | 10                            |
| 0                  | 01 | 028 | Aerosol optical Depth (AOD) source                    | Code table        | 0     | 0                  | 5                       | Code table        | 0     | 2                             |
| 0                  | 01 | 029 | SSI Source  | Code table        | 0     | 0                  | 5                       | Code table        | 0     | 2                             |
| 0                  | 01 | 030 | Numerical model identifier (see Note 13)              | CCITT IA5         | 0     | 0                  | 128                     | Character         | 0     | 16                            |

\* Descriptor 0 01 027 should be used instead of 0 01 026 to encode this element.

\*\* Descriptors 0 01 012 and 0 01 013 may relate to parameters of various meanings and the corresponding values may be integrated on different periods.

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| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME  | BUFR  |       |                    |                         | CREX                         |       |                               |
|--------------------|----|-----|--|---|-------|--------------------|-------------------------|------------------------------|-------|-------------------------------|
|                    |    |     |  | UNIT  | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT                         | SCALE | DATA<br>WIDTH<br>(Characters) |
| 0                  | 01 | 031 | Identification of originating/generating centre<br>(see Note 10) | Code table  | 0     | 0                  | 16                      | Code table                   | 0     | 5                             |
| 0                  | 01 | 032 | Generating application   | Code table defined by<br>originating/<br>generating<br>centre (Notes<br>(3), (4) and (5)) | 0     | 0                  | 8                       | Code table                   | 0     | 3                             |
| 0                  | 01 | 033 | Identification of originating/generating centre                  | Code table  | 0     | 0                  | 8                       | Code table                   | 0     | 3                             |
| 0                  | 01 | 034 | Identification of originating/generating sub-<br>centre          | Code table  | 0     | 0                  | 8                       | Code table                   | 0     | 3                             |
| 0                  | 01 | 035 | Originating Centre   | Common Code<br>Table C-11   | 0     | 0                  | 16                      | Common<br>Code Table<br>C-11 | 0     | 5                             |
| 0                  | 01 | 036 | Agency in charge of operating the Observing<br>platform          | Code table  | 0     | 0                  | 20                      | Code table                   | 0     | 7                             |
| 0                  | 01 | 037 | SIGMET sequence identifier                                       | CCITT IA5   | 0     | 0                  | 24                      | Character                    | 0     | 3                             |
| 0                  | 01 | 038 | Source of Sea Ice Fraction                                       | Code table  | 0     | 0                  | 5                       | Code table                   | 0     | 2                             |
| 0                  | 01 | 039 | Graphical Area Forecast (GFA) sequence<br>identifier             | CCITT IA5   | 0     | 0                  | 40                      | Character                    | 0     | 5                             |
| 0                  | 01 | 041 | Absolute platform velocity – first component<br>(see Note 6)     | m s <sup>-1</sup>   | 5     | –1073741824        | 31                      | m s <sup>-1</sup>            | 5     | 10                            |
| 0                  | 01 | 042 | Absolute platform velocity – second<br>component (see Note 6)    | m s <sup>-1</sup>   | 5     | –1073741824        | 31                      | m s <sup>-1</sup>            | 5     | 10                            |
| 0                  | 01 | 043 | Absolute platform velocity – third component<br>(see Note 6)     | m s <sup>-1</sup>   | 5     | –1073741824        | 31                      | m s <sup>-1</sup>            | 5     | 10                            |
| 0                  | 01 | 050 | Platform transmitter ID number                                   | Numeric   | 0     | 0                  | 17                      | Numeric                      | 0     | 6                             |
| 0                  | 01 | 051 | Platform transmitter ID number                                   | CCITT IA5   | 0     | 0                  | 96                      | Character                    | 0     | 12                            |
| 0                  | 01 | 060 | Aircraft reporting point (Beacon identifier)                     | CCITT IA5   | 0     | 0                  | 64                      | Character                    | 0     | 8                             |
| 0                  | 01 | 062 | Short ICAO location indicator                                    | CCITT IA5   | 0     | 0                  | 32                      | Character                    | 0     | 4                             |
| 0                  | 01 | 063 | ICAO location indicator  | CCITT IA5   | 0     | 0                  | 64                      | Character                    | 0     | 8                             |
| 0                  | 01 | 064 | Runway designator  | CCITT IA5   | 0     | 0                  | 32                      | Character                    | 0     | 4                             |
| 0                  | 01 | 065 | ICAO region identifier   | CCITT IA5   | 0     | 0                  | 256                     | Character                    | 0     | 32                            |
| 0                  | 01 | 075 | Tide station identification                                      | CCITT IA5   | 0     | 0                  | 40                      | Character                    | 0     | 5                             |
| 0                  | 01 | 080 | Ship line number according to SOOP                               | CCITT IA5   | 0     | 0                  | 32                      | Character                    | 0     | 4                             |
| 0                  | 01 | 081 | Radiosonde serial number   | CCITT IA5   | 0     | 0                  | 160                     | Character                    | 0     | 20                            |
| 0                  | 01 | 082 | Radiosonde ascension number (see Note 12)                        | Numeric   | 0     | 0                  | 14                      | Numeric                      | 0     | 4                             |
| 0                  | 01 | 083 | Radiosonde release number (see Note 12)                          | Numeric   | 0     | 0                  | 3                       | Numeric                      | 0     | 1                             |

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| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME                             | BUFR       |       |                    |                         | CREX       |       |                               |
|--------------------|----|-----|---|------------|-------|--------------------|-------------------------|------------|-------|-------------------------------|
|                    |    |     |   | UNIT       | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT       | SCALE | DATA<br>WIDTH<br>(Characters) |
| F                  | X  | Y   |   |            |       |                    |                         |            |       |                               |
| 0                  | 01 | 085 | Observing platform manufacturer's model           | CCITT IA5  | 0     | 0                  | 160                     | Character  | 0     | 20                            |
| 0                  | 01 | 086 | Observing platform manufacturer's serial number   | CCITT IA5  | 0     | 0                  | 256                     | Character  | 0     | 32                            |
| 0                  | 01 | 087 | WMO Marine observing platform extended identifier | Numeric    | 0     | 0                  | 23                      | Numeric    | 0     | 7                             |
| 0                  | 01 | 090 | Technique for making up initial perturbations     | Code table | 0     | 0                  | 8                       | Code table | 0     | 3                             |
| 0                  | 01 | 091 | Ensemble member number                            | Numeric    | 0     | 0                  | 10                      | Numeric    | 0     | 4                             |
| 0                  | 01 | 092 | Type of ensemble forecast                         | Code table | 0     | 0                  | 8                       | Code table | 0     | 3                             |
| 0                  | 01 | 093 | Balloon lot number                                | CCITT IA5  | 0     | 0                  | 96                      | Character  | 0     | 12                            |
| 0                  | 01 | 094 | WBAN Number                                       | Numeric    | 0     | 0                  | 17                      | Numeric    | 0     | 5                             |
| 0                  | 01 | 095 | Observer identification                           | CCITT IA5  | 0     | 0                  | 32                      | Character  | 0     | 4                             |
| 0                  | 01 | 096 | Station acquisition                               | CCITT IA5  | 0     | 0                  | 160                     | Character  | 0     | 20                            |
| 0                  | 01 | 101 | State identifier                                  | Code table | 0     | 0                  | 10                      | Code table | 0     | 3                             |
| 0                  | 01 | 102 | National station number                           | Numeric    | 0     | 0                  | 30                      | Numeric    | 0     | 9                             |
| 0                  | 01 | 124 | Grid point identifier                             | Numeric    | 0     | 0                  | 24                      | Numeric    | 0     | 8                             |
| 0                  | 01 | 144 | Snapshot identifier                               | Numeric    | 0     | 0                  | 31                      | Numeric    | 0     | 10                            |

Notes:

- (1) The storm identifier (descriptor 0 01 025) has the following meaning: the first two characters shall be a numeric sequence number assigned by the originator of the message; the third character is a letter indicating the ocean basin where the storm is located, as follows:
 

|   |  |
|---|--|
| W | NW Pacific Ocean   |
| E | NE Pacific Ocean to 140°W                                |
| C | NE Pacific Ocean 140°W – 180°W                           |
| L | N Atlantic Ocean, including Caribbean and Gulf of Mexico |
| A | N Arabian Sea  |
| B | Bay of Bengal  |
| S | S Indian Ocean   |
| P | S Pacific Ocean  |
| F | RSMC Nadi's zone in South Pacific                        |
| U | Australia  |
| O | South China Sea  |
| T | East China Sea   |

There is no requirement that differing observers coordinate sequence numbers even though they both may be reporting the same storm.
- (2) WMO storm name (descriptor 0 01 027): the storm name NAMELESS shall be used in those cases where an identifiable tropical disturbance has not reached tropical storm strength and has not been assigned an official name.
- (3) Where a centre other than the originating centre generates quality information, replacement or substitute values, and/or statistical information, the centre may be indicated by using 0 01 033.

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- (4) A generating centre may wish to indicate a reference to the application that generated quality information, etc.; it may use descriptor 0 01 032 for this purpose. However, the corresponding code tables will vary from centre to centre.
- (5) Code table 0 01 032 is to be generated by each centre.
- (6) The components of absolute platform velocity (0 01 041, 0 01 042, 0 01 043) are defined as follows:
  - First component: From the Earth's centre to 0 degree longitude at the Equator: velocity of the platform along this line relative to the Earth's centre.
  - Second component: From the Earth's centre to 90 degrees East longitude at the Equator: velocity of the platform along this line relative to the Earth's centre.
  - Third component: From the Earth's centre to the North Pole: velocity of the platform along this line relative to the Earth's centre.
- (7) The values for descriptors 0 01 041, 0 01 042 and 0 01 043 have been chosen to be suitable for polar orbiting satellites in approximately Sun-synchronous orbits. Geostationary orbits would require greater data widths for distance and slightly less for speed.
- (8) Left handed xyz axes have been chosen for descriptors 0 01 041, 0 01 042 and 0 01 043.
- (9) Descriptor 0 01 020 should be used instead of 0 01 004 for encoding this element.
- (10) Descriptor 0 01 033 shall be used instead of descriptor 0 01 031 for encoding originating/generating centre. Code table 0 01 034 is to be established by the associated originating/generating centre identified by descriptor 0 01 033 and provided to the Secretariat for publication.
- (11) For 0 01 022, the character string representing the "Name of feature" should be of the form: "Type of phenomenon" – "Location or geographical name" (e.g.: "volcano – Popocatepetl", "oil fire – Kuwait")
- (12) Descriptor 0-01-082 is to be used for reporting the sequential number of the current radiosonde reporting period (e.g. synoptic cycle) within a given year or other similar locally-defined length of time. Descriptor 0-01-083 is to be used in the case of multiple sequential radiosonde releases during a single reporting period (e.g. synoptic cycle), in order to indicate which particular release generated the corresponding data values.
- (13) 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.
- (14) Stationary position of ship shall be reported by 0 01 012 set to 0 and 0 01 013 set to 0. Course of ship unknown ( $D_s = 9$ ) shall be reported by 0 01 012 set to 509.

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## Class 02 - Instrumentation

| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME  | BUFR       |       |                    |                         | CREX       |       |                               |
|--------------------|----|-----|--|------------|-------|--------------------|-------------------------|------------|-------|-------------------------------|
|                    |    |     |  | UNIT       | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT       | SCALE | DATA<br>WIDTH<br>(Characters) |
| F                  | X  | Y   |  |            |       |                    |                         |            |       |                               |
| 0                  | 02 | 001 | Type of station  | Code table | 0     | 0                  | 2                       | Code table | 0     | 1                             |
| 0                  | 02 | 002 | Type of instrumentation for wind measurement   | Flag table | 0     | 0                  | 4                       | Flag table | 0     | 2                             |
| 0                  | 02 | 003 | Type of measuring equipment used   | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 004 | Type of instrumentation for evaporation measurement or type of crop for which evapotranspiration is reported | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 005 | Precision of temperature observation   | K          | 2     | 0                  | 7                       | K          | 2     | 3                             |
| 0                  | 02 | 011 | Radiosonde type  | Code table | 0     | 0                  | 8                       | Code table | 0     | 3                             |
| 0                  | 02 | 012 | Radiosonde computational method  | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 013 | Solar and infrared radiation correction  | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 014 | Tracking technique/status of system used   | Code table | 0     | 0                  | 7                       | Code table | 0     | 3                             |
| 0                  | 02 | 015 | Radiosonde completeness  | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 016 | Radiosonde configuration   | Flag table | 0     | 0                  | 5                       | Flag table | 0     | 2                             |
| 0                  | 02 | 019 | Satellite instruments  | Code table | 0     | 0                  | 11                      | Code table | 0     | 4                             |
| 0                  | 02 | 020 | Satellite classification   | Code table | 0     | 0                  | 9                       | Code table | 0     | 3                             |
| 0                  | 02 | 021 | Satellite instrument data used in processing*  | Flag table | 0     | 0                  | 9                       | Flag table | 0     | 3                             |
| 0                  | 02 | 022 | Satellite data-processing technique used   | Flag table | 0     | 0                  | 8                       | Flag table | 0     | 3                             |
| 0                  | 02 | 023 | Satellite derived wind computation method  | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 024 | Integrated mean humidity computational method  | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 025 | Satellite channel(s) used in computation   | Flag table | 0     | 0                  | 25                      | Flag table | 0     | 9                             |
| 0                  | 02 | 026 | Cross track resolution   | m          | 2     | 0                  | 12                      | m          | 2     | 4                             |
| 0                  | 02 | 027 | Along track resolution   | m          | 2     | 0                  | 12                      | m          | 2     | 4                             |
| 0                  | 02 | 028 | Segment size at nadir in X direction   | m          | 0     | 0                  | 18                      | m          | 0     | 6                             |
| 0                  | 02 | 029 | Segment size at nadir in Y direction   | m          | 0     | 0                  | 18                      | m          | 0     | 6                             |
| 0                  | 02 | 030 | Method of current measurement  | Code table | 0     | 0                  | 3                       | Code table | 0     | 1                             |
| 0                  | 02 | 031 | Duration and time of current measurement   | Code table | 0     | 0                  | 5                       | Code table | 0     | 2                             |
| 0                  | 02 | 032 | Indicator for digitization   | Code table | 0     | 0                  | 2                       | Code table | 0     | 1                             |
| 0                  | 02 | 033 | Method of salinity/depth measurement   | Code table | 0     | 0                  | 3                       | Code table | 0     | 1                             |
| 0                  | 02 | 034 | Drogue type  | Code table | 0     | 0                  | 5                       | Code table | 0     | 2                             |
| 0                  | 02 | 035 | Cable length   | m          | 0     | 0                  | 9                       | m          | 0     | 3                             |
| 0                  | 02 | 036 | Buoy type  | Code table | 0     | 0                  | 2                       | Code table | 0     | 1                             |
| 0                  | 02 | 037 | Method of tidal observation  | Code table | 0     | 0                  | 3                       | Code table | 0     | 1                             |
| 0                  | 02 | 038 | Method of water temperature and/or salinity measurement  | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |

\* Descriptor 0 02 152 should be used instead of 0 02 021 for encoding this element.



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| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME   | BUFR       |       |                    |                         | CREX       |       |                               |
|--------------------|----|-----|---|------------|-------|--------------------|-------------------------|------------|-------|-------------------------------|
|                    |    |     |   | UNIT       | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT       | SCALE | DATA<br>WIDTH<br>(Characters) |
| F                  | X  | Y   |   |            |       |                    |                         |            |       |                               |
| 0                  | 02 | 039 | Method of wet-bulb temperature measurement                      | Code table | 0     | 0                  | 3                       | Code table | 0     | 1                             |
| 0                  | 02 | 040 | Method of removing velocity and motion of platform from current | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 041 | Method for estimating reports related to synoptic features      | Code table | 0     | 0                  | 6                       | Code table | 0     | 2                             |
| 0                  | 02 | 042 | Indicator for sea surface current speed                         | Code table | 0     | 0                  | 2                       | Code table | 0     | 1                             |
| 0                  | 02 | 044 | Indicator for method of calculating spectral wave data          | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 045 | Indicator for type of platform                                  | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 046 | Wave measurement instrumentation                                | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 048 | Satellite sensor indicator                                      | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 049 | Geostationary satellite data-processing technique used          | Flag table | 0     | 0                  | 8                       | Flag table | 0     | 3                             |
| 0                  | 02 | 050 | Geostationary sounder satellite channels used                   | Flag table | 0     | 0                  | 20                      | Flag table | 0     | 7                             |
| 0                  | 02 | 051 | Indicator to specify observing method for extreme temperatures  | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 052 | Geostationary imager satellite channels used                    | Flag table | 0     | 0                  | 6                       | Flag table | 0     | 2                             |
| 0                  | 02 | 053 | GOES-I/M brightness temperature characteristics                 | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 054 | GOES-I/M soundings parameter characteristics                    | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 055 | Geostationary soundings statistical parameters                  | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 056 | Geostationary soundings accuracy statistics                     | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 057 | Origin of first guess information for GOES-I/M soundings        | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 058 | Valid times of first guess information for GOES-I/M soundings   | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 059 | Origin of analysis information for GOES-I/M soundings           | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 060 | Origin of surface information for GOES-I/M soundings            | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 061 | Aircraft navigational system                                    | Code table | 0     | 0                  | 3                       | Code table | 0     | 1                             |
| 0                  | 02 | 062 | Type of aircraft data relay system                              | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 063 | Aircraft roll angle   | Degree     | 2     | -18000             | 16                      | Degree     | 2     | 5                             |
| 0                  | 02 | 064 | Aircraft roll angle quality                                     | Code table | 0     | 0                  | 2                       | Code table | 0     | 1                             |
| 0                  | 02 | 065 | ACARS ground receiving station                                  | CCITT IA5  | 0     | 0                  | 40                      | Character  | 0     | 5                             |
| 0                  | 02 | 066 | Radiosonde ground receiving system                              | Code table | 0     | 0                  | 6                       | Code table | 0     | 2                             |
| 0                  | 02 | 067 | Radiosonde operating frequency                                  | Hz         | -5    | 0                  | 15                      | Hz         | -5    | 5                             |
| 0                  | 02 | 070 | Original specification of latitude/longitude                    | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 071 | Spectrographic wavelength                                       | m          | 13    | 0                  | 30                      | m          | 13    | 10                            |
| 0                  | 02 | 080 | Balloon manufacturer  | Code table | 0     | 0                  | 6                       | Code table | 0     | 2                             |
| 0                  | 02 | 081 | Type of balloon   | Code table | 0     | 0                  | 5                       | Code table | 0     | 2                             |
| 0                  | 02 | 082 | Weight of balloon   | Kg         | 3     | 0                  | 12                      | Kg         | 3     | 4                             |
| 0                  | 02 | 083 | Type of balloon shelter   | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |

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| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME                | BUFR                   |       |                    |                         | CREX           |       |                               |
|--------------------|----|-----|--------------------------------------|------------------------|-------|--------------------|-------------------------|----------------|-------|-------------------------------|
|                    |    |     |                                      | UNIT                   | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT           | SCALE | DATA<br>WIDTH<br>(Characters) |
| F                  | X  | Y   |                                      |                        |       |                    |                         |                |       |                               |
| 0                  | 02 | 084 | Type of gas used in balloon          | Code table             | 0     | 0                  | 4                       | Code table     | 0     | 2                             |
| 0                  | 02 | 085 | Amount of gas used in balloon        | Kg                     | 3     | 0                  | 13                      | Kg             | 3     | 4                             |
| 0                  | 02 | 086 | Balloon flight train length          | m                      | 1     | 0                  | 10                      | m              | 1     | 4                             |
| 0                  | 02 | 091 | Entry sensor 4/20 mA                 | A                      | 4     | 0                  | 10                      | A              | 4     | 3                             |
| 0                  | 02 | 095 | Type of pressure sensor              | Code table             | 0     | 0                  | 5                       | Code table     | 0     | 2                             |
| 0                  | 02 | 096 | Type of temperature sensor           | Code table             | 0     | 0                  | 5                       | Code table     | 0     | 2                             |
| 0                  | 02 | 097 | Type of humidity sensor              | Code table             | 0     | 0                  | 5                       | Code table     | 0     | 2                             |
| 0                  | 02 | 099 | Polarisation                         | Code table             | 0     | 0                  | 3                       | Code table     | 0     | 1                             |
| 0                  | 02 | 100 | Radar constant*                      | dB                     | 1     | 0                  | 12                      | dB             | 1     | 4                             |
| 0                  | 02 | 101 | Type of antenna                      | Code table             | 0     | 0                  | 4                       | Code table     | 0     | 2                             |
| 0                  | 02 | 102 | Antenna height above tower base      | m                      | 0     | 0                  | 8                       | m              | 0     | 3                             |
| 0                  | 02 | 103 | Radome                               | Flag table             | 0     | 0                  | 2                       | Flag table     | 0     | 1                             |
| 0                  | 02 | 104 | Antenna polarisation                 | Code table             | 0     | 0                  | 4                       | Code table     | 0     | 2                             |
| 0                  | 02 | 105 | Maximum antenna gain                 | dB                     | 0     | 0                  | 6                       | dB             | 0     | 2                             |
| 0                  | 02 | 106 | 3-dB beamwidth                       | Degree                 | 1     | 0                  | 6                       | Degree         | 1     | 2                             |
| 0                  | 02 | 107 | Sidelobe suppression                 | dB                     | 0     | 0                  | 6                       | dB             | 0     | 2                             |
| 0                  | 02 | 108 | Crosspol discrimination (on axis)    | dB                     | 0     | 0                  | 6                       | dB             | 0     | 2                             |
| 0                  | 02 | 109 | Antenna speed (azimuth)              | Degree s <sup>-1</sup> | 2     | 0                  | 12                      | Degree s-1     | 2     | 4                             |
| 0                  | 02 | 110 | Antenna speed (elevation)            | Degree s <sup>-1</sup> | 2     | 0                  | 12                      | Degree s-1     | 2     | 4                             |
| 0                  | 02 | 111 | Radar incidence angle                | Degree                 | 1     | 0                  | 10                      | Degree         | 1     | 4                             |
| 0                  | 02 | 112 | Radar look angle                     | Degree                 | 1     | 0                  | 12                      | Degree         | 1     | 4                             |
| 0                  | 02 | 113 | Number of azimuth looks              | Numeric                | 0     | 0                  | 4                       | Numeric        | 0     | 2                             |
| 0                  | 02 | 114 | Antenna effective surface area       | m <sup>2</sup>         | 0     | 0                  | 15                      | m <sup>2</sup> | 0     | 5                             |
| 0                  | 02 | 115 | Type of surface observing equipment  | Code table             | 0     | 0                  | 5                       | Code table     | 0     | 2                             |
| 0                  | 02 | 116 | Percentage of 320 MHZ band processed | %                      | 0     | 0                  | 7                       | %              | 0     | 3                             |
| 0                  | 02 | 117 | Percentage of 80 MHZ band processed  | %                      | 0     | 0                  | 7                       | %              | 0     | 3                             |
| 0                  | 02 | 118 | Percentage of 20 MHZ band processed  | %                      | 0     | 0                  | 7                       | %              | 0     | 3                             |
| 0                  | 02 | 119 | RA-2 instrument operations           | Code table             | 0     | 0                  | 3                       | Code table     | 0     | 1                             |
| 0                  | 02 | 120 | Ocean wave frequency                 | Hz                     | 3     | 0                  | 10                      | Hz             | 3     | 4                             |
| 0                  | 02 | 121 | Mean frequency                       | Hz                     | -8    | 0                  | 7                       | Hz             | -8    | 3                             |
| 0                  | 02 | 122 | Frequency agility range              | Hz                     | -6    | -128               | 8                       | Hz             | -6    | 3                             |
| 0                  | 02 | 123 | Peak power                           | W                      | -4    | 0                  | 7                       | W              | -4    | 3                             |
| 0                  | 02 | 124 | Average power                        | W                      | -1    | 0                  | 7                       | W              | -1    | 3                             |
| 0                  | 02 | 125 | Pulse repetition frequency           | Hz                     | -1    | 0                  | 8                       | Hz             | -1    | 3                             |
| 0                  | 02 | 126 | Pulse width                          | s                      | 7     | 0                  | 6                       | s              | 7     | 2                             |

\* This constant is defined as follows:  $Z = P + \text{radar constant}$  where  $Z$  = the reflectivity of target in beam direction (dBZ);  $P$  = the input receiver power above 1 mW (dBm). This constant is used to normalize the signal to the equivalent 100 km range.

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| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME  | BUFR       |       |                    |                         | CREX       |       |                               |
|--------------------|----|-----|--|------------|-------|--------------------|-------------------------|------------|-------|-------------------------------|
|                    |    |     |  | UNIT       | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT       | SCALE | DATA<br>WIDTH<br>(Characters) |
| F                  | X  | Y   |  |            |       |                    |                         |            |       |                               |
| 0                  | 02 | 127 | Receiver intermediate frequency                                | Hz         | -6    | 0                  | 7                       | Hz         | -6    | 3                             |
| 0                  | 02 | 128 | Intermediate frequency bandwidth                               | Hz         | -5    | 0                  | 6                       | Hz         | -5    | 2                             |
| 0                  | 02 | 129 | Minimum detectable signal                                      | dB         | 0     | -150               | 5                       | dB         | 0     | 3                             |
| 0                  | 02 | 130 | Dynamic range  | dB         | 0     | 0                  | 7                       | dB         | 0     | 3                             |
| 0                  | 02 | 131 | Sensitivity time control (STC)                                 | Flag table | 0     | 0                  | 2                       | Flag table | 0     | 1                             |
| 0                  | 02 | 132 | Azimuth pointing accuracy                                      | Degree     | 2     | 0                  | 6                       | Degree     | 2     | 2                             |
| 0                  | 02 | 133 | Elevation pointing accuracy                                    | Degree     | 2     | 0                  | 6                       | Degree     | 2     | 2                             |
| 0                  | 02 | 134 | Antenna beam azimuth   | Degree     | 2     | 0                  | 16                      | Degree     | 2     | 5                             |
| 0                  | 02 | 135 | Antenna elevation  | Degree     | 2     | -9000              | 15                      | Degree     | 2     | 5                             |
| 0                  | 02 | 136 | Range processed by range attenuation correction                | m          | -3    | 0                  | 16                      | m          | -3    | 5                             |
| 0                  | 02 | 140 | Satellite radar beam azimuth angle                             | Degree     | 0     | 0                  | 9                       | Degree     | 0     | 3                             |
| 0                  | 02 | 141 | Measurement type   | CCITT IA5  | 0     | 0                  | 24                      | Character  | 0     | 3                             |
| 0                  | 02 | 142 | Ozone instrument serial number/ identification                 | CCITT IA5  | 0     | 0                  | 32                      | Character  | 0     | 4                             |
| 0                  | 02 | 143 | Ozone instrument type  | Code table | 0     | 0                  | 7                       | Code table | 0     | 3                             |
| 0                  | 02 | 144 | Light source type for Brewer spectro photometer                | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 145 | Wave length setting for Dobson instruments                     | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 146 | Source conditions for Dobson instruments                       | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 148 | Data collection and/or location system                         | Code table | 0     | 0                  | 5                       | Code table | 0     | 2                             |
| 0                  | 02 | 149 | Type of data buoy  | Code table | 0     | 0                  | 6                       | Code table | 0     | 2                             |
| 0                  | 02 | 150 | TOVS/ATOVS/AVHRR instrumentation channel number                | Code table | 0     | 0                  | 6                       | Code table | 0     | 2                             |
| 0                  | 02 | 151 | Radiometer identifier  | Code table | 0     | 0                  | 11                      | Code table | 0     | 4                             |
| 0                  | 02 | 152 | Satellite instrument used in data processing <sup>(6)</sup>    | Flag table | 0     | 0                  | 31                      | Flag table | 0     | 10                            |
| 0                  | 02 | 153 | Satellite channel centre frequency                             | Hz         | -8    | 0                  | 26                      | Hz         | -8    | 8                             |
| 0                  | 02 | 154 | Satellite channel band width                                   | Hz         | -8    | 0                  | 26                      | Hz         | -8    | 8                             |
| 0                  | 02 | 156 | Percentage of valid KU ocean retracker measurements            | %          | 0     | 0                  | 7                       | %          | 0     | 3                             |
| 0                  | 02 | 157 | Percentage of valid S ocean retracker measurements             | %          | 0     | 0                  | 7                       | %          | 0     | 3                             |
| 0                  | 02 | 158 | RA-2 instrument  | Flag table | 0     | 0                  | 9                       | Flag table | 0     | 3                             |
| 0                  | 02 | 159 | MWR instrument   | Flag table | 0     | 0                  | 8                       | Flag table | 0     | 3                             |
| 0                  | 02 | 160 | Wave length of the radar                                       | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 163 | Height assignment method                                       | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 164 | Tracer correlation method                                      | Code table | 0     | 0                  | 3                       | Code table | 0     | 1                             |
| 0                  | 02 | 166 | Radiance type  | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 167 | Radiance computational method                                  | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 168 | Hydrostatic pressure of lower end of cable (thermistor string) | Pa         | -3    | 0                  | 16                      | KPa        | 0     | 5                             |
| 0                  | 02 | 169 | Anemometer type  | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 02 | 172 | Product type for retrieved atmospheric gases                   | Code table | 0     | 0                  | 8                       | Code table | 0     | 3                             |

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| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME                                 | BUFR                |       |                    |                         | CREX                |       |                               |
|--------------------|----|-----|---|---------------------|-------|--------------------|-------------------------|---------------------|-------|-------------------------------|
|                    |    |     |   | UNIT                | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT                | SCALE | DATA<br>WIDTH<br>(Characters) |
| F                  | X  | Y   |   |                     |       |                    |                         |                     |       |                               |
| 0                  | 02 | 173 | Square of the off nadir angle <sup>(7)</sup>          | Degree <sup>2</sup> | 4     | 0                  | 10                      | Degree <sup>2</sup> | 4     | 4                             |
| 0                  | 02 | 174 | Mean across track pixel number                        | Numeric             | 0     | 0                  | 9                       | Numeric             | 0     | 3                             |
| 0                  | 02 | 175 | Method of precipitation measurement                   | Code table          | 0     | 0                  | 4                       | Code table          | 0     | 2                             |
| 0                  | 02 | 176 | Method of state of ground measurement                 | Code table          | 0     | 0                  | 4                       | Code table          | 0     | 2                             |
| 0                  | 02 | 177 | Method of snow depth measurement                      | Code table          | 0     | 0                  | 4                       | Code table          | 0     | 2                             |
| 0                  | 02 | 178 | Method of liquid content measurement of precipitation | Code table          | 0     | 0                  | 4                       | Code table          | 0     | 2                             |
| 0                  | 02 | 179 | Type of sky condition algorithm                       | Code table          | 0     | 0                  | 4                       | Code table          | 0     | 2                             |
| 0                  | 02 | 180 | Main present weather detecting system                 | Code table          | 0     | 0                  | 4                       | Code table          | 0     | 2                             |
| 0                  | 02 | 181 | Supplementary present weather sensor                  | Flag table          | 0     | 0                  | 21                      | Flag table          | 0     | 7                             |
| 0                  | 02 | 182 | Visibility measurement system                         | Code table          | 0     | 0                  | 4                       | Code table          | 0     | 2                             |
| 0                  | 02 | 183 | Cloud detection system                                | Code table          | 0     | 0                  | 4                       | Code table          | 0     | 2                             |
| 0                  | 02 | 184 | Type of lightning detection sensor                    | Code table          | 0     | 0                  | 4                       | Code table          | 0     | 2                             |
| 0                  | 02 | 185 | Method of evaporation measurement                     | Code table          | 0     | 0                  | 4                       | Code table          | 0     | 2                             |
| 0                  | 02 | 186 | Capability to detect precipitation phenomena          | Flag table          | 0     | 0                  | 30                      | Flag table          | 0     | 10                            |
| 0                  | 02 | 187 | Capability to detect other weather phenomena          | Flag table          | 0     | 0                  | 18                      | Flag table          | 0     | 6                             |
| 0                  | 02 | 188 | Capability to detect obscuration                      | Flag table          | 0     | 0                  | 21                      | Flag table          | 0     | 7                             |
| 0                  | 02 | 189 | Capability to discriminate lightning strikes          | Flag table          | 0     | 0                  | 12                      | Flag table          | 0     | 4                             |
| 0                  | 02 | 190 | Lagrangian drifter submergence (% time submerged)     | %                   | 0     | 0                  | 7                       | %                   | 0     | 3                             |

### Notes:

- (1) This class shall contain elements to describe the instrumentation used to obtain the meteorological elements reported.
- (2) This class may also contain elements relating to observational procedures.
- (3) Some indication of expected accuracy may be implied in conjunction with certain elements in this class.
- (4) Note that descriptor 0 02 140 is the Azimuth angle measured anticlockwise from satellite heading vector.
- (5) In descriptor 0 02 142: Ozone instrument serial number/identification is four characters long. For Japanese Dobsons instruments, omit the leading digit(s).
- (6) Descriptor 0 02 019 should be used instead of descriptor 0 02 152 for single satellite instrument identification.
- (7) Square of off-nadir angle computed from Ku waveform-derived parameters, Unit 10<sup>-4</sup> deg<sup>2</sup>, Common minimum value 0, Common maximum value 900.

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### Class 04 - Location (time)

| TABLE<br>REFERENCE<br>F X Y |    |     | TABLE<br>ELEMENT NAME   | BUFR       |       |                    |                         | CREX       |       |                               |
|-----------------------------|----|-----|---|------------|-------|--------------------|-------------------------|------------|-------|-------------------------------|
|                             |    |     |   | UNIT       | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT       | SCALE | DATA<br>WIDTH<br>(Characters) |
| 0                           | 04 | 001 | Year  | Year       | 0     | 0                  | 12                      | Year       | 0     | 4                             |
| 0                           | 04 | 002 | Month   | Month      | 0     | 0                  | 4                       | Month      | 0     | 2                             |
| 0                           | 04 | 003 | Day   | Day        | 0     | 0                  | 6                       | Day        | 0     | 2                             |
| 0                           | 04 | 004 | Hour  | Hour       | 0     | 0                  | 5                       | Hour       | 0     | 2                             |
| 0                           | 04 | 005 | Minute  | Minute     | 0     | 0                  | 6                       | Minute     | 0     | 2                             |
| 0                           | 04 | 006 | Second  | Second     | 0     | 0                  | 6                       | Second     | 0     | 2                             |
| 0                           | 04 | 007 | Seconds within a minute (microsecond accuracy)                | Second     | 6     | 0                  | 26                      | S          | 6     | 8                             |
| 0                           | 04 | 011 | Time increment  | Year       | 0     | -1024              | 11                      | Year       | 0     | 4                             |
| 0                           | 04 | 012 | Time increment  | Month      | 0     | -1024              | 11                      | Month      | 0     | 4                             |
| 0                           | 04 | 013 | Time increment  | Day        | 0     | -1024              | 11                      | Day        | 0     | 4                             |
| 0                           | 04 | 014 | Time increment  | Hour       | 0     | -1024              | 11                      | Hour       | 0     | 4                             |
| 0                           | 04 | 015 | Time increment  | Minute     | 0     | -2048              | 12                      | Minute     | 0     | 4                             |
| 0                           | 04 | 016 | Time increment  | Second     | 0     | -4096              | 13                      | Second     | 0     | 4                             |
| 0                           | 04 | 017 | Reference time period for accumulated or extreme data         | Minute     | 0     | -1440              | 12                      | Minute     | 0     | 4                             |
| 0                           | 04 | 021 | Time period or displacement                                   | Year       | 0     | -1024              | 11                      | Year       | 0     | 4                             |
| 0                           | 04 | 022 | Time period or displacement                                   | Month      | 0     | -1024              | 11                      | Month      | 0     | 4                             |
| 0                           | 04 | 023 | Time period or displacement                                   | Day        | 0     | -1024              | 11                      | Day        | 0     | 4                             |
| 0                           | 04 | 024 | Time period or displacement                                   | Hour       | 0     | -2048              | 12                      | Hour       | 0     | 4                             |
| 0                           | 04 | 025 | Time period or displacement                                   | Minute     | 0     | -2048              | 12                      | Minute     | 0     | 4                             |
| 0                           | 04 | 026 | Time period or displacement                                   | Second     | 0     | -4096              | 13                      | Second     | 0     | 4                             |
| 0                           | 04 | 031 | Duration of time relating to following value                  | Hour       | 0     | 0                  | 8                       | Hour       | 0     | 3                             |
| 0                           | 04 | 032 | Duration of time relating to following value                  | Minute     | 0     | 0                  | 6                       | Minute     | 0     | 2                             |
| 0                           | 04 | 041 | Time difference, UTC -LMT (see Note 6)                        | Minute     | 0     | -1440              | 12                      | Minute     | 0     | 4                             |
| 0                           | 04 | 043 | Day of the year   | Day        | 0     | 0                  | 9                       | Day        | 0     | 3                             |
| 0                           | 04 | 051 | Principal time of daily reading of maximum temperature        | Hour       | 0     | 0                  | 5                       | Hour       | 0     | 2                             |
| 0                           | 04 | 052 | Principal time of daily reading of minimum temperature        | Hour       | 0     | 0                  | 5                       | Hour       | 0     | 2                             |
| 0                           | 04 | 053 | Number of days with precipitation equal to or more than 1 mm  | Numeric    | 0     | 0                  | 6                       | Numeric    | 0     | 2                             |
| 0                           | 04 | 059 | Times of observation used to compute the reported mean values | Flag table | 0     | 0                  | 6                       | Flag table | 0     | 2                             |
| 0                           | 04 | 065 | Short time increment  | Minute     | 0     | -128               | 8                       | Minute     | 0     | 2                             |

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|   |    |     |                                      |            |   |       |    |            |   |   |
|---|----|-----|--------------------------------------|------------|---|-------|----|------------|---|---|
| 0 | 04 | 073 | Short time period or displacement    | Day        | 0 | -128  | 8  | Day        | 0 | 2 |
| 0 | 04 | 074 | Short time period or displacement    | Hour       | 0 | -128  | 8  | Hour       | 0 | 2 |
| 0 | 04 | 075 | Short time period or displacement    | Minute     | 0 | -128  | 8  | Minute     | 0 | 2 |
| 0 | 04 | 080 | Averaging period for following value | Code table | 0 | 0     | 4  | Code table | 0 | 2 |
| 0 | 04 | 086 | Long time period or displacement     | Second     | 0 | -8192 | 15 | Second     | 0 | 5 |

### Notes:

- (1) The significance of time periods or displacements may be indicated using the time significance code corresponding to table reference 0 08 021.
- (2) Where more than one time period or displacement is required to define complex time structures, they shall be defined in immediate succession, and the following ordering shall apply: ensemble period (if required), followed by forecast period (if required), followed by period for averaging or accumulation (if required).
- (3) Time periods or displacements and time increments require an initial time location to be defined prior to their use, followed where appropriate by a time significance definition.
- (4) The time location, when used with forecast values, shall indicate the time of the initial state for the forecast, or the beginning of the forecast period; when used with ensemble means of forecast values, the time location shall indicate the initial state or the beginning of the first forecast over which ensemble means are derived.
- (5) Negative time periods or displacements shall be used to indicate time periods or displacements preceding the currently defined time.
- (6) Descriptor 0 04 041 has been replaced by the combination of 0 08 025 and 0 26 003 and should not be used for encoding this element.
- (7) All times are Universal Time Coordinated (UTC) unless otherwise noted.

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### Class 05 - Location (horizontal -1)

| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME                     | BUFR        |       |                    |                         | CREX        |       |                               |
|--------------------|----|-----|---|-------------|-------|--------------------|-------------------------|-------------|-------|-------------------------------|
|                    |    |     |   | UNIT        | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT        | SCALE | DATA<br>WIDTH<br>(Characters) |
| F                  | X  | Y   |   |             |       |                    |                         |             |       |                               |
| 0                  | 05 | 001 | Latitude (high accuracy)                  | Degree      | 5     | -9000000           | 25                      | Degree      | 5     | 7                             |
| 0                  | 05 | 002 | Latitude (coarse accuracy)                | Degree      | 2     | -9000              | 15                      | Degree      | 2     | 4                             |
| 0                  | 05 | 011 | Latitude increment (high accuracy)        | Degree      | 5     | -9000000           | 25                      | Degree      | 5     | 7                             |
| 0                  | 05 | 012 | Latitude increment (coarse accuracy)      | Degree      | 2     | -9000              | 15                      | Degree      | 2     | 4                             |
| 0                  | 05 | 015 | Latitude displacement (high accuracy)     | Degree      | 5     | -9000000           | 25                      | Degree      | 5     | 7                             |
| 0                  | 05 | 016 | Latitude displacement (coarse accuracy)   | Degree      | 2     | -9000              | 15                      | Degree      | 2     | 4                             |
| 0                  | 05 | 021 | Bearing or azimuth                        | Degree true | 2     | 0                  | 16                      | Degree true | 2     | 5                             |
| 0                  | 05 | 022 | Solar azimuth                             | Degree true | 2     | 0                  | 16                      | Degree true | 2     | 5                             |
| 0                  | 05 | 023 | Sun to satellite azimuth difference       | Degree      | 1     | -1800              | 12                      | Degree      | 1     | 4                             |
| 0                  | 05 | 030 | Direction (spectral)                      | Degree      | 0     | 0                  | 12                      | Degree      | 0     | 4                             |
| 0                  | 05 | 031 | Row number                                | Numeric     | 0     | 0                  | 12                      | Numeric     | 0     | 4                             |
| 0                  | 05 | 033 | Pixel size on horizontal – 1              | m           | -1    | 0                  | 16                      | m           | -1    | 5                             |
| 0                  | 05 | 034 | Along track row number                    | Numeric     | 0     | 0                  | 11                      | Numeric     | 0     | 4                             |
| 0                  | 05 | 036 | Ship transect number according to SOOP    | Numeric     | 0     | 0                  | 7                       | Numeric     | 0     | 2                             |
| 0                  | 05 | 040 | Orbit number                              | Numeric     | 0     | 0                  | 24                      | Numeric     | 0     | 8                             |
| 0                  | 05 | 041 | Scan line number                          | Numeric     | 0     | 0                  | 8                       | Numeric     | 0     | 3                             |
| 0                  | 05 | 042 | Channel number                            | Numeric     | 0     | 0                  | 6                       | Numeric     | 0     | 2                             |
| 0                  | 05 | 043 | Field of view number                      | Numeric     | 0     | 0                  | 8                       | Numeric     | 0     | 3                             |
| 0                  | 05 | 044 | Satellite cycle number                    | Numeric     | 0     | 0                  | 11                      | Numeric     | 0     | 4                             |
| 0                  | 05 | 052 | Channel number increment                  | Numeric     | 0     | 0                  | 5                       | Numeric     | 0     | 2                             |
| 0                  | 05 | 053 | Field of view number increment            | Numeric     | 0     | 0                  | 5                       | Numeric     | 0     | 2                             |
| 0                  | 05 | 060 | Y angular position from centre of gravity | Degree      | 6     | -8000000           | 24                      | Degree      | 6     | 8                             |
| 0                  | 05 | 061 | Z angular position from centre of gravity | Degree      | 6     | -8000000           | 24                      | Degree      | 6     | 8                             |

Notes:

- (1) Values of latitude and latitude increments are limited to the range -90 degrees to +90 degrees.
- (2) South latitude shall be assigned negative values.
- (3) North to south increments shall be assigned negative values.
- (4) Bearing or azimuth shall only be used with respect to a stated location, and shall not redefine that location.
- (5) The Pixel size on horizontal – 1 is given at location where map scale factor is unity.

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### Class 06 - Location (horizontal - 2)

| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME                    | BUFR                |       |                    |                         | CREX                |       |                               |
|--------------------|----|-----|--|---------------------|-------|--------------------|-------------------------|---------------------|-------|-------------------------------|
|                    |    |     |  | UNIT                | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT                | SCALE | DATA<br>WIDTH<br>(Characters) |
| F                  | X  | Y   |  |                     |       |                    |                         |                     |       |                               |
| 0                  | 06 | 001 | Longitude (high accuracy)                | Degree              | 5     | −18000000          | 26                      | Degree              | 5     | 8                             |
| 0                  | 06 | 002 | Longitude (coarse accuracy)              | Degree              | 2     | −18000             | 16                      | Degree              | 2     | 5                             |
| 0                  | 06 | 011 | Longitude increment (high accuracy)      | Degree              | 5     | −18000000          | 26                      | Degree              | 5     | 8                             |
| 0                  | 06 | 012 | Longitude increment (coarse accuracy)    | Degree              | 2     | −18000             | 16                      | Degree              | 2     | 5                             |
| 0                  | 06 | 015 | Longitude displacement (high accuracy)   | Degree              | 5     | −18000000          | 26                      | Degree              | 5     | 8                             |
| 0                  | 06 | 016 | Longitude displacement (coarse accuracy) | Degree              | 2     | −18000             | 16                      | Degree              | 2     | 5                             |
| 0                  | 06 | 021 | Distance                                 | m                   | −1    | 0                  | 13                      | m                   | −1    | 4                             |
| 0                  | 06 | 030 | Wave number (spectral)                   | rad m <sup>−1</sup> | 5     | 0                  | 13                      | rad m <sup>−1</sup> | 5     | 4                             |
| 0                  | 06 | 031 | Column number                            | Numeric             | 0     | 0                  | 12                      | Numeric             | 0     | 4                             |
| 0                  | 06 | 033 | Pixel size on horizontal – 2             | m                   | −1    | 0                  | 16                      | m                   | −1    | 5                             |
| 0                  | 06 | 034 | Cross-track cell number                  | Numeric             | 0     | 0                  | 7                       | Numeric             | 0     | 3                             |
| 0                  | 06 | 040 | Radius of confidence                     | m                   | 0     | 0                  | 13                      | m                   | 0     | 4                             |

Notes:

- (1) Values of longitude are limited to the range −180 degrees to +180 degrees.
- (2) West longitude shall be assigned negative values.
- (3) East to west increments shall be assigned negative values.
- (4) Distance shall only be used with respect to a stated location and a bearing, azimuth or elevation; it shall not redefine that location.
- (5) The Pixel size on horizontal – 2 is given at location where map scale factor is unity.



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## Class 07 - Location (vertical)

| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME   | BUFR                           |       |                    |                         | CREX                           |       |                               |
|--------------------|----|-----|---|--------------------------------|-------|--------------------|-------------------------|--------------------------------|-------|-------------------------------|
|                    |    |     |   | UNIT                           | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT                           | SCALE | DATA<br>WIDTH<br>(Characters) |
| F                  | X  | Y   |   |                                |       |                    |                         |                                |       |                               |
| 0                  | 07 | 001 | Height of station (see Note 1)  | m                              | 0     | -400               | 15                      | m                              | 0     | 5                             |
| 0                  | 07 | 002 | Height or altitude  | m                              | -1    | -40                | 16                      | m                              | -1    | 5                             |
| 0                  | 07 | 003 | Geopotential  | m <sup>2</sup> s <sup>-2</sup> | -1    | -400               | 17                      | m <sup>2</sup> s <sup>-2</sup> | -1    | 6                             |
| 0                  | 07 | 004 | Pressure  | Pa                             | -1    | 0                  | 14                      | Pa                             | -1    | 5                             |
| 0                  | 07 | 005 | Height increment  | m                              | 0     | -400               | 12                      | m                              | 0     | 4                             |
| 0                  | 07 | 006 | Height above station  | m                              | 0     | 0                  | 15                      | m                              | 0     | 5                             |
| 0                  | 07 | 007 | Height  | m                              | 0     | -1000              | 17                      | m                              | 0     | 6                             |
| 0                  | 07 | 008 | Geopotential  | m <sup>2</sup> s <sup>-2</sup> | 0     | -10000             | 20                      | m <sup>2</sup> s <sup>-2</sup> | 0     | 7                             |
| 0                  | 07 | 009 | Geopotential height   | gpm                            | 0     | -1000              | 17                      | gpm                            | 0     | 5                             |
| 0                  | 07 | 010 | Flight level  | m                              | 0     | -1024              | 16                      | ft                             | -1    | 5                             |
| 0                  | 07 | 012 | Grid point altitude   | m                              | 2     | -50000             | 20                      | m                              | 2     | 7                             |
| 0                  | 07 | 021 | Elevation (see Note 2)  | Degree                         | 2     | -9000              | 15                      | Degree                         | 2     | 5                             |
| 0                  | 07 | 022 | Solar elevation   | Degree                         | 2     | -9000              | 15                      | Degree                         | 2     | 5                             |
| 0                  | 07 | 024 | Satellite zenith angle  | Degree                         | 2     | -9000              | 15                      | Degree                         | 2     | 5                             |
| 0                  | 07 | 025 | Solar zenith angle  | Degree                         | 2     | -9000              | 15                      | Degree                         | 2     | 5                             |
| 0                  | 07 | 026 | Satellite zenith angle  | Degree                         | 4     | -900000            | 21                      | Degree                         | 4     | 7                             |
| 0                  | 07 | 030 | Height of station ground above mean sea level (see Note 3)                    | m                              | 1     | - 4000             | 17                      | m                              | 1     | 5                             |
| 0                  | 07 | 031 | Height of barometer above mean sea level (see Note 4)                         | m                              | 1     | - 4000             | 17                      | m                              | 1     | 5                             |
| 0                  | 07 | 032 | Height of sensor above local ground (or deck of marine platform) (see Note 5) | m                              | 2     | 0                  | 16                      | m                              | 2     | 5                             |
| 0                  | 07 | 033 | Height of sensor above water surface (see Note 6)                             | m                              | 1     | 0                  | 12                      | m                              | 1     | 4                             |
| 0                  | 07 | 040 | Impact parameter (see Note 7)   | m                              | 1     | 62000000           | 22                      | m                              | 1     | 8                             |
| 0                  | 07 | 061 | Depth below land surface  | m                              | 2     | 0                  | 14                      | m                              | 2     | 5                             |
| 0                  | 07 | 062 | Depth below sea/water surface   | m                              | 1     | 0                  | 17                      | m                              | 1     | 6                             |
| 0                  | 07 | 063 | Depth below sea/water surface (cm)  | m                              | 2     | 0                  | 20                      | m                              | 2     | 7                             |
| 0                  | 07 | 064 | Representative height of sensor above station (see Note 8)                    | m                              | 0     | 0                  | 4                       | m                              | 0     | 2                             |
| 0                  | 07 | 065 | Water pressure  | Pa                             | -3    | 0                  | 17                      | Pa                             | -3    | 6                             |
| 0                  | 07 | 070 | Drogue depth  | m                              | 0     | 0                  | 10                      | m                              | 0     | 4                             |

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### Notes:

- (1) Regarding data from ground based stations, this descriptor should be used for archived data only. Descriptors 0 07 030 and 0 07 031 should be used and preferred to represent ground elevation and elevation of barometer, respectively, as defined in Observing Stations, WMO Publication No. 9, Volume A1. Regarding marine stations, this descriptor refers to the height above mean sea level of the deck of marine platform where the instruments stand.
- (2) Elevation shall only be used with respect to a stated location and a bearing, azimuth or distance; it shall not redefine that location.
- (3) Height of station ground above mean sea level is defined as the height above mean sea-level of the ground on which the raingauge stands or, if there is no raingauge, the ground beneath the thermometer screen. If there is neither raingauge nor screen, it is the average level of terrain in the vicinity of the station (Reference: Guide to Meteorological Instruments and Methods of Observation, WMO-No. 8. 1996).
- (4) Height of barometer above mean sea level, referring to the location of barometer of a station, does not redefine the descriptor 0 07 030.
- (5) Height of sensor above local ground (or deck of marine platform) is the actual height of sensor above ground (or deck of marine platform) at the point where the sensor is located. This descriptor does not redefine the descriptor either 0 07 030 or 0 07 033. Previously defined value of 0 07 032 may be cancelled by setting 0 07 032 to a "missing value".
- (6) Height of sensor above water surface is the height of sensor above water surface of sea or lake. This descriptor does not redefine the descriptor either 0 07 030 or 0 07 032. Previously defined value of 0 07 033 may be cancelled by setting 0 07 033 to a "missing value".
- (7) For an atmospheric limb sounder, the "impact parameter" is the distance between the ray asymptote and the centre of curvature of the Earth's surface at the tangent point.
- (8) Representative height of sensor above station is the standard height of a sensor required by WMO documentation. Value of the following meteorological element should be adjusted using a formula. For example, standard height recommended in WMO documentation for surface wind sensors is 10 metres. If the sensor is placed at different height, the wind speed may be adjusted using a formula.

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## Class 08 - Significance qualifiers

| TABLE REFERENCE |    |     | TABLE ELEMENT NAME   | BUFR       |       |                 |                   | CREX       |       |                         |
|-----------------|----|-----|--|------------|-------|-----------------|-------------------|------------|-------|-------------------------|
| F               | X  | Y   |  | UNIT       | SCALE | REFERENCE VALUE | DATA WIDTH (Bits) | UNIT       | SCALE | DATA WIDTH (Characters) |
| 0               | 08 | 001 | Vertical sounding significance   | Flag table | 0     | 0               | 7                 | Flag table | 0     | 3                       |
| 0               | 08 | 002 | Vertical significance (surface observations)                                   | Code table | 0     | 0               | 6                 | Code table | 0     | 2                       |
| 0               | 08 | 003 | Vertical significance (satellite observations)                                 | Code table | 0     | 0               | 6                 | Code table | 0     | 2                       |
| 0               | 08 | 004 | Phase of aircraft flight   | Code table | 0     | 0               | 3                 | Code table | 0     | 1                       |
| 0               | 08 | 005 | Meteorological attribute significance  | Code table | 0     | 0               | 4                 | Code table | 0     | 2                       |
| 0               | 08 | 006 | Ozone vertical sounding significance   | Flag table | 0     | 0               | 9                 | Flag table | 0     | 3                       |
| 0               | 08 | 007 | Dimensional significance   | Code table | 0     | 0               | 4                 | Code table | 0     | 2                       |
| 0               | 08 | 008 | Radiation vertical sounding significance                                       | Flag table | 0     | 0               | 9                 | Flag table | 0     | 3                       |
| 0               | 08 | 009 | Detailed phase of flight   | Code Table | 0     | 0               | 4                 | Code table | 0     | 2                       |
| 0               | 08 | 010 | Surface qualifier (temperature data)   | Code table | 0     | 0               | 5                 | Code table | 0     | 2                       |
| 0               | 08 | 011 | Meteorological feature   | Code table | 0     | 0               | 6                 | Code table | 0     | 2                       |
| 0               | 08 | 012 | Land/sea qualifier   | Code table | 0     | 0               | 2                 | Code table | 0     | 1                       |
| 0               | 08 | 013 | Day/night qualifier  | Code table | 0     | 0               | 2                 | Code table | 0     | 1                       |
| 0               | 08 | 014 | Qualifier for runway visual range  | Code table | 0     | 0               | 4                 | Code table | 0     | 2                       |
| 0               | 08 | 016 | Change qualifier of a trend-type forecast or an aerodrome forecast             | Code table | 0     | 0               | 3                 | Code table | 0     | 1                       |
| 0               | 08 | 017 | Qualifier of the time when the forecast change is expected                     | Code table | 0     | 0               | 2                 | Code table | 0     | 1                       |
| 0               | 08 | 018 | SEAWINDS land/ice surface type   | Flag table | 0     | 0               | 17                | Flag table | 0     | 6                       |
| 0               | 08 | 019 | Qualifier for following Centre identifier                                      | Code table | 0     | 0               | 4                 | Code table | 0     | 2                       |
| 0               | 08 | 020 | Total number of missing entities (with respect to accumulation or average)     | Numeric    | 0     | 0               | 16                | Numeric    | 0     | 5                       |
| 0               | 08 | 021 | Time significance  | Code table | 0     | 0               | 5                 | Code table | 0     | 2                       |
| 0               | 08 | 022 | Total number (with respect to accumulation or average)                         | Numeric    | 0     | 0               | 16                | Numeric    | 0     | 5                       |
| 0               | 08 | 023 | First order statistics   | Code table | 0     | 0               | 6                 | Code table | 0     | 2                       |
| 0               | 08 | 024 | Difference statistics  | Code table | 0     | 0               | 6                 | Code table | 0     | 2                       |
| 0               | 08 | 025 | Time difference qualifier (see Note 5)   | Code table | 0     | 0               | 4                 | Code table | 0     | 2                       |
| 0               | 08 | 026 | Matrix significance  | Code table | 0     | 0               | 6                 | Code table | 0     | 2                       |
| 0               | 08 | 029 | Remotely sensed surface type   | Code table | 0     | 0               | 8                 | Code table | 0     | 3                       |
| 0               | 08 | 030 | Manual on Codes (Volume I.1, Section C) Code table from which data are derived | Numeric    | 0     | 0               | 13                | Numeric    | 0     | 4                       |
| 0               | 08 | 031 | Data category CREX table A   | Numeric    | 0     | 0               | 8                 | Numeric    | 0     | 3                       |
| 0               | 08 | 033 | Method of derivation of percentage confidence (see Note 6)                     | Code table | 0     | 0               | 7                 | Code table | 0     | 3                       |

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| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME  | BUFR       |       |                    |                         | CREX       |       |                            |
|--------------------|----|-----|--|------------|-------|--------------------|-------------------------|------------|-------|----------------------------|
| F                  | X  | Y   |  | UNIT       | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT       | SCALE | DATA WIDTH<br>(Characters) |
| 0                  | 08 | 035 | Type of monitoring exercise  | Code table | 0     | 0                  | 3                       | Code table | 0     | 1                          |
| 0                  | 08 | 036 | Type of centre or station performing monitoring                    | Code table | 0     | 0                  | 3                       | Code table | 0     | 1                          |
| 0                  | 08 | 039 | Time significance (Aviation forecast)                              | Code table | 0     | 0                  | 6                       | Code table | 0     | 2                          |
| 0                  | 08 | 040 | Flight Level significance  | Code table | 0     | 0                  | 6                       | Code table | 0     | 2                          |
| 0                  | 08 | 041 | Data significance  | Code table | 0     | 0                  | 5                       | Code table | 0     | 2                          |
| 0                  | 08 | 042 | Extended vertical sounding significance                            | Flag table | 0     | 0                  | 18                      | Flag table | 0     | 6                          |
| 0                  | 08 | 043 | Atmospheric chemical or physical constituent type                  | Code table | 0     | 0                  | 8                       | Code table | 0     | 3                          |
| 0                  | 08 | 049 | Number of observations   | Numeric    | 0     | 0                  | 8                       | Numeric    | 0     | 3                          |
| 0                  | 08 | 050 | Qualifier for number of missing values in calculation of statistic | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                          |
| 0                  | 08 | 051 | Qualifier for number of missing values in calculation of statistic | Code table | 0     | 0                  | 3                       | Code table | 0     | 1                          |
| 0                  | 08 | 052 | Condition for which number of days of occurrence follows           | Code table | 0     | 0                  | 5                       | Code table | 0     | 2                          |
| 0                  | 08 | 053 | Day of occurrence qualifier  | Code table | 0     | 0                  | 2                       | Code table | 0     | 1                          |
| 0                  | 08 | 054 | Qualifier for wind speed or wind gusts                             | Code table | 0     | 0                  | 3                       | Code table | 0     | 1                          |
| 0                  | 08 | 060 | Sample scanning mode significance                                  | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                          |
| 0                  | 08 | 065 | Sun-glint indicator  | Code table | 0     | 0                  | 2                       | Code table | 0     | 1                          |
| 0                  | 08 | 066 | Semi-transparency indicator  | Code table | 0     | 0                  | 2                       | Code table | 0     | 1                          |
| 0                  | 08 | 070 | TOVS/ATOVS product qualifier                                       | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                          |
| 0                  | 08 | 072 | Pixel(s) type  | Code table | 0     | 0                  | 3                       | Code table | 0     | 1                          |
| 0                  | 08 | 074 | Altimeter echo type  | Code table | 0     | 0                  | 2                       | Code table | 0     | 1                          |
| 0                  | 08 | 075 | Ascending/Descending Orbit Qualifier                               | Code table | 0     | 0                  | 2                       | Code table | 0     | 1                          |
| 0                  | 08 | 076 | Type of band   | Code table | 0     | 0                  | 6                       | Code table | 0     | 2                          |
| 0                  | 08 | 077 | Radiometer sensed surface type                                     | Code table | 0     | 0                  | 7                       | Code table | 0     | 3                          |
| 0                  | 08 | 079 | Product status   | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                          |
| 0                  | 08 | 080 | Qualifier for GTSP quality flag                                    | Code table | 0     | 0                  | 6                       | Code table | 0     | 2                          |
| 0                  | 08 | 081 | Type of equipment  | Code table | 0     | 0                  | 6                       | Code table | 0     | 2                          |
| 0                  | 08 | 082 | Modification of sensor height to another value                     | Code table | 0     | 0                  | 3                       | Code table | 0     | 1                          |
| 0                  | 08 | 083 | Nominal value indicator  | Flag table | 0     | 0                  | 15                      | Flag table | 0     | 5                          |
| 0                  | 08 | 085 | Beam identifier  | Code table | 0     | 0                  | 3                       | Code table | 0     | 1                          |
| 0                  | 08 | 090 | Decimal scale of following significands                            | Numeric    | 0     | -127               | 8                       | Numeric    | 0     | 3                          |

Notes:

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- (1) Where values are accumulated or averaged (for example over a time period), the total number of values from which the accumulated or averaged values are obtained may be represented using reference 0 08 022.
- (2) A previously defined significance may be cancelled by transmitting a “missing” from the appropriate code or flag table.
- (3) First order statistics have values with a similar range and the same dimensions as the corresponding reported values (e.g., maxima, minima, means, etc.).
- (4) Difference statistics are difference values; they have dimensions similar to the corresponding reported values with respect to units, but assume a range centred on zero (e.g., the difference between reported and analysed values, the difference between reported and forecast values, etc.).
- (5) Descriptor 0 08 025 is to be used with 0 26 003 (time difference).
- (6) Descriptor 0 08 033 is to be used by preceding the element 0 33 007 as part of quality control information in order to specify the method used to calculate the percentage confidence.
- (7) When descriptor 0 08 043 is used to specify particulate matter (PM) under a given size threshold, descriptor 0 08 045 may also be used to further specify a subset of the PM population on the basis of ion composition.
- (8) Descriptor 0 08 090 is to be used to establish the decimal scale of one or more subsequent numerical element descriptors requiring a large dynamic range of values. The numerical element descriptor(s) will contain the scaled value of the measurement(s) with the required number of significant digits. The actual value will be obtained, at the application level, by multiplying the scaled value by the given decimal scale: (scaled value \* 10<sup>decimal scale</sup>).

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### Class 10 - Non-coordinate location (vertical)

| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME  | BUFR                           |       |                    |                         | CREX                           |       |                               |
|--------------------|----|-----|--|--------------------------------|-------|--------------------|-------------------------|--------------------------------|-------|-------------------------------|
|                    |    |     |  | UNIT                           | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT                           | SCALE | DATA<br>WIDTH<br>(Characters) |
| F                  | X  | Y   |  |                                |       |                    |                         |                                |       |                               |
| 0                  | 10 | 001 | Height of land surface   | m                              | 0     | -400               | 15                      | m                              | 0     | 5                             |
| 0                  | 10 | 002 | Height   | m                              | -1    | -40                | 16                      | m                              | -1    | 5                             |
| 0                  | 10 | 003 | Geopotential   | m <sup>2</sup> s <sup>-2</sup> | -1    | -400               | 17                      | m <sup>2</sup> s <sup>-2</sup> | -1    | 6                             |
| 0                  | 10 | 004 | Pressure   | Pa                             | -1    | 0                  | 14                      | Pa                             | -1    | 5                             |
| 0                  | 10 | 007 | Height   | m                              | 0     | -1000              | 17                      | m                              | 0     | 6                             |
| 0                  | 10 | 008 | Geopotential   | m <sup>2</sup> s <sup>-2</sup> | 0     | -10000             | 20                      | m <sup>2</sup> s <sup>-2</sup> | 0     | 7                             |
| 0                  | 10 | 009 | Geopotential height  | gpm                            | 0     | -1000              | 17                      | gpm                            | 0     | 5                             |
| 0                  | 10 | 010 | Minimum pressure reduced to mean sea level   | Pa                             | -1    | 0                  | 14                      | Pa                             | -1    | 5                             |
| 0                  | 10 | 011 | Maximum pressure reduced to mean sea level   | Pa                             | -1    | 0                  | 14                      | Pa                             | -1    | 5                             |
| 0                  | 10 | 031 | In direction of the North Pole, distance from the Earth's centre (see Notes 2 and 3) | m                              | 2     | -1073741824        | 31                      | m                              | 2     | 10                            |
| 0                  | 10 | 032 | Satellite distance to Earth's centre   | m                              | 1     | 0                  | 27                      | m                              | 2     | 9                             |
| 0                  | 10 | 033 | Altitude (platform to Ellipsoid)   | m                              | 1     | 0                  | 27                      | m                              | 2     | 9                             |
| 0                  | 10 | 034 | Earth radius   | m                              | 1     | 0                  | 27                      | m                              | 2     | 9                             |
| 0                  | 10 | 035 | Earth's local radius of curvature  | m                              | 1     | 62000000           | 22                      | m                              | 1     | 8                             |
| 0                  | 10 | 036 | Geoid undulation (see Note 4)  | m                              | 2     | -15000             | 15                      | m                              | 2     | 6                             |
| 0                  | 10 | 040 | Number of retrieved layers   | Numeric                        | 0     | 0                  | 10                      | Numeric                        | 0     | 4                             |
| 0                  | 10 | 050 | Standard deviation altitude  | m                              | 2     | 0                  | 16                      | m                              | 2     | 5                             |
| 0                  | 10 | 051 | Pressure reduced to mean sea level   | Pa                             | -1    | 0                  | 14                      | Pa                             | -1    | 5                             |
| 0                  | 10 | 052 | Altimeter setting (QNH)  | Pa                             | -1    | 0                  | 14                      | Pa                             | -1    | 5                             |
| 0                  | 10 | 060 | Pressure change  | Pa                             | -1    | -1024              | 11                      | Pa                             | -1    | 4                             |
| 0                  | 10 | 061 | 3-hour pressure change   | Pa                             | -1    | -500               | 10                      | Pa                             | -1    | 4                             |
| 0                  | 10 | 062 | 24-hour pressure change  | Pa                             | -1    | -1000              | 11                      | Pa                             | -1    | 4                             |
| 0                  | 10 | 063 | Characteristic of pressure tendency  | 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                  | 10 | 070 | Indicated aircraft altitude  | m                              | 0     | -400               | 16                      | m                              | 0     | 5                             |
| 0                  | 10 | 080 | Viewing Zenith angle   | Degree                         | 2     | -9000              | 15                      | Degree                         | 2     | 5                             |
| 0                  | 10 | 081 | Altitude of COG above reference Ellipsoid  | m                              | 3     | 0                  | 31                      | m                              | 3     | 10                            |
| 0                  | 10 | 082 | Instantaneous altitude rate  | ms <sup>-1</sup>               | 3     | -65536             | 17                      | ms <sup>-1</sup>               | 3     | 6                             |
| 0                  | 10 | 083 | Squared off Nadir angle of the satellite from platform data                          | Degree <sup>2</sup>            | 2     | 0                  | 16                      | Degree <sup>2</sup>            | 2     | 5                             |
| 0                  | 10 | 084 | Squared off Nadir angle of the satellite from waveform data                          | Degree <sup>2</sup>            | 2     | 0                  | 16                      | Degree <sup>2</sup>            | 2     | 5                             |
| 0                  | 10 | 085 | Mean sea surface height  | m                              | 3     | -131072            | 18                      | m                              | 3     | 6                             |
| 0                  | 10 | 086 | Geoid's height   | m                              | 3     | -131072            | 18                      | m                              | 3     | 6                             |
| 0                  | 10 | 087 | Ocean depth/land elevation   | m                              | 1     | -131072            | 18                      | m                              | 1     | 6                             |

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|   |    |     |   |                      |   |         |    |        |   |   |
|---|----|-----|---|----------------------|---|---------|----|--------|---|---|
| 0 | 10 | 088 | Total geocentric ocean tide height (solution 1)             | m                    | 3 | -32768  | 16 | m      | 3 | 5 |
| 0 | 10 | 089 | Total geocentric ocean tide height (solution 2)             | m                    | 3 | -32768  | 16 | m      | 3 | 5 |
| 0 | 10 | 090 | Long period tide height                                     | m                    | 3 | -32768  | 16 | m      | 3 | 5 |
| 0 | 10 | 091 | Tidal loading height  | m                    | 3 | -32768  | 16 | m      | 3 | 5 |
| 0 | 10 | 092 | Solid Earth tide height                                     | m                    | 3 | -32768  | 16 | m      | 3 | 5 |
| 0 | 10 | 093 | Geocentric pole tide height                                 | m                    | 3 | -32768  | 16 | m      | 3 | 5 |
| 0 | 10 | 095 | Height of atmosphere used                                   | m                    | 0 | 0       | 16 | m      | 0 | 5 |
| 0 | 10 | 096 | Mean dynamic topography                                     | m                    | 3 | -131072 | 18 | m      | 3 | 6 |
| 0 | 10 | 097 | Mean sea surface height from altimeter only                 | m                    | 3 | -131072 | 18 | m      | 3 | 6 |
| 0 | 10 | 098 | Loading tide height geocentric ocean tide solution 1        | m                    | 4 | -2000   | 12 | m      | 4 | 4 |
| 0 | 10 | 099 | Loading tide height geocentric ocean tide solution 2        | m                    | 4 | -2000   | 12 | m      | 4 | 4 |
| 0 | 10 | 100 | Non-equilibrium long period tide height                     | m                    | 4 | -2000   | 12 | m      | 4 | 4 |
| 0 | 10 | 101 | Squared off nadir angle of the satellite from waveform data | Degrees <sup>2</sup> | 2 | -32768  | 16 | Degree | 2 | 5 |

### Notes:

- (1) Vertical elements and pressure shall be used to define values of these elements independent of the element or variable denoting the vertical coordinate.
- (2) The value for descriptor 0 10 031 has been chosen to be suitable for polar orbiting satellites in approximately sun-synchronous orbits. Geostationary orbits would require greater data widths for distance and slightly less for speed.
- (3) Left handed xyz axes have been chosen for descriptor 0 10 031.
- (4) The “geoid undulation” is the difference between the reference ellipsoid (WGS-84) and the geoid height (EGM96) at the geographic location of the observation, both referenced to the centre of mass of the Earth.

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## Class 11 - Wind and turbulence

| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME                                      | BUFR                           |       |                    |                         | CREX                           |       |                               |
|--------------------|----|-----|--|--------------------------------|-------|--------------------|-------------------------|--------------------------------|-------|-------------------------------|
|                    |    |     |  | UNIT                           | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT                           | SCALE | DATA<br>WIDTH<br>(Characters) |
| F                  | X  | Y   |  |                                |       |                    |                         |                                |       |                               |
| 0                  | 11 | 001 | Wind direction   | Degree true                    | 0     | 0                  | 9                       | Degree true                    | 0     | 3                             |
| 0                  | 11 | 002 | Wind speed   | m s <sup>-1</sup>              | 1     | 0                  | 12                      | m s <sup>-1</sup>              | 1     | 4                             |
| 0                  | 11 | 003 | u-component  | m s <sup>-1</sup>              | 1     | -4096              | 13                      | m s <sup>-1</sup>              | 1     | 4                             |
| 0                  | 11 | 004 | v-component  | m s <sup>-1</sup>              | 1     | -4096              | 13                      | m s <sup>-1</sup>              | 1     | 4                             |
| 0                  | 11 | 005 | w-component  | Pa s <sup>-1</sup>             | 1     | -512               | 10                      | Pa s <sup>-1</sup>             | 1     | 4                             |
| 0                  | 11 | 006 | w-component  | m s <sup>-1</sup>              | 2     | -4096              | 13                      | m s <sup>-1</sup>              | 2     | 4                             |
| 0                  | 11 | 010 | Wind direction associated with wind speed which follows    | Degree true                    | 0     | 0                  | 9                       | Degree true                    | 0     | 3                             |
| 0                  | 11 | 011 | Wind direction at 10 m                                     | Degree true                    | 0     | 0                  | 9                       | Degree true                    | 0     | 3                             |
| 0                  | 11 | 012 | Wind speed at 10 m   | m s <sup>-1</sup>              | 1     | 0                  | 12                      | m s <sup>-1</sup>              | 1     | 4                             |
| 0                  | 11 | 013 | Wind direction at 5 m                                      | Degree true                    | 0     | 0                  | 9                       | Degree true                    | 0     | 3                             |
| 0                  | 11 | 014 | Wind speed at 5 m  | m s <sup>-1</sup>              | 1     | 0                  | 12                      | m s <sup>-1</sup>              | 1     | 4                             |
| 0                  | 11 | 016 | Extreme counterclockwise wind direction of a variable wind | Degree true                    | 0     | 0                  | 9                       | Degree true                    | 0     | 3                             |
| 0                  | 11 | 017 | Extreme clockwise wind direction of a variable wind        | Degree true                    | 0     | 0                  | 9                       | Degree true                    | 0     | 3                             |
| 0                  | 11 | 019 | Steadiness of wind <sup>(6)</sup>                          | %                              | 0     | 0                  | 7                       | %                              | 0     | 3                             |
| 0                  | 11 | 021 | Relative vorticity   | s <sup>-1</sup>                | 9     | -65536             | 17                      | s <sup>-1</sup>                | 9     | 6                             |
| 0                  | 11 | 022 | Divergence   | s <sup>-1</sup>                | 9     | -65536             | 17                      | s <sup>-1</sup>                | 9     | 6                             |
| 0                  | 11 | 023 | Velocity potential   | m <sup>2</sup> s <sup>-1</sup> | -2    | -65536             | 17                      | m <sup>2</sup> s <sup>-1</sup> | -2    | 6                             |
| 0                  | 11 | 030 | Extended degree of turbulence                              | Code table                     | 0     | 0                  | 6                       | Code table                     | 0     | 2                             |
| 0                  | 11 | 031 | Degree of turbulence                                       | Code table                     | 0     | 0                  | 4                       | Code table                     | 0     | 2                             |
| 0                  | 11 | 032 | Height of base of turbulence                               | m                              | -1    | -40                | 16                      | m                              | -1    | 5                             |
| 0                  | 11 | 033 | Height of top of turbulence                                | m                              | -1    | -40                | 16                      | m                              | -1    | 5                             |
| 0                  | 11 | 034 | Vertical gust velocity                                     | m s <sup>-1</sup>              | 1     | -1024              | 11                      | m s <sup>-1</sup>              | 1     | 4                             |
| 0                  | 11 | 035 | Vertical gust acceleration                                 | m s <sup>-2</sup>              | 2     | -8192              | 14                      | m s <sup>-2</sup>              | 2     | 5                             |
| 0                  | 11 | 036 | Maximum derived equivalent vertical gust speed             | m s <sup>-1</sup>              | 1     | 0                  | 10                      | m s <sup>-1</sup>              | 1     | 4                             |
| 0                  | 11 | 037 | Turbulence Index   | Code table                     | 0     | 0                  | 6                       | Code table                     | 0     | 2                             |
| 0                  | 11 | 038 | Time of occurrence of Peak Eddy Dissipation Rate           | Code table                     | 0     | 0                  | 5                       | Code table                     | 0     | 2                             |
| 0                  | 11 | 039 | Extended time of occurrence of peak Eddy Dissipation Rate  | Code table                     | 0     | 0                  | 6                       | Code table                     | 0     | 2                             |
| 0                  | 11 | 040 | Maximum wind speed (mean wind)                             | m s <sup>-1</sup>              | 1     | 0                  | 12                      | m s <sup>-1</sup>              | 1     | 4                             |
| 0                  | 11 | 041 | Maximum wind gust speed                                    | m s <sup>-1</sup>              | 1     | 0                  | 12                      | m s <sup>-1</sup>              | 1     | 4                             |
| 0                  | 11 | 042 | Maximum wind speed (10-min mean wind)                      | m s <sup>-1</sup>              | 1     | 0                  | 12                      | m s <sup>-1</sup>              | 1     | 4                             |



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| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME   | BUFR                             |       |                    |                         | CREX                             |       |                               |
|--------------------|----|-----|---|----------------------------------|-------|--------------------|-------------------------|----------------------------------|-------|-------------------------------|
|                    |    |     |   | UNIT                             | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT                             | SCALE | DATA<br>WIDTH<br>(Characters) |
| F                  | X  | Y   |   |                                  |       |                    |                         |                                  |       |                               |
| 0                  | 11 | 043 | Maximum wind gust direction                                     | Degree true                      | 0     | 0                  | 9                       | Degree true                      | 0     | 3                             |
| 0                  | 11 | 044 | Mean wind direction for surface – 1 500 m (5 000 feet)          | Degree true                      | 0     | 0                  | 9                       | Degree true                      | 0     | 3                             |
| 0                  | 11 | 045 | Mean wind speed for surface – 1 500 m (5 000 feet)              | m s <sup>-1</sup>                | 1     | 0                  | 12                      | m s <sup>-1</sup>                | 1     | 4                             |
| 0                  | 11 | 046 | Maximum instantaneous wind speed                                | m s <sup>-1</sup>                | 1     | 0                  | 12                      | m s <sup>-1</sup>                | 1     | 4                             |
| 0                  | 11 | 047 | Maximum instantaneous wind speed over 10 minutes                | m s <sup>-1</sup>                | 1     | 0                  | 12                      | m s <sup>-1</sup>                | 1     | 4                             |
| 0                  | 11 | 049 | Standard deviation of wind direction                            | Degree true                      | 0     | 0                  | 9                       | Degree true                      | 0     | 3                             |
| 0                  | 11 | 050 | Standard deviation of horizontal wind speed                     | m s <sup>-1</sup>                | 1     | 0                  | 12                      | m s <sup>-1</sup>                | 1     | 4                             |
| 0                  | 11 | 051 | Standard deviation of vertical wind speed                       | m s <sup>-1</sup>                | 1     | 0                  | 8                       | m s <sup>-1</sup>                | 1     | 3                             |
| 0                  | 11 | 052 | Formal uncertainty in wind speed                                | m s <sup>-1</sup>                | 2     | 0                  | 13                      | m s <sup>-1</sup>                | 2     | 5                             |
| 0                  | 11 | 053 | Formal uncertainty in wind direction                            | Degree true                      | 2     | 0                  | 15                      | Degree true                      | 2     | 5                             |
| 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 <sup>-1</sup>                | 1     | 0                  | 12                      | m s <sup>-1</sup>                | 1     | 4                             |
| 0                  | 11 | 061 | Absolute wind shear in 1 km layer below                         | m s <sup>-1</sup>                | 1     | 0                  | 12                      | m s <sup>-1</sup>                | 1     | 4                             |
| 0                  | 11 | 062 | Absolute wind shear in 1 km layer above                         | m s <sup>-1</sup>                | 1     | 0                  | 12                      | m s <sup>-1</sup>                | 1     | 4                             |
| 0                  | 11 | 070 | Designator of the runway affected by wind shear (including ALL) | CCITT IA5                        | 0     | 0                  | 32                      | Character                        | 0     | 4                             |
| 0                  | 11 | 071 | Turbulent vertical momentum flux                                | m <sup>2</sup> s <sup>-2</sup>   | 3     | -128               | 14                      | m <sup>2</sup> s <sup>-2</sup>   | 3     | 5                             |
| 0                  | 11 | 072 | Turbulent vertical buoyancy flux                                | K m s <sup>-1</sup>              | 3     | -128               | 11                      | K m s <sup>-1</sup>              | 3     | 4                             |
| 0                  | 11 | 073 | Turbulent kinetic energy  | m <sup>2</sup> s <sup>-2</sup>   | 2     | -1024              | 13                      | m <sup>2</sup> s <sup>-2</sup>   | 2     | 4                             |
| 0                  | 11 | 074 | Dissipation energy  | m <sup>2</sup> s <sup>-2</sup>   | 2     | -1024              | 10                      | m <sup>2</sup> s <sup>-2</sup>   | 2     | 4                             |
| 0                  | 11 | 075 | Mean turbulence intensity (eddy dissipation rate)               | m <sup>2/3</sup> s <sup>-1</sup> | 2     | 0                  | 8                       | m <sup>2/3</sup> s <sup>-1</sup> | 2     | 3                             |
| 0                  | 11 | 076 | Peak turbulence intensity (eddy dissipation rate)               | m <sup>2/3</sup> s <sup>-1</sup> | 2     | 0                  | 8                       | m <sup>2/3</sup> s <sup>-1</sup> | 2     | 3                             |
| 0                  | 11 | 077 | Reporting interval or averaging time for Eddy Dissipation Rate  | s                                | 0     | 0                  | 12                      | s                                | 0     | 4                             |
| 0                  | 11 | 081 | Model wind direction at 10m                                     | Degree true                      | 2     | 0                  | 16                      | Degree true                      | 2     | 5                             |
| 0                  | 11 | 082 | Model wind speed at 10m   | m s <sup>-1</sup>                | 2     | 0                  | 14                      | m s <sup>-1</sup>                | 2     | 4                             |
| 0                  | 11 | 083 | Wind speed  | km h <sup>-1</sup>               | 0     | 0                  | 9                       | km h <sup>-1</sup>               | 0     | 3                             |
| 0                  | 11 | 084 | Wind speed  | knot                             | 0     | 0                  | 8                       | knot                             | 0     | 3                             |
| 0                  | 11 | 085 | Maximum wind gust speed   | km h <sup>-1</sup>               | 0     | 0                  | 9                       | km h <sup>-1</sup>               | 0     | 3                             |
| 0                  | 11 | 086 | Maximum wind gust speed   | knot                             | 0     | 0                  | 8                       | knot                             | 0     | 3                             |
| 0                  | 11 | 095 | U component of the model wind vector                            | m s <sup>-1</sup>                | 1     | -4096              | 13                      | m s <sup>-1</sup>                | 1     | 4                             |
| 0                  | 11 | 096 | V component of the model wind vector                            | m s <sup>-1</sup>                | 1     | -4096              | 13                      | m s <sup>-1</sup>                | 1     | 4                             |

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| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME      | BUFR              |       |                    |                         | CREX              |       |                               |
|--------------------|----|-----|----------------------------|-------------------|-------|--------------------|-------------------------|-------------------|-------|-------------------------------|
|                    |    |     |                            | UNIT              | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT              | SCALE | DATA<br>WIDTH<br>(Characters) |
| F                  | X  | Y   |                            |                   |       |                    |                         |                   |       |                               |
| 0                  | 11 | 097 | Wind speed from altimeter  | m s <sup>-1</sup> | 2     | 0                  | 12                      | m s <sup>-1</sup> | 2     | 4                             |
| 0                  | 11 | 098 | Wind speed from radiometer | m s <sup>-1</sup> | 2     | 0                  | 12                      | m s <sup>-1</sup> | 2     | 4                             |

Notes:

- (1) West to east u-components shall be assigned positive values.
- (2) South to north v-components shall be assigned positive values.
- (3) Upward w-components shall be assigned positive values where units are m s<sup>-1</sup>.
- (4) Downward w-components shall be assigned positive values where units are Pa s<sup>-1</sup>.
- (5) Wind reporting standards:

|                      | Speed   | Direction |
|----------------------|---------|-----------|
| No observation       | Missing | Missing   |
| Calm                 | 0       | 0         |
| Normal observation   | > 0     | 1° – 360° |
| Speed only           | > 0     | Missing   |
| Direction only       | Missing | 1° – 360° |
| “Light and variable” | > 0     | 0         |

- (6) The steadiness factor (descriptor 0 11 019) is the ratio of speed of the monthly mean vector wind to the speed of the monthly mean scalar wind expressed as a percentage. It is reported to the nearest one percent.
- (7) Surface wind direction measured at a station within 1° of the North Pole or within 1° of the South Pole shall be reported in such a way that the azimuth ring shall be aligned with its zero coinciding with the Greenwich 0° meridian.

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## Class 12 - Temperature

| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME                                    | BUFR                               |       |                    |                         | CREX                               |       |                               |
|--------------------|----|-----|--|------------------------------------|-------|--------------------|-------------------------|------------------------------------|-------|-------------------------------|
| F                  | X  | Y   |  | UNIT                               | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT                               | SCALE | DATA<br>WIDTH<br>(Characters) |
| 0                  | 12 | 001 | Temperature/dry-bulb temperature                         | K                                  | 1     | 0                  | 12                      | °C                                 | 1     | 3                             |
| 0                  | 12 | 002 | Wet-bulb temperature                                     | K                                  | 1     | 0                  | 12                      | °C                                 | 1     | 3                             |
| 0                  | 12 | 003 | Dew-point temperature                                    | K                                  | 1     | 0                  | 12                      | °C                                 | 1     | 3                             |
| 0                  | 12 | 004 | Dry-bulb temperature at 2 m                              | K                                  | 1     | 0                  | 12                      | °C                                 | 1     | 3                             |
| 0                  | 12 | 005 | Wet-bulb temperature at 2 m                              | K                                  | 1     | 0                  | 12                      | °C                                 | 1     | 3                             |
| 0                  | 12 | 006 | Dew-point temperature at 2 m                             | K                                  | 1     | 0                  | 12                      | °C                                 | 1     | 3                             |
| 0                  | 12 | 007 | Virtual temperature                                      | K                                  | 1     | 0                  | 12                      | °C                                 | 1     | 3                             |
| 0                  | 12 | 011 | Maximum temperature, at height and over period specified | K                                  | 1     | 0                  | 12                      | °C                                 | 1     | 3                             |
| 0                  | 12 | 012 | Minimum temperature, at height and over period specified | K                                  | 1     | 0                  | 12                      | °C                                 | 1     | 3                             |
| 0                  | 12 | 013 | Ground minimum temperature, past 12 hours                | K                                  | 1     | 0                  | 12                      | °C                                 | 1     | 3                             |
| 0                  | 12 | 014 | Maximum temperature at 2 m, past 12 hours                | K                                  | 1     | 0                  | 12                      | °C                                 | 1     | 3                             |
| 0                  | 12 | 015 | Minimum temperature at 2 m, past 12 hours                | K                                  | 1     | 0                  | 12                      | °C                                 | 1     | 3                             |
| 0                  | 12 | 016 | Maximum temperature at 2 m, past 24 hours                | K                                  | 1     | 0                  | 12                      | °C                                 | 1     | 3                             |
| 0                  | 12 | 017 | Minimum temperature at 2 m, past 24 hours                | K                                  | 1     | 0                  | 12                      | °C                                 | 1     | 3                             |
| 0                  | 12 | 021 | Maximum temperature at 2m                                | K                                  | 2     | 0                  | 16                      | °C                                 | 2     | 4                             |
| 0                  | 12 | 022 | Minimum temperature at 2m                                | K                                  | 2     | 0                  | 16                      | °C                                 | 2     | 4                             |
| 0                  | 12 | 023 | Temperature  | °C                                 | 0     | -99                | 8                       | °C                                 | 0     | 2                             |
| 0                  | 12 | 024 | Dew point temperature                                    | °C                                 | 0     | -99                | 8                       | °C                                 | 0     | 2                             |
| 0                  | 12 | 030 | Soil temperature   | K                                  | 1     | 0                  | 12                      | °C                                 | 1     | 3                             |
| 0                  | 12 | 049 | Temperature change over specified period                 | K                                  | 0     | -30                | 6                       | °C                                 | 0     | 2                             |
| 0                  | 12 | 051 | Standard deviation temperature                           | K                                  | 1     | 0                  | 10                      | °C                                 | 1     | 3                             |
| 0                  | 12 | 052 | Highest daily mean temperature                           | K                                  | 1     | 0                  | 12                      | °C                                 | 1     | 3                             |
| 0                  | 12 | 053 | Lowest daily mean temperature                            | K                                  | 1     | 0                  | 12                      | °C                                 | 1     | 3                             |
| 0                  | 12 | 061 | Skin temperature   | K                                  | 1     | 0                  | 12                      | °C                                 | 1     | 3                             |
| 0                  | 12 | 062 | Equivalent black body temperature                        | K                                  | 1     | 0                  | 12                      | °C                                 | 1     | 3                             |
| 0                  | 12 | 063 | Brightness temperature                                   | K                                  | 1     | 0                  | 12                      | °C                                 | 1     | 3                             |
| 0                  | 12 | 064 | Instrument temperature                                   | K                                  | 1     | 0                  | 12                      | K                                  | 1     | 4                             |
| 0                  | 12 | 065 | Standard deviation brightness temperature                | K                                  | 1     | 0                  | 12                      | K                                  | 1     | 4                             |
| 0                  | 12 | 070 | Warm load temperature                                    | K                                  | 2     | 0                  | 16                      | K                                  | 2     | 5                             |
| 0                  | 12 | 071 | Coldest cluster temperature                              | K                                  | 1     | 0                  | 12                      | K                                  | 1     | 4                             |
| 0                  | 12 | 072 | Radiance   | W m <sup>-2</sup> sr <sup>-1</sup> | 6     | 0                  | 31                      | W m <sup>-2</sup> sr <sup>-1</sup> | 6     | 9                             |
| 0                  | 12 | 075 | Spectral radiance  | W m <sup>-3</sup> sr <sup>-1</sup> | -3    | 0                  | 16                      | W m <sup>-3</sup> sr <sup>-1</sup> | -3    | 5                             |
| 0                  | 12 | 076 | Radiance (see Note 2)                                    | W m <sup>-2</sup> sr <sup>-1</sup> | 3     | 0                  | 16                      | W m <sup>-2</sup> sr <sup>-1</sup> | 3     | 5                             |
| 0                  | 12 | 080 | Brightness temperature real part                         | K                                  | 2     | -10000             | 16                      | K                                  | 2     | 5                             |

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|   |    |     |                                       |   |   |        |    |    |   |   |
|---|----|-----|---------------------------------------|---|---|--------|----|----|---|---|
| 0 | 12 | 081 | Brightness temperature imaginary part | K | 2 | -10000 | 16 | K  | 2 | 5 |
| 0 | 12 | 082 | Pixel radiometric accuracy            | K | 2 | 0      | 12 | K  | 2 | 4 |
| 0 | 12 | 101 | Temperature/dry-bulb temperature      | K | 2 | 0      | 16 | °C | 2 | 4 |

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| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME                                    | BUFR |       |                    |                         | CREX |       |                               |
|--------------------|----|-----|--|------|-------|--------------------|-------------------------|------|-------|-------------------------------|
| F                  | X  | Y   |  | UNIT | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT | SCALE | DATA<br>WIDTH<br>(Characters) |
| 0                  | 12 | 102 | Wet-bulb temperature                                     | K    | 2     | 0                  | 16                      | °C   | 2     | 4                             |
| 0                  | 12 | 103 | Dew-point temperature                                    | K    | 2     | 0                  | 16                      | °C   | 2     | 4                             |
| 0                  | 12 | 104 | Dry-bulb temperature at 2m                               | K    | 2     | 0                  | 16                      | °C   | 2     | 4                             |
| 0                  | 12 | 105 | Web-bulb temperature at 2m                               | K    | 2     | 0                  | 16                      | °C   | 2     | 4                             |
| 0                  | 12 | 106 | Dew-point temperature at 2m                              | K    | 2     | 0                  | 16                      | °C   | 2     | 4                             |
| 0                  | 12 | 107 | Virtual temperature                                      | K    | 2     | 0                  | 16                      | °C   | 2     | 4                             |
| 0                  | 12 | 111 | Maximum temperature, at height and over period specified | K    | 2     | 0                  | 16                      | °C   | 2     | 4                             |
| 0                  | 12 | 112 | Minimum temperature, at height and over period specified | K    | 2     | 0                  | 16                      | °C   | 2     | 4                             |
| 0                  | 12 | 113 | Ground minimum temperature, past 12 hours                | K    | 2     | 0                  | 16                      | °C   | 2     | 4                             |
| 0                  | 12 | 114 | Maximum temperature at 2m, past 12 hours                 | K    | 2     | 0                  | 16                      | °C   | 2     | 4                             |
| 0                  | 12 | 115 | Minimum temperature at 2m, past 12 hours                 | K    | 2     | 0                  | 16                      | °C   | 2     | 4                             |
| 0                  | 12 | 116 | Maximum temperature at 2m, past 24 hours                 | K    | 2     | 0                  | 16                      | °C   | 2     | 4                             |
| 0                  | 12 | 117 | Minimum temperature at 2m, past 24 hours                 | K    | 2     | 0                  | 16                      | °C   | 2     | 4                             |
| 0                  | 12 | 118 | Maximum temperature at height specified, past 24 hours   | K    | 2     | 0                  | 16                      | °C   | 2     | 4                             |
| 0                  | 12 | 119 | Minimum temperature at height specified, past 24 hours   | K    | 2     | 0                  | 16                      | °C   | 2     | 4                             |
| 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                  | 12 | 130 | Soil temperature   | K    | 2     | 0                  | 16                      | °C   | 2     | 4                             |
| 0                  | 12 | 151 | Standard deviation of daily mean temperature             | K    | 2     | 0                  | 12                      | °C   | 2     | 4                             |
| 0                  | 12 | 152 | Highest daily mean temperature                           | K    | 2     | 0                  | 16                      | °C   | 2     | 4                             |
| 0                  | 12 | 153 | Lowest daily mean temperature                            | K    | 2     | 0                  | 16                      | °C   | 2     | 4                             |
| 0                  | 12 | 161 | Skin temperature   | K    | 2     | 0                  | 16                      | °C   | 2     | 4                             |
| 0                  | 12 | 162 | Equivalent black body temperature                        | K    | 2     | 0                  | 16                      | °C   | 2     | 4                             |
| 0                  | 12 | 163 | Brightness temperature                                   | K    | 2     | 0                  | 16                      | °C   | 2     | 4                             |
| 0                  | 12 | 164 | Instrument temperature                                   | K    | 2     | 0                  | 16                      | K    | 2     | 5                             |
| 0                  | 12 | 165 | Direct sun brightness temperature                        | K    | 0     | 0                  | 23                      | K    | 0     | 7                             |
| 0                  | 12 | 166 | Snapshot accuracy  | K    | 1     | -4000              | 13                      | K    | 1     | 4                             |
| 0                  | 12 | 167 | Radiometric accuracy (pure polarisation)                 | K    | 1     | 0                  | 9                       | K    | 1     | 3                             |
| 0                  | 12 | 168 | Radiometric accuracy (cross polarisation)                | K    | 1     | 0                  | 9                       | K    | 1     | 3                             |
| 0                  | 12 | 171 | Coldest cluster temperature                              | K    | 2     | 0                  | 16                      | K    | 2     | 5                             |
| 0                  | 12 | 180 | Averaged 12 micron BT for all clear pixels at Nadir      | K    | 2     | 0                  | 16                      | K    | 2     | 5                             |

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|   |    |     |   |   |   |   |    |   |   |   |
|---|----|-----|---|---|---|---|----|---|---|---|
| 0 | 12 | 181 | Averaged 11 micron BT for all clear pixels at Nadir       | K | 2 | 0 | 16 | K | 2 | 5 |
| 0 | 12 | 182 | Averaged 3.7 micron BT for all clear pixels at Nadir      | K | 2 | 0 | 16 | K | 2 | 5 |
| 0 | 12 | 183 | Averaged 12 micron BT for all clear pixels, forward view  | K | 2 | 0 | 16 | K | 2 | 5 |
| 0 | 12 | 184 | Averaged 11 micron BT for all clear pixels, forward view  | K | 2 | 0 | 16 | K | 2 | 5 |
| 0 | 12 | 185 | Averaged 3.7 micron BT for all clear pixels, forward view | K | 2 | 0 | 16 | K | 2 | 5 |
| 0 | 12 | 186 | Mean Nadir sea surface temperature                        | K | 2 | 0 | 16 | K | 2 | 5 |
| 0 | 12 | 187 | Mean dual view sea surface temperature                    | K | 2 | 0 | 16 | K | 2 | 5 |
| 0 | 12 | 188 | Interpolated 23.8 GHz brightness T from MWR               | K | 2 | 0 | 16 | K | 2 | 5 |
| 0 | 12 | 189 | Interpolated 36.5 GHz brightness T from MWR               | K | 2 | 0 | 16 | K | 2 | 5 |

Notes:

- (1) Where the expression “at height and over period specified” is entered under ELEMENT NAME, an appropriate vertical location shall be specified using descriptors from class 07, together with an appropriate period using descriptors from class 04.
- (2) Descriptor 0 12 076 should be used instead of descriptor 0 12 072 to encode radiance.

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## Class 13 - Hygrographic and hydrological elements

| TABLE REFERENCE |    |     | TABLE ELEMENT NAME                                   | BUFR                               |       |                 |                   | CREX                               |       |                         |
|-----------------|----|-----|--|------------------------------------|-------|-----------------|-------------------|------------------------------------|-------|-------------------------|
| F               | X  | Y   |  | UNIT                               | SCALE | REFERENCE VALUE | DATA WIDTH (Bits) | UNIT                               | SCALE | DATA WIDTH (Characters) |
| 0               | 13 | 001 | Specific humidity                                    | kg kg <sup>-1</sup>                | 5     | 0               | 14                | kg kg <sup>-1</sup>                | 5     | 5                       |
| 0               | 13 | 002 | Mixing ratio   | kg kg <sup>-1</sup>                | 5     | 0               | 14                | kg kg <sup>-1</sup>                | 5     | 5                       |
| 0               | 13 | 003 | Relative humidity                                    | %                                  | 0     | 0               | 7                 | %                                  | 0     | 3                       |
| 0               | 13 | 004 | Vapour pressure                                      | Pa                                 | -1    | 0               | 10                | Pa                                 | -1    | 4                       |
| 0               | 13 | 005 | Vapour density                                       | kg m <sup>-3</sup>                 | 3     | 0               | 7                 | kg m <sup>-3</sup>                 | 3     | 3                       |
| 0               | 13 | 006 | Mixing heights                                       | M                                  | -1    | -40             | 16                | m                                  | -1    | 5                       |
| 0               | 13 | 007 | Minimum relative humidity                            | %                                  | 0     | 0               | 7                 | %                                  | 0     | 3                       |
| 0               | 13 | 008 | Maximum relative humidity                            | %                                  | 0     | 0               | 7                 | %                                  | 0     | 3                       |
| 0               | 13 | 009 | Relative humidity (see Note 6)                       | %                                  | 1     | -1000           | 12                | %                                  | 1     | 4                       |
| 0               | 13 | 011 | Total precipitation/total water equivalent           | kg m <sup>-2</sup>                 | 1     | -1              | 14                | kg m <sup>-2</sup>                 | 1     | 5                       |
| 0               | 13 | 012 | Depth of fresh snow                                  | m                                  | 2     | -2              | 12                | m                                  | 2     | 4                       |
| 0               | 13 | 013 | Total snow depth                                     | m                                  | 2     | -2              | 16                | m                                  | 2     | 5                       |
| 0               | 13 | 014 | Rainfall/water equivalent of snow (averaged rate)    | kg m <sup>-2</sup> s <sup>-1</sup> | 4     | 0               | 12                | kg m <sup>-2</sup> s <sup>-1</sup> | 4     | 4                       |
| 0               | 13 | 015 | Snowfall (averaged rate)                             | m s <sup>-1</sup>                  | 7     | 0               | 12                | m s <sup>-1</sup>                  | 7     | 4                       |
| 0               | 13 | 016 | Precipitable water                                   | kg m <sup>-2</sup>                 | 0     | 0               | 7                 | kg m <sup>-2</sup>                 | 0     | 3                       |
| 0               | 13 | 019 | Total precipitation past 1 hour                      | kg m <sup>-2</sup>                 | 1     | -1              | 14                | kg m <sup>-2</sup>                 | 1     | 4                       |
| 0               | 13 | 020 | Total precipitation past 3 hours                     | kg m <sup>-2</sup>                 | 1     | -1              | 14                | kg m <sup>-2</sup>                 | 1     | 5                       |
| 0               | 13 | 021 | Total precipitation past 6 hours                     | kg m <sup>-2</sup>                 | 1     | -1              | 14                | kg m <sup>-2</sup>                 | 1     | 5                       |
| 0               | 13 | 022 | Total precipitation past 12 hours                    | kg m <sup>-2</sup>                 | 1     | -1              | 14                | kg m <sup>-2</sup>                 | 1     | 5                       |
| 0               | 13 | 023 | Total precipitation past 24 hours                    | kg m <sup>-2</sup>                 | 1     | -1              | 14                | kg m <sup>-2</sup>                 | 1     | 5                       |
| 0               | 13 | 031 | Evapotranspiration                                   | kg m <sup>-2</sup>                 | 0     | 0               | 7                 | kg m <sup>-2</sup>                 | 0     | 3                       |
| 0               | 13 | 032 | Evaporation/evapotranspiration (see Note 5)          | kg m <sup>-2</sup>                 | 1     | 0               | 8                 | kg m <sup>-2</sup>                 | 1     | 3                       |
| 0               | 13 | 033 | Evaporation/evapotranspiration                       | kg m <sup>-2</sup>                 | 1     | 0               | 10                | kg m <sup>-2</sup>                 | 1     | 4                       |
| 0               | 13 | 038 | Superadiabatic indicator                             | Code table                         | 0     | 0               | 2                 | Code table                         | 0     | 1                       |
| 0               | 13 | 039 | Terrain type (ice/snow)                              | Code table                         | 0     | 0               | 3                 | Code table                         | 0     | 1                       |
| 0               | 13 | 040 | Surface flag   | Code table                         | 0     | 0               | 4                 | Code table                         | 0     | 2                       |
| 0               | 13 | 041 | Pasquill-Gifford stability category                  | Code table                         | 0     | 0               | 4                 | Code table                         | 0     | 2                       |
| 0               | 13 | 042 | Parcel lifted index (to 500 hPa) (see Notes 3 and 4) | K                                  | 0     | -20             | 6                 | K                                  | 0     | 2                       |
| 0               | 13 | 043 | Best lifted index (to 500 hPa) (see Notes 3 and 4)   | K                                  | 0     | -20             | 6                 | K                                  | 0     | 2                       |
| 0               | 13 | 044 | K index  | K                                  | 0     | -30             | 8                 | K                                  | 0     | 3                       |
| 0               | 13 | 045 | KO index   | K                                  | 0     | -30             | 8                 | K                                  | 0     | 3                       |
| 0               | 13 | 046 | Maximum buoyancy                                     | K                                  | 0     | -30             | 8                 | K                                  | 0     | 3                       |
| 0               | 13 | 047 | Modified Showalter stability index (see Note 7)      | K                                  | 0     | -60             | 6                 | °C                                 | 0     | 2                       |
| 0               | 13 | 048 | Water fraction                                       | %                                  | 1     | 0               | 10                | %                                  | 1     | 4                       |
| 0               | 13 | 051 | Frequency group, precipitation                       | Code table                         | 0     | 0               | 4                 | Code table                         | 0     | 2                       |

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|   |    |     |  |                                    |   |    |    |                         |   |    |
|---|----|-----|--|------------------------------------|---|----|----|-------------------------|---|----|
| 0 | 13 | 052 | Highest daily amount of precipitation      | kg m <sup>-2</sup>                 | 1 | -1 | 14 | kg m <sup>-2</sup>      | 1 | 5  |
| 0 | 13 | 055 | Intensity of precipitation                 | Kg m <sup>-2</sup> s <sup>-1</sup> | 4 | 0  | 8  | mm h <sup>-1</sup>      | 1 | 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 | 13 | 058 | Size of precipitating element              | m                                  | 4 | 0  | 7  | mm                      | 1 | 3  |
| 0 | 13 | 059 | Number of flashes (thunderstorm)           | Numeric                            | 0 | 0  | 7  | Numeric                 | 0 | 3  |
| 0 | 13 | 060 | Total accumulated precipitation            | kg m <sup>-2</sup>                 | 1 | -1 | 17 | kg m <sup>-2</sup>      | 1 | 5  |
| 0 | 13 | 071 | Upstream water level                       | m                                  | 2 | 0  | 14 | m                       | 2 | 4  |
| 0 | 13 | 072 | Downstream water level                     | m                                  | 2 | 0  | 14 | m                       | 2 | 4  |
| 0 | 13 | 073 | Maximum water level                        | m                                  | 2 | 0  | 14 | m                       | 2 | 4  |
| 0 | 13 | 080 | Water pH                                   | pH unit                            | 1 | 0  | 10 | pH unit                 | 1 | 3  |
| 0 | 13 | 081 | Water conductivity                         | Siemens m <sup>-1</sup>            | 3 | 0  | 14 | Siemens m <sup>-1</sup> | 3 | 4  |
| 0 | 13 | 082 | Water temperature                          | K                                  | 1 | 0  | 12 | K                       | 1 | 4  |
| 0 | 13 | 083 | Dissolved oxygen                           | Kg m <sup>-3</sup>                 | 6 | 0  | 15 | kg m <sup>-3</sup>      | 6 | 5  |
| 0 | 13 | 084 | Turbidity                                  | Lumen                              | 0 | 0  | 14 | Lumen                   | 0 | 4  |
| 0 | 13 | 085 | Oxydation Reduction Potential (ORP)        | V                                  | 3 | 0  | 14 | V                       | 3 | 4  |
| 0 | 13 | 090 | Radiometer water vapour content            | Kgm <sup>-2</sup>                  | 1 | 0  | 10 | Kgm <sup>-2</sup>       | 1 | 4  |
| 0 | 13 | 091 | Radiometer liquid content                  | Kgm <sup>-2</sup>                  | 2 | 0  | 8  | Kgm <sup>-2</sup>       | 2 | 3  |
| 0 | 13 | 093 | Cloud optical thickness                    | Numeric                            | 0 | 0  | 8  | Numeric                 | 0 | 3  |
| 0 | 13 | 095 | Total column water vapour                  | Kgm <sup>-2</sup>                  | 4 | 0  | 19 | Kgm <sup>-2</sup>       | 4 | 6  |
| 0 | 13 | 096 | MWR water vapour content                   | Kgm <sup>-2</sup>                  | 2 | 0  | 14 | Kgm <sup>-2</sup>       | 2 | 5  |
| 0 | 13 | 097 | MWR liquid water content                   | Kgm <sup>-2</sup>                  | 2 | 0  | 14 | Kgm <sup>-2</sup>       | 2 | 5  |
| 0 | 13 | 098 | Integrated water vapour density            | Kgm <sup>-2</sup>                  | 8 | 0  | 30 | Kgm <sup>-2</sup>       | 8 | 10 |
| 0 | 13 | 155 | Intensity of precipitation (high accuracy) | kg m <sup>-2</sup> s <sup>-1</sup> | 5 | -1 | 16 | mm h <sup>-1</sup>      | 1 | 5  |

### Notes:

- (1) A precipitation value of -0.1kg m<sup>-2</sup> before scaling (-1 after scaling or in CREX) shall indicate a "trace" (non-measurable, less than 0.05 kg m<sup>-2</sup>).
- (2) A snow depth value of -0.01 m before scaling (-1 after scaling or in CREX) shall indicate a little (less than 0.005 m) snow. A value of -0.02 m (-2 after scaling or in CREX) shall indicate "snow cover not continuous".
- (3) The "parcel lifted index" (as defined in the International Meteorological Vocabulary (WMO–No. 182) under the listing "lifted index") is defined as the temperature difference between the ambient 500 hPa temperature (T500) and that of a parcel of air lifted from the surface (Tparcel) following the dry and moist adiabatic process. Negative values of (T500 – Tparcel) suggest instability. The "best lifted index" is defined as the most unstable of a collection of parcel lifted indices, with parcel initial conditions defined for a collection of 30 hPa thick layers stacked one upon the other with the lowest resting on the ground. Commonly four to six such layers are used in the calculation.
- (4) Since the two lifted indices (042 and 043) are defined as temperature differences, they may take on negative values, even though the units are kelvin; hence the non-zero reference value.
- (5) Descriptor 0 13 033 should be used instead of descriptor 0 13 032 to encode evaporation/evapotranspiration.
- (6) Concerning descriptor 0 13 009, the originators of these data want to be able to retain the raw (i.e. unprocessed) relative humidity value reported by the sensor in order to be able to track, among other things, when a sensor begins to malfunction. The latter case is when a negative value might occur. For world-wide exchange with other countries, it is possible that only the processed data would ever be sent.
- (7) 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.



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## Class 14 - Radiation and radiance

| TABLE<br>REFERENCE<br>F   X   Y |    |     | TABLE<br>ELEMENT NAME   | BUFR   |       |                    |                          | CREX   |       |                               |
|---------------------------------|----|-----|---|--|-------|--------------------|--------------------------|--|-------|-------------------------------|
|                                 |    |     |   | UNIT   | SCALE | REFERENCE<br>VALUE | DATA<br>WIDT<br>H (Bits) | UNIT   | SCALE | DATA<br>WIDTH<br>(Characters) |
| 0                               | 14 | 001 | Long-wave radiation, integrated over 24 hours                             | J m <sup>-2</sup>                                  | -3    | -65536             | 17                       | J m <sup>-2</sup>                                  | -3    | 5                             |
| 0                               | 14 | 002 | Long-wave radiation, integrated over period specified                     | J m <sup>-2</sup>                                  | -3    | -65536             | 17                       | J m <sup>-2</sup>                                  | -3    | 5                             |
| 0                               | 14 | 003 | Short-wave radiation, integrated over 24 hours                            | J m <sup>-2</sup>                                  | -3    | -65536             | 17                       | J m <sup>-2</sup>                                  | -3    | 5                             |
| 0                               | 14 | 004 | Short-wave radiation, integrated over period specified                    | J m <sup>-2</sup>                                  | -3    | -65536             | 17                       | J m <sup>-2</sup>                                  | -3    | 5                             |
| 0                               | 14 | 011 | Net long-wave radiation, integrated over 24 hours                         | J m <sup>-2</sup>                                  | -3    | -65536             | 17                       | J m <sup>-2</sup>                                  | -3    | 5                             |
| 0                               | 14 | 012 | Net long-wave radiation, integrated over period specified                 | J m <sup>-2</sup>                                  | -3    | -65536             | 17                       | J m <sup>-2</sup>                                  | -3    | 5                             |
| 0                               | 14 | 013 | Net short-wave radiation, integrated over 24 hours                        | J m <sup>-2</sup>                                  | -3    | -65536             | 17                       | J m <sup>-2</sup>                                  | -3    | 5                             |
| 0                               | 14 | 014 | Net short-wave radiation, integrated over period specified                | J m <sup>-2</sup>                                  | -3    | -65536             | 17                       | J m <sup>-2</sup>                                  | -3    | 5                             |
| 0                               | 14 | 015 | Net radiation, integrated over 24 hours                                   | J m <sup>-2</sup>                                  | -4    | -16384             | 15                       | J m <sup>-2</sup>                                  | -4    | 5                             |
| 0                               | 14 | 016 | Net radiation, integrated over period specified                           | J m <sup>-2</sup>                                  | -4    | -16384             | 15                       | J m <sup>-2</sup>                                  | -4    | 5                             |
| 0                               | 14 | 017 | Instantaneous long-wave radiation   | W m <sup>-2</sup>                                  | 0     | -512               | 10                       | W m <sup>-2</sup>                                  | 0     | 4                             |
| 0                               | 14 | 018 | Instantaneous short-wave radiation  | W m <sup>-2</sup>                                  | 0     | -2048              | 12                       | W m <sup>-2</sup>                                  | 0     | 4                             |
| 0                               | 14 | 019 | Surface albedo  | %  | 0     | 0                  | 7                        | %  | 0     | 3                             |
| 0                               | 14 | 020 | Global solar radiation, integrated over 24 hours                          | J m <sup>-2</sup>                                  | -4    | 0                  | 15                       | J m <sup>-2</sup>                                  | -4    | 5                             |
| 0                               | 14 | 021 | Global solar radiation, integrated over period specified                  | J m <sup>-2</sup>                                  | -4    | 0                  | 15                       | J m <sup>-2</sup>                                  | -4    | 5                             |
| 0                               | 14 | 022 | Diffuse solar radiation, integrated over 24 hours                         | J m <sup>-2</sup>                                  | -4    | 0                  | 15                       | J m <sup>-2</sup>                                  | -4    | 5                             |
| 0                               | 14 | 023 | Diffuse solar radiation, integrated over period specified                 | J m <sup>-2</sup>                                  | -4    | 0                  | 15                       | J m <sup>-2</sup>                                  | -4    | 5                             |
| 0                               | 14 | 024 | Direct solar radiation, integrated over 24 hours                          | J m <sup>-2</sup>                                  | -4    | 0                  | 15                       | J m <sup>-2</sup>                                  | -4    | 5                             |
| 0                               | 14 | 025 | Direct solar radiation, integrated over period specified                  | J m <sup>-2</sup>                                  | -4    | 0                  | 15                       | J m <sup>-2</sup>                                  | -4    | 5                             |
| 0                               | 14 | 026 | Albedo at the top of clouds   | %  | 0     | 0                  | 7                        | %  | 0     | 3                             |
| 0                               | 14 | 027 | Albedo  | %  | 0     | 0                  | 7                        | %  | 0     | 3                             |
| 0                               | 14 | 028 | Global solar radiation (high accuracy), integrated over period specified  | J m <sup>-2</sup>                                  | -2    | 0                  | 20                       | J m <sup>-2</sup>                                  | -2    | 6                             |
| 0                               | 14 | 029 | Diffuse solar radiation (high accuracy), integrated over period specified | J m <sup>-2</sup>                                  | -2    | 0                  | 20                       | J m <sup>-2</sup>                                  | -2    | 6                             |
| 0                               | 14 | 030 | Direct solar radiation (high accuracy), integrated over period specified  | J m <sup>-2</sup>                                  | -2    | 0                  | 20                       | J m <sup>-2</sup>                                  | -2    | 6                             |
| 0                               | 14 | 031 | Total sunshine  | Minute   | 0     | 0                  | 11                       | Minute   | 0     | 4                             |
| 0                               | 14 | 032 | Total sunshine  | Hour   | 0     | 0                  | 10                       | Hour   | 0     | 4                             |
| 0                               | 14 | 033 | Total sunshine  | %  | 0     | 0                  | 9                        | %  | 0     | 3                             |
| 0                               | 14 | 034 | Sunshine over period specified  | Minute   | 0     | 0                  | 11                       | Minute   | 0     | 4                             |
| 0                               | 14 | 035 | Solar Radiation Flux  | W m <sup>-2</sup>                                  | 1     | 0                  | 14                       | W m <sup>-2</sup>                                  | 1     | 5                             |
| 0                               | 14 | 042 | Bi-directional reflectance  | %  | 0     | 0                  | 7                        | %  | 0     | 3                             |
| 0                               | 14 | 045 | Channel radiance (see Note 4)   | Wm <sup>-2</sup> sr <sup>-1</sup> cm <sup>-1</sup> | 0     | 0                  | 11                       | Wm <sup>-2</sup> sr <sup>-1</sup> cm <sup>-1</sup> | 0     | 4                             |

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|   |    |     |  |   |    |        |    |   |    |    |
|---|----|-----|--|---|----|--------|----|---|----|----|
| 0 | 14 | 046 | Scaled IASI radiance (see Note 6)                | $\text{Wm}^{-2}\text{sr}^{-1}\text{m}^{-1}$ | 0  | -5000  | 16 | $\text{Wm}^{-2}\text{sr}^{-1}\text{m}^{-1}$ | 0  | 5  |
| 0 | 14 | 047 | Scaled mean AVHRR radiance                       | $\text{Wm}^{-2}\text{sr}^{-1}\text{m}^{-1}$ | 0  | 0      | 31 | $\text{Wm}^{-2}\text{sr}^{-1}\text{m}^{-1}$ | 0  | 10 |
| 0 | 14 | 048 | Scaled standard deviation AVHRR radiance         | $\text{Wm}^{-2}\text{sr}^{-1}\text{m}^{-1}$ | 0  | 0      | 31 | $\text{Wm}^{-2}\text{sr}^{-1}\text{m}^{-1}$ | 0  | 10 |
| 0 | 14 | 050 | Emissivity (see note 5)                          | %   | 1  | 0      | 10 | %   | 1  | 4  |
| 0 | 14 | 051 | Direct solar radiation integrated over last hour | $\text{J m}^{-2}$                           | -3 | 0      | 14 | $\text{Jm}^{-2}$                            | -3 | 4  |
| 0 | 14 | 055 | Solar activity index                             | Numeric                                     | 0  | -32768 | 16 | Numeric                                     | 0  | 5  |

Notes:

- (1) Downward radiation shall be assigned **positive** values.
- (2) Upward radiation shall be assigned **negative** values.
- (3) Where the expression “period specified” is entered under ELEMENT NAME, an appropriate period shall be specified using descriptors from class 04.
- (4) Channel radiance (014045) uses cm to represent the wave number.
- (5) Emissivity is the ratio of the amount of energy emitted from a particular object compared to the amount that would be emitted by a blackbody at the same temperature (I.e. the Planck function). Multiplying by 100 gives a percent (and provides 2 digits of precision at the same time).
- (6) 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.

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## Class 15 - Physical/chemical constituents

| TABLE REFERENCE |    |     | TABLE ELEMENT NAME   | BUFR                    |       |                 |                   | CREX                   |       |                         |
|-----------------|----|-----|--|-------------------------|-------|-----------------|-------------------|------------------------|-------|-------------------------|
| F               | X  | Y   |  | UNIT                    | SCALE | REFERENCE VALUE | DATA WIDTH (Bits) | UNIT                   | SCALE | DATA WIDTH (Characters) |
| 0               | 15 | 001 | Total ozone  | DU                      | 0     | 0               | 10                | DU                     | 0     | 4                       |
| 0               | 15 | 002 | Air mass (slant path at 22 km)                               | Numeric                 | 2     | 0               | 10                | Numeric                | 2     | 3                       |
| 0               | 15 | 003 | Measured ozone partial pressure (sounding) (see Note 1)      | Pascal                  | 4     | 0               | 9                 | nbar                   | 0     | 3                       |
| 0               | 15 | 004 | Ozone sounding correction factor (see Note 2)                | Numeric                 | 3     | 0               | 11                | Numeric                | 3     | 4                       |
| 0               | 15 | 005 | Ozone p (see Note 3)   | DU                      | 0     | 0               | 10                | DU                     | 0     | 3                       |
| 0               | 15 | 008 | Significand of volumetric mixing ratio                       | Numeric                 | 0     | 0               | 10                | Numeric                | 0     | 4                       |
| 0               | 15 | 011 | Log 10 of integrated electron density                        | log (1/m <sup>2</sup> ) | 3     | 14000           | 13                | log (m <sup>-2</sup> ) | 3     | 4                       |
| 0               | 15 | 012 | Total electron count per square metre                        | 1/m <sup>2</sup>        | -16   | 0               | 6                 | 1/m <sup>2</sup>       | -16   | 2                       |
| 0               | 15 | 015 | Maximum image spectral component before normalization        | Numeric                 | 0     | 0               | 31                | Numeric                | 0     | 10                      |
| 0               | 15 | 020 | Integrated O <sub>3</sub> density                            | kg m <sup>-2</sup>      | 8     | 0               | 21                | Kg m <sup>-2</sup>     | 8     | 7                       |
| 0               | 15 | 021 | Integrated mass density                                      | kg m <sup>-2</sup>      | 11    | 0               | 31                | kg m <sup>-2</sup>     | 11    | 10                      |
| 0               | 15 | 024 | Optical depth  | Numeric                 | 4     | 0               | 24                | Numeric                | 4     | 8                       |
| 0               | 15 | 025 | Type of pollutant  | Code table              | 0     | 0               | 4                 | Code table             | 0     | 2                       |
| 0               | 15 | 026 | Concentration of pollutant (mol mol <sup>-1</sup> )          | mol mol <sup>-1</sup>   | 9     | 0               | 9                 | mol mol <sup>-1</sup>  | 9     | 3                       |
| 0               | 15 | 027 | Concentration of pollutant (kg m <sup>-3</sup> )             | kg m <sup>-3</sup>      | 9     | 0               | 10                | kg m <sup>-3</sup>     | 9     | 4                       |
| 0               | 15 | 030 | Aerosol contamination index (see Note 6)                     | Numeric                 | 2     | -1000           | 12                | Numeric                | 2     | 4                       |
| 0               | 15 | 031 | Atmospheric path delay in satellite signal                   | m                       | 4     | 10000           | 15                | m                      | 4     | 5                       |
| 0               | 15 | 032 | Estimated error in atmospheric path delay                    | m                       | 4     | 0               | 10                | m                      | 4     | 4                       |
| 0               | 15 | 033 | Difference in path delays for limb views at extremes of scan | m                       | 5     | -10000          | 15                | m                      | 5     | 5                       |
| 0               | 15 | 034 | Estimated error in path delay difference                     | m                       | 5     | 0               | 14                | m                      | 5     | 5                       |
| 0               | 15 | 035 | Component of zenith path delay due to water vapour           | m                       | 4     | 0               | 14                | m                      | 4     | 5                       |
| 0               | 15 | 036 | Atmospheric refractivity (see Note 5)                        | N-units                 | 3     | 0               | 19                | N-units                | 3     | 6                       |
| 0               | 15 | 037 | Bending angle  | Radians                 | 8     | -100000         | 23                | Radians                | 8     | 7                       |

Notes:

(1) 0 15 003 is partial pressure of ozone, measured at the pressure level identified by 0 07 004.

(2) 0 15 004 (CF) is defined as:

CF = TOI/TOS

where TOI is the integrated ozone value obtained "simultaneously to a sounding" from a Dobson or Brewer spectrophotometer at the site or "nearby" and TOS is the total ozone obtained from the sounding. TOS is sum of the integrated ozone below the lowest pressure level reached by the sounding and the estimate of the amount above. In the absence of any spectrophotometer measurement, CF = Missing value.

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- (3) 0 15 005 is the value obtained as the result of the vertical integration of the sounding values (0 15 003) measured below the lowest pressure level reached by the sonde, multiplied by 0 15 004.
- (4) DU = Dobson unit.
- (5) The refractivity,  $N$ , is related to the refractive index,  $n$  by the formula  $N = 10^6 (n - 1)$ .  $N$  is therefore dimensionless but values computed by the formula are by convention described as being in 'N-units'.
- (6) For this descriptor, numbers less than -1 indicate a predominance of scattering aerosols, increasing in concentration as the number becomes more negative. Numbers greater than +1 indicate a predominance of absorptive aerosols, increasing in concentration as the number becomes more positive. Numbers between -1 and +1 indicate clouds or noise.

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## Class 19 - Synoptic features

| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME   | BUFR              |       |                    |                         | CREX              |       |                               |
|--------------------|----|-----|---|-------------------|-------|--------------------|-------------------------|-------------------|-------|-------------------------------|
| F                  | X  | Y   |   | UNIT              | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT              | SCALE | DATA<br>WIDTH<br>(Characters) |
| 0                  | 19 | 001 | Type of synoptic feature  | Code table        | 0     | 0                  | 6                       | Code table        | 0     | 2                             |
| 0                  | 19 | 002 | Effective radius of feature (see Note 1)  | m                 | -2    | 0                  | 12                      | m                 | -2    | 4                             |
| 0                  | 19 | 003 | Wind speed threshold (see Note 2)   | m s <sup>-1</sup> | 0     | 0                  | 8                       | m s <sup>-1</sup> | 0     | 3                             |
| 0                  | 19 | 004 | Effective radius with respect to wind speeds above threshold (see Note 2)         | m                 | -2    | 0                  | 12                      | m                 | -2    | 4                             |
| 0                  | 19 | 005 | Direction of motion of feature (see Note 3)                                       | Degree true       | 0     | 0                  | 9                       | Degree true       | 0     | 3                             |
| 0                  | 19 | 006 | Speed of motion of feature (see Note 3)   | m s <sup>-1</sup> | 2     | 0                  | 14                      | m s <sup>-1</sup> | 2     | 5                             |
| 0                  | 19 | 007 | Effective radius of feature   | m                 | -3    | 0                  | 12                      | m                 | -3    | 4                             |
| 0                  | 19 | 008 | Vertical extent of circulation  | Code table        | 0     | 0                  | 3                       | Code table        | 0     | 1                             |
| 0                  | 19 | 009 | Effective radius with respect to wind speeds above threshold (large storms)       | m                 | -3    | 0                  | 12                      | m                 | -3    | 4                             |
| 0                  | 19 | 010 | Method for tracking the centre of synoptic feature                                | Code table        | 0     | 0                  | 4                       | Code table        | 0     | 2                             |
| 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                             |
| 0                  | 19 | 106 | Identification number of tropical cyclone   | Numeric           | 0     | 0                  | 7                       | Numeric           | 0     | 3                             |
| 0                  | 19 | 107 | Time interval over which the movement of the tropical cyclone has been calculated | 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 intensity of the tropical cyclone                      | Code table        | 0     | 0                  | 4                       | Code table        | 0     | 2                             |
| 0                  | 19 | 111 | Current Intensity (CI) number of the tropical                                     | Numeric           | 1     | 0                  | 7                       | Numeric           | 1     | 3                             |

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|   |    |     |  |            |   |     |    |            |   |   |
|---|----|-----|--|------------|---|-----|----|------------|---|---|
|   |    |     | cyclone  |            |   |     |    |            |   |   |
| 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 the 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 |

Notes:

- (1) The effective radius of feature shall be defined with respect to the radius of the 1000-hPa isobars at mean sea level.
- (2) Maximum wind and effective radius of maximum wind shall be indicated by means of the 0 19 003 and 0 19 004 entries.
- (3) For a stationary feature, both 019005 (Direction of motion of feature) and 019006 (Speed of motion of feature) shall be reported 0.

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## Class 20 - Observed phenomena

| TABLE REFERENCE |    |     | TABLE ELEMENT NAME                      | BUFR       |       |                 |                   | CREX       |       |                         |
|-----------------|----|-----|---|------------|-------|-----------------|-------------------|------------|-------|-------------------------|
| F               | X  | Y   |   | UNIT       | SCALE | REFERENCE VALUE | DATA WIDTH (Bits) | UNIT       | SCALE | DATA WIDTH (Characters) |
| 0               | 20 | 001 | Horizontal visibility                   | m          | -1    | 0               | 13                | m          | -1    | 4                       |
| 0               | 20 | 002 | Vertical visibility                     | m          | -1    | 0               | 7                 | m          | -1    | 3                       |
| 0               | 20 | 003 | Present weather (see note 1)            | Code table | 0     | 0               | 9                 | Code table | 0     | 3                       |
| 0               | 20 | 004 | Past weather (1) (see note 2)           | Code table | 0     | 0               | 5                 | Code table | 0     | 2                       |
| 0               | 20 | 005 | Past weather (2) (see note 2)           | Code table | 0     | 0               | 5                 | Code table | 0     | 2                       |
| 0               | 20 | 006 | Flight Rules                            | Code table | 0     | 0               | 3                 | Code table | 0     | 1                       |
| 0               | 20 | 008 | Cloud distribution for aviation         | Code table | 0     | 0               | 5                 | Code table | 0     | 2                       |
| 0               | 20 | 009 | General Weather Indicator (TAF/METAR)   | Code table | 0     | 0               | 4                 | Code table | 0     | 2                       |
| 0               | 20 | 010 | Cloud cover (total) (see note 5)        | %          | 0     | 0               | 7                 | %          | 0     | 3                       |
| 0               | 20 | 011 | Cloud amount                            | Code table | 0     | 0               | 4                 | Code table | 0     | 2                       |
| 0               | 20 | 012 | Cloud type                              | Code table | 0     | 0               | 6                 | Code table | 0     | 2                       |
| 0               | 20 | 013 | Height of base of cloud                 | m          | -1    | -40             | 11                | m          | -1    | 4                       |
| 0               | 20 | 014 | Height of top of cloud                  | m          | -1    | -40             | 11                | m          | -1    | 4                       |
| 0               | 20 | 015 | Pressure at base of cloud               | Pa         | -1    | 0               | 14                | Pa         | -1    | 5                       |
| 0               | 20 | 016 | Pressure at top of cloud                | Pa         | -1    | 0               | 14                | Pa         | -1    | 5                       |
| 0               | 20 | 017 | Cloud top description                   | Code table | 0     | 0               | 4                 | Code table | 0     | 2                       |
| 0               | 20 | 018 | Tendency of runway visual range         | Code table | 0     | 0               | 2                 | Code table | 0     | 1                       |
| 0               | 20 | 019 | Significant present or forecast weather | CCITT IA5  | 0     | 0               | 72                | Character  | 0     | 9                       |
| 0               | 20 | 020 | Significant recent weather phenomena    | CCITT IA5  | 0     | 0               | 32                | Character  | 0     | 4                       |
| 0               | 20 | 021 | Type of precipitation                   | Flag table | 0     | 0               | 30                | Flag table | 0     | 10                      |
| 0               | 20 | 022 | Character of precipitation              | Code table | 0     | 0               | 4                 | Code table | 0     | 2                       |
| 0               | 20 | 023 | Other weather phenomena                 | Flag table | 0     | 0               | 18                | Flag table | 0     | 6                       |
| 0               | 20 | 024 | Intensity of phenomena                  | Code table | 0     | 0               | 3                 | Code table | 0     | 1                       |
| 0               | 20 | 025 | Obscuration                             | Flag table | 0     | 0               | 21                | Flag table | 0     | 7                       |
| 0               | 20 | 026 | Character of obscuration                | Code table | 0     | 0               | 4                 | Code table | 0     | 2                       |
| 0               | 20 | 027 | Phenomena occurrence                    | Flag table | 0     | 0               | 9                 | Flag table | 0     | 3                       |
| 0               | 20 | 028 | Expected change in intensity            | Code table | 0     | 0               | 3                 | Code table | 0     | 1                       |
| 0               | 20 | 029 | Rain flag                               | Code table | 0     | 0               | 2                 | Code table | 0     | 1                       |
| 0               | 20 | 031 | Ice deposit (thickness)                 | m          | 2     | 0               | 7                 | m          | 2     | 3                       |
| 0               | 20 | 032 | Rate of ice accretion                   | Code table | 0     | 0               | 3                 | Code table | 0     | 1                       |
| 0               | 20 | 033 | Cause of ice accretion                  | Flag table | 0     | 0               | 4                 | Flag table | 0     | 2                       |
| 0               | 20 | 034 | Sea ice concentration                   | Code table | 0     | 0               | 5                 | Code table | 0     | 2                       |
| 0               | 20 | 035 | Amount and type of ice                  | Code table | 0     | 0               | 4                 | Code table | 0     | 2                       |
| 0               | 20 | 036 | Ice situation                           | Code table | 0     | 0               | 5                 | Code table | 0     | 2                       |
| 0               | 20 | 037 | Ice development                         | Code table | 0     | 0               | 5                 | Code table | 0     | 2                       |

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| 0                  | 20 | 038 | Bearing of ice edge (see note 3)                            | Degree true        | 0     | 0                  | 12*                     | Degree true        | 0     | 3                             |
|--------------------|----|-----|---|--------------------|-------|--------------------|-------------------------|--------------------|-------|-------------------------------|
| TABLE<br>REFERENCE |    |     | TALBE<br>ELEMENT NAME                                       | BUFR               |       |                    |                         | CREX               |       |                               |
|                    |    |     |   | UNIT               | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT               | SCALE | DATA<br>WIDTH<br>(Characters) |
| F                  | X  | Y   |   |                    |       |                    |                         |                    |       |                               |
| 0                  | 20 | 039 | Ice distance  | m                  | -1    | 0                  | 13                      | m                  | -1    | 4                             |
| 0                  | 20 | 040 | Evolution of drift snow                                     | Code table         | 0     | 0                  | 4                       | Code table         | 0     | 2                             |
| 0                  | 20 | 041 | Airframe icing  | Code table         | 0     | 0                  | 4                       | Code table         | 0     | 2                             |
| 0                  | 20 | 042 | Airframe icing present                                      | Code table         | 0     | 0                  | 2                       | Code table         | 0     | 1                             |
| 0                  | 20 | 043 | Peak liquid water content                                   | Kg m <sup>-3</sup> | 4     | 0                  | 7                       | Kg m <sup>-3</sup> | 4     | 2                             |
| 0                  | 20 | 044 | Average liquid water content                                | Kg m <sup>-3</sup> | 4     | 0                  | 7                       | Kg m <sup>-3</sup> | 4     | 2                             |
| 0                  | 20 | 045 | Supercooled large droplet (SLD) conditions                  | Code table         | 0     | 0                  | 2                       | Code table         | 0     | 2                             |
| 0                  | 20 | 048 | Evolution of feature  | Code table         | 0     | 0                  | 4                       | Code table         | 0     | 2                             |
| 0                  | 20 | 050 | Cloud index   | Code table         | 0     | 0                  | 8                       | Code table         | 0     | 3                             |
| 0                  | 20 | 051 | Amount of low clouds  | %                  | 0     | 0                  | 7                       | %                  | 0     | 3                             |
| 0                  | 20 | 052 | Amount of middle clouds                                     | %                  | 0     | 0                  | 7                       | %                  | 0     | 3                             |
| 0                  | 20 | 053 | Amount of high clouds                                       | %                  | 0     | 0                  | 7                       | %                  | 0     | 3                             |
| 0                  | 20 | 054 | True direction from which a phenomenon or clouds are moving | Degree true        | 0     | 0                  | 9                       | Degree true        | 0     | 3                             |
| 0                  | 20 | 055 | State of sky in the tropics                                 | Code table         | 0     | 0                  | 4                       | Code table         | 0     | 2                             |
| 0                  | 20 | 056 | Cloud phase   | Code table         | 0     | 0                  | 3                       | Code table         | 0     | 1                             |
| 0                  | 20 | 058 | Visibility seawards from a coastal station                  | m                  | -1    | 0                  | 13                      | m                  | -1    | 4                             |
| 0                  | 20 | 059 | Minimum horizontal visibility                               | m                  | -1    | 0                  | 9                       | m                  | -1    | 3                             |
| 0                  | 20 | 060 | Prevailing horizontal visibility (see Note 7)               | m                  | -1    | 0                  | 10                      | m                  | -1    | 4                             |
| 0                  | 20 | 061 | Runway visual range (RVR)                                   | m                  | 0     | 0                  | 12                      | m                  | 0     | 4                             |
| 0                  | 20 | 062 | State of the ground (with or without snow)                  | Code table         | 0     | 0                  | 5                       | Code table         | 0     | 2                             |
| 0                  | 20 | 063 | Special phenomena   | Code table         | 0     | 0                  | 10                      | Code table         | 0     | 4                             |
| 0                  | 20 | 065 | Snow cover (see note 4)                                     | %                  | 0     | 0                  | 7                       | %                  | 0     | 3                             |
| 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 | 070 | Minimum number of atmospherics                              | Numeric            | 0     | 0                  | 7                       | Numeric            | 0     | 3                             |
| 0                  | 20 | 071 | Accuracy of fix and rate of atmospherics                    | Code table         | 0     | 0                  | 4                       | Code table         | 0     | 2                             |
| 0                  | 20 | 081 | Cloud amount in segment                                     | %                  | 0     | 0                  | 7                       | %                  | 0     | 3                             |
| 0                  | 20 | 082 | Amount segment cloud free                                   | %                  | 0     | 0                  | 7                       | %                  | 0     | 3                             |
| 0                  | 20 | 083 | Amount of segment covered by scene                          | %                  | 0     | 0                  | 7                       | %                  | 0     | 3                             |
| 0                  | 20 | 085 | General condition of runway                                 | Code table         | 0     | 0                  | 4                       | Code table         | 0     | 1                             |
| 0                  | 20 | 086 | Runway deposits   | Code table         | 0     | 0                  | 4                       | Code table         | 0     | 1                             |
| 0                  | 20 | 087 | Runway contamination  | Code table         | 0     | 0                  | 4                       | Code table         | 0     | 1                             |
| 0                  | 20 | 088 | Depth of runway deposits                                    | m                  | 3     | 0                  | 12                      | m                  | 0     | 4                             |
| 0                  | 20 | 089 | Runway friction coefficient                                 | Code table         | 0     | 0                  | 7                       | Code table         | 0     | 2                             |
| 0                  | 20 | 090 | Special clouds  | Code table         | 0     | 0                  | 4                       | Code table         | 0     | 2                             |
| 0                  | 20 | 091 | Vertical visibility   | Foot               | -2    | 0                  | 10                      | Foot               | -2    | 3                             |



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|   |    |     |   |            |    |       |    |            |    |   |
|---|----|-----|---|------------|----|-------|----|------------|----|---|
| 0 | 20 | 092 | Height of base of cloud   | Foot       | -2 | 0     | 10 | Foot       | -2 | 3 |
| 0 | 20 | 095 | Ice probability   | Numeric    | 3  | 0     | 10 | Numeric    | 3  | 4 |
| 0 | 20 | 096 | Ice age ("A" parameter)   | dB         | 2  | -4096 | 13 | dB         | 2  | 4 |
| 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 |

### Notes:

- (1) When encoding present weather reported from an automatic weather station, the appropriate combination of descriptors 0-20-021, 0-20-022, 0-20-023, 0-20-024, 0-20-025, 0-20-026 and 0-20-027 should be used and preferred. A descriptor 0-20-003 should be used only when descriptors mentioned above are not applicable.
- (2) When encoding past weather reported from an automatic weather station, the appropriate combination of descriptors 0-20-021, 0-20-022, 0-20-023, 0-20-024, 0-20-025, 0-20-026 and 0-20-027 should be used and preferred. Descriptors 0-20-004 or 0-20-005 should be used only when descriptors mentioned above are not applicable.
- (3) The data width for descriptor 0 20 038 originally defined to be 12 is wrong. 9 bits are sufficient as for all the other “degree true” quantities. However, the 12-bit width is maintained for historical consistency. Also: A bearing of ice edge value 0 shall indicate “Ship in shore or flaw lead”.
- (4) Snow cover will be reported for each satellite pixel as a percentage of coverage of the pixel. It does not seem feasible to try to use existing descriptor 0 20 062 for such a purpose because the use of that descriptor additionally implies details on, e.g. snow drifts, wet compared to dry snow, etc. that a satellite obviously cannot accurately detect.
- (5) A cloud cover (total) value 113 shall indicate “Sky obscured by fog and/or other meteorological phenomena.
- (6) When encoding height of cloud base between 20050 and 21000 m, 0 20 013 shall be set to 20050; when encoding height of cloud base above 21000 m, 0 20 013 shall be set to 20060.
- (7) A prevailing visibility value of 10000 m before scaling (after scaling 1000) shall be used to report prevailing visibility 10 km or more.

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## Class 21 - Radar data

| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME                      | BUFR               |       |                    |                         | CREX               |       |                               |
|--------------------|----|-----|--|--------------------|-------|--------------------|-------------------------|--------------------|-------|-------------------------------|
| F                  | X  | Y   |  | UNIT               | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT               | SCALE | DATA<br>WIDTH<br>(Characters) |
| 0                  | 21 | 001 | Horizontal reflectivity                    | dB                 | 0     | −64                | 7                       | dB                 | 0     | 3                             |
| 0                  | 21 | 002 | Vertical reflectivity                      | dB                 | 0     | −64                | 7                       | dB                 | 0     | 3                             |
| 0                  | 21 | 003 | Differential reflectivity                  | dB                 | 1     | −5                 | 7                       | dB                 | 1     | 3                             |
| 0                  | 21 | 005 | Linear depolarisation ratio                | dB                 | 0     | −65                | 6                       | dB                 | 0     | 2                             |
| 0                  | 21 | 006 | Circular depolarisation ratio              | dB                 | 0     | −65                | 6                       | dB                 | 0     | 2                             |
| 0                  | 21 | 011 | Doppler mean velocity in X-direction       | m s <sup>−1</sup>  | 0     | −128               | 8                       | m s <sup>−1</sup>  | 0     | 3                             |
| 0                  | 21 | 012 | Doppler mean velocity in Y-direction       | m s <sup>−1</sup>  | 0     | −128               | 8                       | m s <sup>−1</sup>  | 0     | 3                             |
| 0                  | 21 | 013 | Doppler mean velocity in Z-direction       | m s <sup>−1</sup>  | 0     | −128               | 8                       | m s <sup>−1</sup>  | 0     | 3                             |
| 0                  | 21 | 014 | Doppler mean velocity (radial)             | m s <sup>−1</sup>  | 1     | −4096              | 13                      | m s <sup>−1</sup>  | 1     | 4                             |
| 0                  | 21 | 017 | Doppler velocity spectral width            | m s <sup>−1</sup>  | 1     | 0                  | 8                       | m s <sup>−1</sup>  | 1     | 3                             |
| 0                  | 21 | 021 | Echo tops                                  | m                  | −3    | 0                  | 4                       | m                  | −3    | 2                             |
| 0                  | 21 | 030 | Signal to noise ratio                      | dB                 | 0     | −32                | 8                       | dB                 | 0     | 3                             |
| 0                  | 21 | 031 | Vertically integrated liquid-water content | kg m <sup>−2</sup> | 0     | 0                  | 7                       | kg m <sup>−2</sup> | 0     | 3                             |
| 0                  | 21 | 036 | Radar rainfall intensity                   | m s <sup>−1</sup>  | 7     | 0                  | 12                      | m s <sup>−1</sup>  | 7     | 4                             |
| 0                  | 21 | 041 | Bright-band height                         | m                  | −2    | 0                  | 8                       | m                  | −2    | 3                             |
| 0                  | 21 | 051 | Signal power above 1 mW                    | dB                 | 0     | −256               | 8                       | dB                 | 0     | 3                             |
| 0                  | 21 | 062 | Backscatter                                | dB                 | 2     | −5000              | 13                      | dB                 | 2     | 4                             |
| 0                  | 21 | 063 | Radiometric resolution (noise value)       | %                  | 1     | 0                  | 10                      | %                  | 1     | 4                             |
| 0                  | 21 | 064 | Clutter noise estimate                     | Numeric            | 0     | 0                  | 8                       | Numeric            | 0     | 3                             |
| 0                  | 21 | 065 | Missing packet counter                     | Numeric            | 0     | −127               | 8                       | Numeric            | 0     | 3                             |
| 0                  | 21 | 066 | Wave scatterometer product confidence data | Flag table         | 0     | 0                  | 12                      | Flag table         | 0     | 4                             |
| 0                  | 21 | 067 | Wind product confidence data               | Flag table         | 0     | 0                  | 13                      | Flag table         | 0     | 5                             |
| 0                  | 21 | 068 | Radar altimeter product confidence data    | Flag table         | 0     | 0                  | 8                       | Flag table         | 0     | 3                             |
| 0                  | 21 | 069 | SST product confidence data                | Flag table         | 0     | 0                  | 10                      | Flag table         | 0     | 4                             |
| 0                  | 21 | 070 | SST product confidence data (SADIST-2)     | Flag table         | 0     | 0                  | 23                      | Flag table         | 0     | 6                             |
| 0                  | 21 | 071 | Peakiness                                  | Numeric            | 0     | 0                  | 16                      | Numeric            | 0     | 5                             |
| 0                  | 21 | 072 | Satellite altimeter calibration status     | Flag table         | 0     | 0                  | 4                       | Flag table         | 0     | 2                             |
| 0                  | 21 | 073 | Satellite altimeter instrument mode        | Flag table         | 0     | 0                  | 9                       | Flag table         | 0     | 3                             |
| 0                  | 21 | 075 | Image spectrum intensity                   | Numeric            | 0     | 0                  | 8                       | Numeric            | 0     | 3                             |
| 0                  | 21 | 076 | Representation of intensities              | Code table         | 0     | 0                  | 3                       | Code table         | 0     | 1                             |
| 0                  | 21 | 077 | Altitude correction (ionosphere)           | m                  | 3     | 0                  | 14                      | m                  | 3     | 5                             |
| 0                  | 21 | 078 | Altitude correction (dry troposphere)      | m                  | 3     | 0                  | 9                       | m                  | 3     | 3                             |

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| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME   | BUFR       |       |                    |                         | CREX       |       |                               |
|--------------------|----|-----|---|------------|-------|--------------------|-------------------------|------------|-------|-------------------------------|
|                    |    |     |   | UNIT       | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT       | SCALE | DATA<br>WIDTH<br>(Characters) |
| F                  | X  | Y   |   |            |       |                    |                         |            |       |                               |
| 0                  | 21 | 079 | Altitude correction (wet troposphere)   | m          | 3     | 2000               | 10                      | m          | 3     | 4                             |
| 0                  | 21 | 080 | Altitude correction (calibration constant)                                    | m          | 3     | 0                  | 11                      | m          | 3     | 4                             |
| 0                  | 21 | 081 | Open loop correction (height-time loop)                                       | m          | 3     | 0                  | 10                      | m          | 3     | 4                             |
| 0                  | 21 | 082 | Open loop correction (auto gain control)                                      | dB         | 3     | -3000              | 14                      | dB         | 3     | 5                             |
| 0                  | 21 | 083 | Warm target calibration   | Numeric    | 0     | 0                  | 16                      | Numeric    | 0     | 5                             |
| 0                  | 21 | 084 | Cold target calibration   | Numeric    | 0     | 0                  | 16                      | Numeric    | 0     | 5                             |
| 0                  | 21 | 085 | ATSR sea surface temperature across- track band number                        | Numeric    | 0     | 0                  | 4                       | Numeric    | 0     | 2                             |
| 0                  | 21 | 086 | Number of pixels in Nadir only, average                                       | Numeric    | 0     | 0                  | 9                       | Numeric    | 0     | 3                             |
| 0                  | 21 | 087 | Number of pixels in dual view, average  | Numeric    | 0     | 0                  | 9                       | Numeric    | 0     | 3                             |
| 0                  | 21 | 088 | Wet backscatter   | dB         | 2     | -5000              | 13                      | dB         | 2     | 4                             |
| 0                  | 21 | 091 | Radar signal Doppler spectrum 0 <sup>th</sup> moment                          | dB         | 0     | -100               | 8                       | dB         | 0     | 3                             |
| 0                  | 21 | 092 | RASS signal Doppler spectrum 0 <sup>th</sup> moment, referring to RASS signal | dB         | 0     | -100               | 8                       | dB         | 0     | 3                             |
| 0                  | 21 | 093 | Ku band peakiness   | Numeric    | 3     | 0                  | 16                      | Numeric    | 3     | 5                             |
| 0                  | 21 | 094 | S band peakiness  | Numeric    | 3     | 0                  | 16                      | Numeric    | 3     | 5                             |
| 0                  | 21 | 101 | Number of vector ambiguities  | Numeric    | 0     | 0                  | 3                       | Numeric    | 0     | 1                             |
| 0                  | 21 | 102 | Index of selected wind vector   | Numeric    | 0     | 0                  | 3                       | Numeric    | 0     | 1                             |
| 0                  | 21 | 103 | Total number of sigma-0 measurements  | Numeric    | 0     | 0                  | 5                       | Numeric    | 0     | 2                             |
| 0                  | 21 | 104 | Likelihood computed for solution  | Numeric    | 3     | -30000             | 15                      | Numeric    | 3     | 5                             |
| 0                  | 21 | 105 | Normalized radar cross-section  | dB         | 2     | -10000             | 14                      | dB         | 2     | 5                             |
| 0                  | 21 | 106 | Kp variance coefficient (Alpha)   | Numeric    | 3     | 0                  | 14                      | Numeric    | 3     | 5                             |
| 0                  | 21 | 107 | Kp variance coefficient (Beta)  | Numeric    | 8     | 0                  | 16                      | Numeric    | 8     | 5                             |
| 0                  | 21 | 109 | SEAWINDS wind vector cell quality   | Flag table | 0     | 0                  | 17                      | Flag table | 0     | 6                             |
| 0                  | 21 | 110 | Number of inner-beam Sigma-0 (forward of satellite)                           | Numeric    | 0     | 0                  | 6                       | Numeric    | 0     | 2                             |
| 0                  | 21 | 111 | Number of outer-beam Sigma-0 (forward of satellite)                           | Numeric    | 0     | 0                  | 6                       | Numeric    | 0     | 2                             |
| 0                  | 21 | 112 | Number of inner-beam Sigma-0 (aft of satellite)                               | Numeric    | 0     | 0                  | 6                       | Numeric    | 0     | 2                             |
| 0                  | 21 | 113 | Number of outer-beam Sigma-0 (aft of satellite)                               | Numeric    | 0     | 0                  | 6                       | Numeric    | 0     | 2                             |
| 0                  | 21 | 114 | Kp variance coefficient (Gamma)   | dB         | 3     | -140000            | 18                      | dB         | 3     | 6                             |
| 0                  | 21 | 115 | SEAWINDS sigma-0 quality  | Flag table | 0     | 0                  | 17                      | Flag table | 0     | 6                             |
| 0                  | 21 | 116 | SEAWINDS sigma-0 mode   | Flag table | 0     | 0                  | 17                      | Flag table | 0     | 6                             |
| 0                  | 21 | 117 | Sigma-0 variance quality control  | Numeric    | 2     | 0                  | 16                      | Numeric    | 2     | 5                             |
| 0                  | 21 | 118 | Attenuation correction on sigma-0   | dB         | 2     | -10000             | 14                      | dB         | 2     | 5                             |
| 0                  | 21 | 119 | Wind scatterometer geophysical model function                                 | Code table | 0     | 0                  | 6                       | Code table | 0     | 2                             |
| 0                  | 21 | 120 | Probability of rain   | Numeric    | 3     | 0                  | 10                      | Numeric    | 3     | 4                             |

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|   |    |     |  |                      |    |             |    |                      |    |    |
|---|----|-----|--|----------------------|----|-------------|----|----------------------|----|----|
| 0 | 21 | 121 | SEAWINDS NOF* rain index   | Numeric              | 0  | 0           | 8  | Numeric              | 0  | 3  |
| 0 | 21 | 122 | Attenuation correction of sigma-0 (from tB)                          | dB                   | 2  | -10000      | 14 | dB                   | 2  | 5  |
| 0 | 21 | 123 | SEAWINDS normalized radar cross section                              | dB                   | 2  | -30000      | 15 | dB                   | 2  | 5  |
| 0 | 21 | 128 | Number of valid points per second used to derive previous parameters | Numeric              | 0  | 0           | 8  | Numeric              | 0  | 3  |
| 0 | 21 | 130 | Spectrum total energy  | Numeric              | 6  | 0           | 28 | Numeric              | 6  | 9  |
| 0 | 21 | 131 | Spectrum max energy  | Numeric              | 6  | 0           | 28 | Numeric              | 6  | 9  |
| 0 | 21 | 132 | Direction of spectrum max on higher resolution grid                  | Degree               | 3  | 0           | 19 | Degree               | 3  | 6  |
| 0 | 21 | 133 | Wave-length of spectrum max on higher resolution grid                | m                    | 3  | 0           | 29 | m                    | 3  | 9  |
| 0 | 21 | 134 | Range resolution of cress covariance spectrum                        | Rad m <sup>-1</sup>  | 3  | 0           | 19 | Rad m <sup>-1</sup>  | 3  | 6  |
| 0 | 21 | 135 | Real part of cross spectra polar grid number of bins                 | Numeric              | 3  | -524288     | 20 | Numeric              | 3  | 7  |
| 0 | 21 | 136 | Imaginary part of cross spectra polar grid number of bins            | Numeric              | 3  | -524288     | 20 | Numeric              | 3  | 7  |
| 0 | 21 | 137 | KU band corrected ocean backscatter coefficient                      | dB                   | 2  | -32768      | 16 | dB                   | 2  | 5  |
| 0 | 21 | 138 | Std KU band corrected ocean backscatter coefficient                  | dB                   | 2  | -32768      | 16 | dB                   | 2  | 5  |
| 0 | 21 | 139 | KU band net instrumental correction for ACG                          | dB                   | 2  | -2048       | 12 | dB                   | 2  | 4  |
| 0 | 21 | 140 | S band corrected ocean backscatter coefficient                       | dB                   | 2  | -32768      | 16 | dB                   | 2  | 5  |
| 0 | 21 | 141 | Std S band corrected ocean backscatter coefficient                   | dB                   | 2  | -32768      | 16 | dB                   | 2  | 5  |
| 0 | 21 | 142 | S band net instrumental correction for ACG                           | dB                   | 2  | -1024       | 11 | dB                   | 2  | 4  |
| 0 | 21 | 143 | KU band rain attenuation   | dB                   | 2  | -1073741824 | 31 | dB                   | 2  | 10 |
| 0 | 21 | 144 | Altimeter rain flag  | Flag table           | 0  | 0           | 2  | Flag table           | 0  | 1  |
| 0 | 21 | 145 | Ku band automatic gain control                                       | dB                   | 2  | 0           | 13 | dB                   | 2  | 4  |
| 0 | 21 | 146 | RMS Ku band automatic gain control                                   | dB                   | 2  | 0           | 8  | dB                   | 2  | 3  |
| 0 | 21 | 147 | Number of valid points for Ku band automatic gain control            | Numeric              | 0  | 0           | 5  | Numeric              | 0  | 2  |
| 0 | 21 | 150 | Beam collocation   | Code table           | 0  | 0           | 2  | Code table           | 0  | 1  |
| 0 | 21 | 151 | Estimated error in sigma-0 at 40 deg. incidence angle                | dB                   | 2  | 0           | 9  | dB                   | 2  | 3  |
| 0 | 21 | 152 | Slope at 40 deg. incidence angle                                     | dB Deg <sup>-1</sup> | 2  | -80         | 7  | dB Deg <sup>-1</sup> | 2  | 2  |
| 0 | 21 | 153 | Estimated error in slope at 40 deg. incidence angle                  | dB Deg <sup>-1</sup> | 2  | -40         | 6  | dB Deg <sup>-1</sup> | 2  | 2  |
| 0 | 21 | 154 | Soil moisture sensitivity  | dB                   | 2  | 0           | 12 | dB                   | 2  | 4  |
| 0 | 21 | 155 | Wind vector cell quality   | Flag table           | 0  | 0           | 24 | Flag table           | 0  | 8  |
| 0 | 21 | 156 | Backscatter distance   | Numeric              | 1  | -4096       | 13 | Numeric              | 1  | 4  |
| 0 | 21 | 157 | Loss per unit length of atmosphere used                              | dB m <sup>-1</sup>   | 10 | 0           | 22 | dB m <sup>-1</sup>   | 10 | 7  |
| 0 | 21 | 158 | ASCAT kp estimate quality  | Code table           | 0  | 0           | 2  | Code table           | 0  | 1  |
| 0 | 21 | 159 | ASCAT sigma-0 usability  | Code table           | 0  | 0           | 2  | Code table           | 0  | 1  |
| 0 | 21 | 160 | ASCAT use of synthetic data  | Numeric              | 3  | 0           | 10 | Numeric              | 3  | 4  |

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|   |    |     |  |            |   |        |    |            |   |   |
|---|----|-----|--|------------|---|--------|----|------------|---|---|
| 0 | 21 | 161 | ASCAT synthetic data quality                             | Numeric    | 3 | 0      | 10 | Numeric    | 3 | 4 |
| 0 | 21 | 162 | ASCAT satellite orbit and attitude quality               | Numeric    | 3 | 0      | 10 | Numeric    | 3 | 4 |
| 0 | 21 | 163 | ASCAT solar array reflection contamination               | Numeric    | 3 | 0      | 10 | Numeric    | 3 | 4 |
| 0 | 21 | 164 | ASCAT telemetry presence and quality                     | Numeric    | 3 | 0      | 10 | Numeric    | 3 | 4 |
| 0 | 21 | 165 | ASCAT extrapolated reference function presence           | Numeric    | 3 | 0      | 10 | Numeric    | 3 | 4 |
| 0 | 21 | 166 | ASCAT land fraction                                      | Numeric    | 3 | 0      | 10 | Numeric    | 3 | 4 |
| 0 | 21 | 169 | Ice presence indicator                                   | Code table | 0 | 0      | 2  | Code table | 0 | 1 |
| 0 | 21 | 170 | C band corrected ocean backscatter coefficient           | dB         | 2 | -32768 | 16 | dB         | 2 | 5 |
| 0 | 21 | 171 | RMS C band corrected ocean backscatter coefficient       | dB         | 2 | -32768 | 16 | dB         | 2 | 5 |
| 0 | 21 | 172 | C band net instrumental correction for AGC               | dB         | 2 | -2048  | 12 | dB         | 2 | 4 |
| 0 | 21 | 173 | C band automatic gain control                            | dB         | 2 | 0      | 13 | dB         | 2 | 4 |
| 0 | 21 | 174 | RMS C band automatic gain control                        | dB         | 2 | 0      | 9  | dB         | 2 | 3 |
| 0 | 21 | 175 | Number of valid points for C band automatic gain control | Numeric    | 0 | 0      | 10 | Numeric    | 0 | 4 |

Note: NOF = Normalized Objective Function

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## Class 22 - Oceanographic elements

| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME  | BUFR              |       |                    |                         | CREX              |       |                               |
|--------------------|----|-----|--|-------------------|-------|--------------------|-------------------------|-------------------|-------|-------------------------------|
| F                  | X  | Y   |  | UNIT              | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNITS             | SCALE | DATA<br>WIDTH<br>(Characters) |
| 0                  | 22 | 001 | Direction of waves   | Degree true       | 0     | 0                  | 9                       | Degree true       | 0     | 3                             |
| 0                  | 22 | 002 | Direction of wind waves  | Degree true       | 0     | 0                  | 9                       | Degree true       | 0     | 3                             |
| 0                  | 22 | 003 | Direction of swell waves   | Degree true       | 0     | 0                  | 9                       | Degree true       | 0     | 3                             |
| 0                  | 22 | 004 | Direction of current (see Note 7)                                      | Degree true       | 0     | 0                  | 9                       | Degree true       | 0     | 3                             |
| 0                  | 22 | 005 | Direction of sea surface current                                       | Degree true       | 0     | 0                  | 9                       | Degree true       | 0     | 3                             |
| 0                  | 22 | 011 | Period of waves  | s                 | 0     | 0                  | 6                       | s                 | 0     | 2                             |
| 0                  | 22 | 012 | Period of wind waves   | s                 | 0     | 0                  | 6                       | s                 | 0     | 2                             |
| 0                  | 22 | 013 | Period of swell waves  | s                 | 0     | 0                  | 6                       | s                 | 0     | 2                             |
| 0                  | 22 | 021 | Height of waves  | m                 | 1     | 0                  | 10                      | m                 | 1     | 4                             |
| 0                  | 22 | 022 | Height of wind waves   | m                 | 1     | 0                  | 10                      | m                 | 1     | 4                             |
| 0                  | 22 | 023 | Height of swell waves  | m                 | 1     | 0                  | 10                      | m                 | 1     | 4                             |
| 0                  | 22 | 025 | Standard deviation wave height   | m                 | 2     | 0                  | 10                      | m                 | 2     | 4                             |
| 0                  | 22 | 026 | Standard deviation of significant wave height                          | m                 | 2     | 0                  | 10                      | m                 | 2     | 4                             |
| 0                  | 22 | 031 | Speed of current   | m s <sup>-1</sup> | 2     | 0                  | 13                      | m s <sup>-1</sup> | 2     | 4                             |
| 0                  | 22 | 032 | Speed of sea surface current   | m s <sup>-1</sup> | 2     | 0                  | 13                      | m s <sup>-1</sup> | 2     | 4                             |
| 0                  | 22 | 035 | Tidal elevation with respect to local chart datum                      | m                 | 2     | 0                  | 14                      | m                 | 2     | 4                             |
| 0                  | 22 | 036 | Meteorological residual tidal elevation (surge or offset)              | m                 | 2     | 0                  | 14                      | m                 | 2     | 4                             |
| 0                  | 22 | 037 | Tidal elevation with respect to national land datum                    | m                 | 3     | -10000             | 15                      | m                 | 3     | 5                             |
| 0                  | 22 | 038 | Tidal elevation with respect to local chart datum                      | m                 | 3     | -10000             | 15                      | m                 | 3     | 5                             |
| 0                  | 22 | 039 | Meteorological residual tidal elevation (surge or offset) (see Note 4) | m                 | 3     | -5000              | 13                      | m                 | 3     | 4                             |
| 0                  | 22 | 040 | Meteorological residual tidal elevation (surge or offset)              | m                 | 3     | -5000              | 14                      | m                 | 3     | 5                             |
| 0                  | 22 | 041 | Sea-surface temperature (15-day running mean)                          | K                 | 1     | 0                  | 12                      | K                 | 1     | 4                             |
| 0                  | 22 | 042 | Sea/water temperature  | K                 | 1     | 0                  | 12                      | K                 | 1     | 4                             |
| 0                  | 22 | 043 | Sea/water temperature  | K                 | 2     | 0                  | 15                      | K                 | 2     | 5                             |
| 0                  | 22 | 044 | Sound velocity   | m s <sup>-1</sup> | 1     | 0                  | 14                      | m s <sup>-1</sup> | 1     | 5                             |
| 0                  | 22 | 045 | Sea/water temperature  | K                 | 3     | 0                  | 19                      | K                 | 3     | 6                             |
| 0                  | 22 | 046 | Sea Ice Fraction   | Numeric           | 2     | 0                  | 7                       | Numeric           | 2     | 3                             |
| 0                  | 22 | 049 | Sea surface temperature  | K                 | 2     | 0                  | 15                      | K                 | 2     | 5                             |
| 0                  | 22 | 050 | Standard deviation sea-surface temperature                             | K                 | 2     | 0                  | 8                       | K                 | 2     | 3                             |
| 0                  | 22 | 055 | Float cycle number   | Numeric           | 0     | 0                  | 10                      | Numeric           | 0     | 3                             |
| 0                  | 22 | 056 | Direction of profile   | Code table        | 0     | 0                  | 2                       | Code table        | 0     | 1                             |
| 0                  | 22 | 059 | Sea surface salinity   | Part per          | 2     | 0                  | 14                      | Part per thousand | 2     | 5                             |

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| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME   | BUFR                            |       |                    |                         | CREX                            |       |                               |
|--------------------|----|-----|---|---------------------------------|-------|--------------------|-------------------------|---------------------------------|-------|-------------------------------|
| F                  | X  | Y   |   | UNIT                            | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNITS                           | SCALE | DATA<br>WIDTH<br>(Characters) |
|                    |    |     |   | thousand                        |       |                    |                         |                                 |       |                               |
| 0                  | 22 | 060 | Lagrangian drifter drogue status                                  | Code table                      | 0     | 0                  | 3                       | Code table                      | 0     | 1                             |
| 0                  | 22 | 061 | State of the sea  | Code table                      | 0     | 0                  | 4                       | Code table                      | 0     | 2                             |
| 0                  | 22 | 062 | Salinity  | Part per<br>thousand            | 2     | 0                  | 14                      | Part per thousand               | 2     | 5                             |
| 0                  | 22 | 063 | Total water depth   | m                               | 0     | 0                  | 14                      | m                               | 0     | 5                             |
| 0                  | 22 | 064 | Salinity  | Part per<br>thousand            | 3     | 0                  | 17                      | Part per thousand               | 3     | 6                             |
| 0                  | 22 | 065 | Water pressure  | Pa                              | -3    | 0                  | 17                      | Pa                              | -3    | 6                             |
| 0                  | 22 | 066 | Water conductivity  | s m <sup>-1</sup>               | 6     | 0                  | 26                      | S m <sup>-1</sup>               | 6     | 8                             |
| 0                  | 22 | 067 | Instrument type for water temperature profile<br>measurement      | Code table                      | 0     | 0                  | 10                      | Code table                      | 0     | 4                             |
| 0                  | 22 | 068 | Water temperature profile recorder types                          | Code table                      | 0     | 0                  | 7                       | Code table                      | 0     | 3                             |
| 0                  | 22 | 069 | Spectral wave density   | m <sup>2</sup> Hz <sup>-1</sup> | 3     | 0                  | 22                      | m <sup>2</sup> Hz <sup>-1</sup> | 3     | 7                             |
| 0                  | 22 | 070 | Significant wave height   | m                               | 2     | 0                  | 13                      | m                               | 2     | 4                             |
| 0                  | 22 | 071 | Spectral peak wave period   | s                               | 1     | 0                  | 9                       | s                               | 1     | 3                             |
| 0                  | 22 | 072 | Spectral peak wave length   | m                               | 0     | 0                  | 13                      | m                               | 0     | 4                             |
| 0                  | 22 | 073 | Maximum wave height   | m                               | 2     | 0                  | 13                      | m                               | 2     | 4                             |
| 0                  | 22 | 074 | Average wave period   | s                               | 1     | 0                  | 9                       | s                               | 1     | 3                             |
| 0                  | 22 | 075 | Average wave length   | m                               | 0     | 0                  | 13                      | m                               | 0     | 4                             |
| 0                  | 22 | 076 | Direction from which dominant waves are coming                    | Degree true                     | 0     | 0                  | 9                       | Degree true                     | 0     | 3                             |
| 0                  | 22 | 077 | Directional spread of dominant wave                               | Degree                          | 0     | 0                  | 9                       | Degree                          | 0     | 3                             |
| 0                  | 22 | 078 | Duration of wave record   | s                               | 0     | 0                  | 12                      | s                               | 0     | 4                             |
| 0                  | 22 | 079 | Length of wave record   | m                               | 0     | 0                  | 16                      | m                               | 0     | 5                             |
| 0                  | 22 | 080 | Waveband central frequency  | Hz                              | 3     | 0                  | 10                      | Hz                              | 3     | 4                             |
| 0                  | 22 | 081 | Waveband central wave number                                      | m <sup>-1</sup>                 | 5     | 0                  | 13                      | m <sup>-1</sup>                 | 5     | 4                             |
| 0                  | 22 | 082 | Maximum non-directional spectral wave density                     | m <sup>2</sup> s                | 2     | 0                  | 20                      | m <sup>2</sup> s                | 2     | 7                             |
| 0                  | 22 | 083 | Maximum non-directional spectral wave number                      | m <sup>3</sup>                  | 2     | 0                  | 20                      | m <sup>3</sup>                  | 2     | 7                             |
| 0                  | 22 | 084 | Band containing maximum non- directional<br>spectral wave density | Numeric                         | 0     | 0                  | 7                       | Numeric                         | 0     | 3                             |
| 0                  | 22 | 085 | Spectral wave density ratio                                       | Numeric                         | 0     | 0                  | 7                       | Numeric                         | 0     | 3                             |
| 0                  | 22 | 086 | Mean direction from which waves are coming                        | Degree true                     | 0     | 0                  | 9                       | Degree true                     | 0     | 3                             |
| 0                  | 22 | 087 | Principal direction from which waves are coming                   | Degree true                     | 0     | 0                  | 9                       | Degree true                     | 0     | 3                             |
| 0                  | 22 | 088 | First normalized polar coordinate from Fourier<br>coefficients    | Numeric                         | 2     | 0                  | 7                       | Numeric                         | 2     | 3                             |
| 0                  | 22 | 089 | Second normalized polar coordinate from Fourier<br>coefficients   | Numeric                         | 2     | 0                  | 7                       | Numeric                         | 2     | 3                             |
| 0                  | 22 | 090 | Non-directional spectral estimate by wave                         | m <sup>2</sup> s                | 2     | 0                  | 20                      | m <sup>2</sup> s                | 2     | 7                             |

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| TABLE REFERENCE |    |     | TABLE ELEMENT NAME  | BUFR                               |       |                 |                   | CREX                               |       |                         |
|-----------------|----|-----|---|------------------------------------|-------|-----------------|-------------------|------------------------------------|-------|-------------------------|
| F               | X  | Y   |   | UNIT                               | SCALE | REFERENCE VALUE | DATA WIDTH (Bits) | UNITS                              | SCALE | DATA WIDTH (Characters) |
|                 |    |     | frequency   |                                    |       |                 |                   |                                    |       |                         |
| 0               | 22 | 091 | Non-directional spectral estimate by wave number              | m <sup>3</sup>                     | 2     | 0               | 20                | m <sup>3</sup>                     | 2     | 7                       |
| 0               | 22 | 092 | Directional spectral estimate by wave frequency               | m <sup>2</sup> rad <sup>-1</sup> s | 2     | 0               | 20                | m <sup>2</sup> rad <sup>-1</sup> s | 2     | 7                       |
| 0               | 22 | 093 | Directional spectral estimate by wave number                  | m <sup>4</sup>                     | 2     | 0               | 20                | m <sup>4</sup>                     | 2     | 7                       |
| 0               | 22 | 094 | Total number of wave bands                                    | Numeric                            | 0     | 0               | 7                 | Numeric                            | 0     | 3                       |
| 0               | 22 | 095 | Directional spread of individual waves                        | Degree                             | 0     | 0               | 8                 | Degree                             | 0     | 3                       |
| 0               | 22 | 096 | Spectral band width   | s <sup>-1</sup>                    | 3     | 0               | 4                 | s <sup>-1</sup>                    | 3     | 2                       |
| 0               | 22 | 097 | Mean wavelength > 731 m of image spectrum at low wave numbers | m                                  | 0     | 0               | 14                | m                                  | 0     | 5                       |
| 0               | 22 | 098 | Wavelength spread (wavelength > 731 m) at low wave numbers    | m                                  | 0     | 0               | 14                | m                                  | 0     | 5                       |
| 0               | 22 | 099 | Mean direction at low wave numbers (wavelength > 731 m)       | Degree true                        | 0     | 0               | 9                 | Degree true                        | 0     | 3                       |
| 0               | 22 | 100 | Direction spread at low wave numbers(wavelength > 731 m)      | Degree                             | 0     | 0               | 9                 | Degree                             | 0     | 3                       |
| 0               | 22 | 101 | Total energy (wavelength > 731m) at low wave numbers          | Numeric                            | 0     | 0               | 31                | Numeric                            | 0     | 10                      |
| 0               | 22 | 120 | Tide station automated water level check                      | Code table                         | 0     | 0               | 5                 | Code table                         | 0     | 2                       |
| 0               | 22 | 121 | Tide station manual water level check                         | Code table                         | 0     | 0               | 5                 | Code table                         | 0     | 2                       |
| 0               | 22 | 122 | Tide station automated meteorological data check              | Code table                         | 0     | 0               | 5                 | Code table                         | 0     | 2                       |
| 0               | 22 | 123 | Tide station manual meteorological data check                 | Code table                         | 0     | 0               | 5                 | Code table                         | 0     | 2                       |
| 0               | 22 | 141 | Sea-surface temperature (15-day running mean)                 | K                                  | 2     | 0               | 15                | K                                  | 2     | 5                       |
| 0               | 22 | 150 | Number of 18 Hz valid points for KU band                      | Numeric                            | 0     | 0               | 10                | Numeric                            | 0     | 4                       |
| 0               | 22 | 151 | KU band ocean range   | m                                  | 3     | 0               | 31                | m                                  | 3     | 10                      |
| 0               | 22 | 152 | STD of 18 Hz KU band ocean range                              | m                                  | 3     | 0               | 16                | m                                  | 3     | 5                       |
| 0               | 22 | 153 | Number of 18 Hz valid points for S band                       | Numeric                            | 0     | 0               | 10                | Numeric                            | 0     | 4                       |
| 0               | 22 | 154 | S band ocean range  | m                                  | 3     | 0               | 31                | m                                  | 3     | 10                      |
| 0               | 22 | 155 | STD of 18 Hz S band ocean range                               | m                                  | 3     | 0               | 16                | m                                  | 3     | 5                       |
| 0               | 22 | 156 | KU band significant wave height                               | m                                  | 3     | 0               | 16                | m                                  | 3     | 5                       |
| 0               | 22 | 157 | STD 18Hz KU band significant wave height                      | m                                  | 3     | 0               | 16                | m                                  | 3     | 5                       |
| 0               | 22 | 158 | S band significant wave height                                | m                                  | 3     | 0               | 16                | m                                  | 3     | 5                       |
| 0               | 22 | 159 | STD 18Hz S band significant wave height                       | m                                  | 3     | 0               | 16                | m                                  | 3     | 5                       |
| 0               | 22 | 160 | Normalized inverse wave age                                   | Numeric                            | 6     | 0               | 21                | Numeric                            | 6     | 7                       |
| 0               | 22 | 161 | Wave spectra  | m <sup>4</sup>                     | 4     | 0               | 27                | m <sup>4</sup>                     | 4     | 9                       |
| 0               | 22 | 162 | RMS of 20 Hz Ku band ocean range                              | m                                  | 3     | 0               | 16                | m                                  | 3     | 5                       |
| 0               | 22 | 163 | Number of 20Hz valid points for Ku band                       | Numeric                            | 0     | 0               | 10                | Numeric                            | 0     | 4                       |
| 0               | 22 | 164 | RMS 20 Hz Ku band significant wave height                     | m                                  | 3     | 0               | 16                | m                                  | 3     | 5                       |
| 0               | 22 | 165 | Number of 20Hz valid points for Ku band                       | Numeric                            | 0     | 0               | 10                | Numeric                            | 0     | 4                       |



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| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME   | BUFR    |       |                    |                         | CREX    |       |                               |
|--------------------|----|-----|---|---------|-------|--------------------|-------------------------|---------|-------|-------------------------------|
| F                  | X  | Y   |   | UNIT    | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNITS   | SCALE | DATA<br>WIDTH<br>(Characters) |
|                    |    |     | significant wave height   |         |       |                    |                         |         |       |                               |
| 0                  | 22 | 166 | Ku band net instrumental correction for significant wave height | m       | 3     | -1000              | 11                      | m       | 3     | 4                             |
| 0                  | 22 | 167 | Number of valid points for Ku band backscatter                  | Numeric | 0     | 0                  | 10                      | Numeric | 0     | 4                             |
| 0                  | 22 | 168 | C band ocean range  | m       | 3     | 0                  | 31                      | m       | 3     | 10                            |
| 0                  | 22 | 169 | RMS of C band ocean range                                       | m       | 3     | 0                  | 16                      | m       | 3     | 5                             |
| 0                  | 22 | 170 | Number of 20Hz valid points for C band                          | Numeric | 0     | 0                  | 10                      | Numeric | 0     | 4                             |
| 0                  | 22 | 171 | C band significant wave height                                  | m       | 3     | 0                  | 16                      | m       | 3     | 5                             |
| 0                  | 22 | 172 | RMS 20Hz C band significant wave height                         | m       | 3     | 0                  | 16                      | m       | 3     | 5                             |
| 0                  | 22 | 173 | Number of 20Hz valid points for C band significant wave height  | Numeric | 0     | 0                  | 10                      | Numeric | 0     | 4                             |
| 0                  | 22 | 174 | C band net instrumental correction for significant wave height  | m       | 3     | -1000              | 11                      | m       | 3     | 4                             |
| 0                  | 22 | 175 | Number of valid points for C band backscatter                   | Numeric | 0     | 0                  | 10                      | Numeric | 0     | 4                             |

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Notes:

- (1) The significant wave height is defined as four times the square root of the energy spectrum integrated over direction and frequency. It corresponds to about the height that one-third of all waves exceed.
- (2) The dominant wave is the one that has the maximum energy in the energy spectrum.
- (3) Mean Wave Direction is the angle  $\alpha_1$  and Principal Wave Direction is the angle  $\alpha_2$ , in the expression  $S(f, \alpha)$  approximately equals:  

$$c_{11} \times (0.5 + r_1 \times \cos(\alpha - \alpha_1) + r_2 \times \cos(2(\alpha - \alpha_2))) / \pi$$
 in which  $S(f, \alpha)$  is the wave directional spectrum and  $c_{11}$  is the non directional spectrum, and the right hand side of this expression is the first two terms of the Fourier series expansion of  $S(f, \alpha)$ . If the mean and principal directions differ significantly (e.g, more than 15 degrees) for a given frequency, crossing seas are indicated.
- (4) Descriptor 0 22 040 should be used instead of 0 22 039 for encoding meteorological residual tidal elevation (surge or offset).
- (5) Additional information:  
 0 22 097 nominal input range 0 – 10000  
 0 22 098 nominal input range 0 – 10000  
 0 22 099 nominal input range 0 – 359  
 0 22 100 nominal input range 0 – 359  
 0 22 101 nominal input range 0 –  $2 \times 10^6$ , but may be greater because of uncertainty.
- (6) Descriptors 0 22 001, 0 22 002, 0 22 003: the direction given in these entries is the direction which waves are coming from.
- (7) Descriptor 0 22 004: the direction given in this entry is the direction towards which the current is flowing.
- (8) Wind waves and waves reporting standards
 

| <i>Observation</i>   | <i>Speed</i> | <i>Direction</i> |
|----------------------|--------------|------------------|
| No observation       | Missing      | Missing          |
| Calm                 | 0            | 0                |
| Normal observation   | >0           | 1-360            |
| Speed only           | >0           | Missing          |
| Direction only       | Missing      | 1-360            |
| "Light and variable" | >0           | 0                |

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## Class 23 - Dispersal and transport

| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME   | BUFR                           |       |                    |                         | CREX                           |       |                               |
|--------------------|----|-----|---|--------------------------------|-------|--------------------|-------------------------|--------------------------------|-------|-------------------------------|
| F                  | X  | Y   |   | UNIT                           | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNITS                          | SCALE | DATA<br>WIDTH<br>(Characters) |
| 0                  | 23 | 001 | Accident early notification — article applicable  | Code table                     | 0     | 0                  | 3                       | Code table                     | 0     | 1                             |
| 0                  | 23 | 002 | Activity or facility involved in incident   | Code table                     | 0     | 0                  | 5                       | Code table                     | 0     | 2                             |
| 0                  | 23 | 003 | Type of release   | Code table                     | 0     | 0                  | 3                       | Code table                     | 0     | 1                             |
| 0                  | 23 | 004 | Countermeasures taken near border   | Code table                     | 0     | 0                  | 3                       | Code table                     | 0     | 1                             |
| 0                  | 23 | 005 | Cause of incident   | Code table                     | 0     | 0                  | 2                       | Code table                     | 0     | 1                             |
| 0                  | 23 | 006 | Incident situation  | Code table                     | 0     | 0                  | 3                       | Code table                     | 0     | 1                             |
| 0                  | 23 | 007 | Characteristics of release  | Code table                     | 0     | 0                  | 3                       | Code table                     | 0     | 1                             |
| 0                  | 23 | 008 | State of current release  | Code table                     | 0     | 0                  | 2                       | Code table                     | 0     | 1                             |
| 0                  | 23 | 009 | State of expected release   | Code table                     | 0     | 0                  | 2                       | Code table                     | 0     | 1                             |
| 0                  | 23 | 016 | Possibility of significant chemical toxic health effect                                 | Code table                     | 0     | 0                  | 2                       | Code table                     | 0     | 1                             |
| 0                  | 23 | 017 | Flow discharge of major recipient   | m <sup>3</sup> s <sup>-1</sup> | 6     | 0                  | 20                      | m <sup>3</sup> s <sup>-1</sup> | 6     | 7                             |
| 0                  | 23 | 018 | Release behaviour over time   | Code table                     | 0     | 0                  | 3                       | Code table                     | 0     | 1                             |
| 0                  | 23 | 019 | Actual release height   | M                              | 0     | -15000             | 17                      | m                              | 0     | 6                             |
| 0                  | 23 | 021 | Effective release height  | M                              | 0     | -15000             | 17                      | m                              | 0     | 6                             |
| 0                  | 23 | 022 | Distance of release point or site of incident   | M                              | 0     | 0                  | 24                      | m                              | 0     | 8                             |
| 0                  | 23 | 023 | Main transport speed in the atmosphere  | m s <sup>-1</sup>              | 1     | 0                  | 12                      | m s <sup>-1</sup>              | 1     | 4                             |
| 0                  | 23 | 024 | Main transport speed in water   | m s <sup>-1</sup>              | 2     | 0                  | 13                      | m s <sup>-1</sup>              | 2     | 4                             |
| 0                  | 23 | 025 | Main transport speed in ground water  | m s <sup>-1</sup>              | 2     | 0                  | 13                      | m s <sup>-1</sup>              | 2     | 4                             |
| 0                  | 23 | 027 | Main transport direction in the atmosphere  | Degree true                    | 0     | 0                  | 9                       | Degree true                    | 0     | 3                             |
| 0                  | 23 | 028 | Main transport direction in water   | Degree true                    | 0     | 0                  | 9                       | Degree true                    | 0     | 3                             |
| 0                  | 23 | 029 | Main transport direction in ground water  | Degree true                    | 0     | 0                  | 9                       | Degree true                    | 0     | 3                             |
| 0                  | 23 | 031 | Possibility that plume will encounter precipitation in State in which incident occurred | Code table                     | 0     | 0                  | 2                       | Code table                     | 0     | 1                             |
| 0                  | 23 | 032 | Plume will encounter change in wind direction and/or speed flag                         | Code table                     | 0     | 0                  | 2                       | Code table                     | 0     | 1                             |

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### Class 24 - Radiological elements

| TABLE REFERENCE |    |     | TABLE ELEMENT NAME   | BUFR               |       |                 |                   | CREX               |       |                         |
|-----------------|----|-----|--|--------------------|-------|-----------------|-------------------|--------------------|-------|-------------------------|
| F               | X  | Y   |  | UNIT               | SCALE | REFERENCE VALUE | DATA WIDTH (Bits) | UNIT               | SCALE | DATA WIDTH (Characters) |
| 0               | 24 | 001 | Estimate of amount of radioactivity released up to specified time                  | Bq*                | -11   | 0               | 28                | Bq*                | -11   | 9                       |
| 0               | 24 | 002 | Estimated maximum potential release  | Bq                 | -11   | 0               | 28                | Bq                 | -11   | 9                       |
| 0               | 24 | 003 | Composition of release   | Code table         | 0     | 0               | 5                 | Code table         | 0     | 2                       |
| 0               | 24 | 004 | Element name   | CCITT IA5          | 0     | 0               | 16                | Character          | 0     | 2                       |
| 0               | 24 | 005 | Isotope mass   | Numeric            | 0     | 0               | 9                 | Numeric            | 0     | 3                       |
| 0               | 24 | 011 | Dose   | mSv**/**           | 2     | 0               | 32                | mSv**/**           | 2     | 10                      |
| 0               | 24 | 012 | Trajectory dose (defined location and expected time of arrival)                    | mSv                | 2     | 0               | 32                | mSv                | 2     | 10                      |
| 0               | 24 | 013 | Gamma dose in air along the main transport path (defined location and time period) | mSv                | 2     | 0               | 32                | mSv                | 2     | 10                      |
| 0               | 24 | 021 | Air concentration (of named isotope type including gross beta)                     | Bq m <sup>-3</sup> | 2     | 0               | 32                | Bq m <sup>-3</sup> | 2     | 10                      |
| 0               | 24 | 022 | Concentration in precipitation (of names isotope type)                             | Bq l <sup>-1</sup> | 2     | 0               | 32                | Bq l <sup>-1</sup> | 2     | 10                      |
| 0               | 24 | 023 | Pulse rate of beta radiation   | s <sup>-1</sup>    | 1     | 0               | 14                | s <sup>-1</sup>    | 1     | 4                       |
| 0               | 24 | 024 | Pulse rate of gamma radiation  | s <sup>-1</sup>    | 1     | 0               | 14                | s <sup>-1</sup>    | 1     | 4                       |

Note: Useful ranges used above:  
 10<sup>11</sup> Bq to 10<sup>19</sup> Bq for releases;  
 10<sup>-2</sup> Bq to 10<sup>7</sup> Bq and 10<sup>-2</sup> mSv to 10<sup>7</sup> mSv for concentration and doses.

|    |                           |                    |                             |                                  |
|----|---------------------------|--------------------|-----------------------------|----------------------------------|
| *  | New named unit and symbol | In other SI units  | Old special unit and symbol | Relationship, old to new units   |
|    | becquerel (Bq)            | s <sup>-1</sup>    | curie (Ci)                  | 1 Ci = 3.7 x 10 <sup>10</sup> Bq |
|    | sievert (Sv)              | J kg <sup>-1</sup> | rem (rem)                   | 1 rem = 0.01 Sv                  |
| ** | Millisievert              |                    |                             |                                  |

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## Class 25 - Processing information

| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME                      | BUFR               |       |                    |                         | CREX               |       |                               |
|--------------------|----|-----|--|--------------------|-------|--------------------|-------------------------|--------------------|-------|-------------------------------|
| F                  | X  | Y   |  | UNIT               | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT               | SCALE | DATA<br>WIDTH<br>(Characters) |
| 0                  | 25 | 001 | Range-gate length                          | m                  | -1    | 0                  | 6                       | m                  | -1    | 2                             |
| 0                  | 25 | 002 | Number of gates averaged                   | Numeric            | 0     | 0                  | 4                       | Numeric            | 0     | 2                             |
| 0                  | 25 | 003 | Number of integrated pulses                | Numeric            | 0     | 0                  | 8                       | Numeric            | 0     | 3                             |
| 0                  | 25 | 004 | Echo processing                            | Code<br>table      | 0     | 0                  | 2                       | Code table         | 0     | 1                             |
| 0                  | 25 | 005 | Echo integration                           | Code<br>table      | 0     | 0                  | 2                       | Code table         | 0     | 1                             |
| 0                  | 25 | 006 | Z to R conversion                          | Code<br>table      | 0     | 0                  | 3                       | Code table         | 0     | 1                             |
| 0                  | 25 | 007 | Z to R conversion factor                   | Numeric            | 0     | 0                  | 12                      | Numeric            | 0     | 4                             |
| 0                  | 25 | 008 | Z to R conversion exponent                 | Numeric            | 2     | 0                  | 9                       | Numeric            | 2     | 3                             |
| 0                  | 25 | 009 | Calibration method (see Note 3)            | Flag table         | 0     | 0                  | 4                       | Flag table         | 0     | 2                             |
| 0                  | 25 | 010 | Clutter treatment                          | Code<br>table      | 0     | 0                  | 4                       | Code table         | 0     | 2                             |
| 0                  | 25 | 011 | Ground occultation correction (screening)  | Code<br>table      | 0     | 0                  | 2                       | Code table         | 0     | 1                             |
| 0                  | 25 | 012 | Range attenuation correction               | Code<br>table      | 0     | 0                  | 2                       | Code table         | 0     | 1                             |
| 0                  | 25 | 013 | Bright-band correction                     | Flag table         | 0     | 0                  | 2                       | Flag table         | 0     | 1                             |
| 0                  | 25 | 014 | Azimuth clutter cut-off (see Note 1)       | Numeric            | 0     | 0                  | 12                      | Numeric            | 0     | 4                             |
| 0                  | 25 | 015 | Radome attenuation correction              | Flag table         | 0     | 0                  | 2                       | Flag table         | 0     | 1                             |
| 0                  | 25 | 016 | Clear-air attenuation correction           | dB m <sup>-1</sup> | 5     | 0                  | 6                       | dB m <sup>-1</sup> | 5     | 2                             |
| 0                  | 25 | 017 | Precipitation attenuation correction       | Flag table         | 0     | 0                  | 2                       | Flag table         | 0     | 1                             |
| 0                  | 25 | 018 | A to Z law for attenuation factor          | Numeric            | 7     | 0                  | 6                       | Numeric            | 7     | 2                             |
| 0                  | 25 | 019 | A to Z law for attenuation exponent        | Numeric            | 2     | 0                  | 7                       | Numeric            | 2     | 3                             |
| 0                  | 25 | 020 | Mean speed estimation                      | Code<br>table      | 0     | 0                  | 2                       | Code table         | 0     | 1                             |
| 0                  | 25 | 021 | Wind computation enhancement               | Flag table         | 0     | 0                  | 8                       | Flag table         | 0     | 3                             |
| 0                  | 25 | 022 | GHRSSST Rejection Flag                     | Flag table         | 0     | 0                  | 9                       | Flag table         | 0     | 3                             |
| 0                  | 25 | 023 | GHRSSST Confidence Flag                    | Flag table         | 0     | 0                  | 9                       | Flag table         | 0     | 3                             |
| 0                  | 25 | 024 | GHRSSST data quality                       | Code<br>table      | 0     | 0                  | 4                       | Code table         | 0     | 2                             |
| 0                  | 25 | 025 | Battery voltage                            | V                  | 1     | 0                  | 9                       | V                  | 1     | 3                             |
| 0                  | 25 | 026 | Battery voltage (large range)              | V                  | 1     | 0                  | 12                      | V                  | 1     | 4                             |
| 0                  | 25 | 028 | Operator or manufacturer defined parameter | Numeric            | 1     | -16384             | 15                      | Numeric            | 1     | 5                             |
| 0                  | 25 | 029 | Calibration method (see Note 3)            | Flag table         | 0     | 0                  | 6                       | Flag table         | 0     | 2                             |

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| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME                                   | BUFR         |       |                    |                         | CREX       |       |                               |
|--------------------|----|-----|---|--------------|-------|--------------------|-------------------------|------------|-------|-------------------------------|
| F                  | X  | Y   |   | UNIT         | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT       | SCALE | DATA<br>WIDTH<br>(Characters) |
| 0                  | 25 | 030 | Running mean sea-surface temperature usage              | Code table   | 0     | 0                  | 2                       | Code table | 0     | 1                             |
| 0                  | 25 | 032 | Wind profiler mode information (see Note 2)             | Code table   | 0     | 0                  | 2                       | Code table | 0     | 1                             |
| 0                  | 25 | 033 | Wind profiler submode information (see Note 2)          | Code table   | 0     | 0                  | 2                       | Code table | 0     | 1                             |
| 0                  | 25 | 034 | Wind profiler quality control test results (see Note 2) | Flag table   | 0     | 0                  | 4                       | Flag table | 0     | 2                             |
| 0                  | 25 | 036 | Atmospherics location method                            | Code table   | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 25 | 037 | SST bias  | K            | 2     | -127               | 8                       | K          | 2     | 3                             |
| 0                  | 25 | 038 | Difference between SST and analysis                     | K            | 1     | -127               | 8                       | K          | 1     | 3                             |
| 0                  | 25 | 040 | CO <sub>2</sub> wind product derivation                 | Code table   | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 25 | 041 | Moving platform direction reporting method              | Code table   | 0     | 0                  | 2                       | Code table | 0     | 1                             |
| 0                  | 25 | 042 | Moving platform speed reporting method                  | Code table   | 0     | 0                  | 2                       | Code table | 0     | 1                             |
| 0                  | 25 | 043 | Wave sampling interval (time)                           | s            | 4     | 0                  | 15                      | s          | 4     | 5                             |
| 0                  | 25 | 044 | Wave sampling interval (space)                          | m            | 2     | 0                  | 14                      | m          | 2     | 5                             |
| 0                  | 25 | 045 | HIRS channel combination                                | Flag table   | 0     | 0                  | 21                      | Flag table | 0     | 7                             |
| 0                  | 25 | 046 | MSU channel combination                                 | Flag table   | 0     | 0                  | 5                       | Flag table | 0     | 2                             |
| 0                  | 25 | 047 | SSU channel combination                                 | Flag table   | 0     | 0                  | 4                       | Flag table | 0     | 2                             |
| 0                  | 25 | 048 | AMSU-A channel combination                              | Flag table   | 0     | 0                  | 16                      | Flag table | 0     | 6                             |
| 0                  | 25 | 049 | AMSU-B channel combination                              | Flag table   | 0     | 0                  | 6                       | Flag table | 0     | 2                             |
| 0                  | 25 | 050 | Principal component score                               | Numeric      | 4     | -131072            | 18                      | Numeric    | 4     | 6                             |
| 0                  | 25 | 051 | AVHRR channel combination                               | Flag table   | 0     | 0                  | 7                       | Flag table | 0     | 3                             |
| 0                  | 25 | 052 | Log-10 of principal components normalized fit to data   | Numeric      | 4     | 0                  | 15                      | Numeric    | 4     | 5                             |
| 0                  | 25 | 053 | Observation quality                                     | Flag table   | 0     | 0                  | 12                      | Flag table | 0     | 4                             |
| 0                  | 25 | 054 | SSMIS Subframe ID number                                | Numeric      | 0     | 0                  | 5                       | Numeric    | 0     | 2                             |
| 0                  | 25 | 055 | Multiplexer housekeeping                                | K            | 2     | 0                  | 16                      | K          | 2     | 5                             |
| 0                  | 25 | 060 | Software identification (see Note 2)                    | Numeric      | 0     | 0                  | 14                      | Numeric    | 0     | 5                             |
| 0                  | 25 | 061 | Software identification and version number              | CCITT<br>IA5 | 0     | 0                  | 96                      | Character  | 0     | 12                            |
| 0                  | 25 | 062 | Database identification                                 | Numeric      | 0     | 0                  | 14                      | Numeric    | 0     | 5                             |
| 0                  | 25 | 065 | Orientation correction (azimuth)                        | Degree       | 2     | -1000              | 11                      | Degree     | 2     | 4                             |
| 0                  | 25 | 066 | Orientation correction (elevation)                      | Degree       | 2     | -1000              | 11                      | Degree     | 2     | 4                             |
| 0                  | 25 | 067 | Radiosonde release point pressure correction            | Pa           | 0     | -8000              | 14                      | Pa         | 0     | 4                             |

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| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME   | BUFR                |       |                    |                         | CREX                |       |                               |
|--------------------|----|-----|---|---------------------|-------|--------------------|-------------------------|---------------------|-------|-------------------------------|
| F                  | X  | Y   |   | UNIT                | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT                | SCALE | DATA<br>WIDTH<br>(Characters) |
| 0                  | 25 | 068 | Number of archive recomputes  | Numeric             | 0     | 0                  | 7                       | Numeric             | 0     | 3                             |
| 0                  | 25 | 069 | Flight level pressure corrections   | Flag table          | 0     | 0                  | 8                       | Flag table          | 0     | 3                             |
| 0                  | 25 | 070 | Major frame count   | Numeric             | 0     | 0                  | 4                       | Numeric             | 0     | 2                             |
| 0                  | 25 | 071 | Frame count   | Numeric             | 0     | 0                  | 5                       | Numeric             | 0     | 2                             |
| 0                  | 25 | 075 | Satellite antenna corrections version number                              | Numeric             | 0     | 0                  | 5                       | Numeric             | 0     | 2                             |
| 0                  | 25 | 076 | Log-10 of (Temperature-radiance central wavenumber) for ATOVS             | Log m <sup>-1</sup> | 8     | 0                  | 30                      | log m <sup>-1</sup> | 8     | 10                            |
| 0                  | 25 | 077 | Bandwidth correction coefficient 1 for ATOVS                              | Numeric             | 5     | -100000            | 18                      | Numeric             | 5     | 7                             |
| 0                  | 25 | 078 | Bandwidth correction coefficient 2 for ATOVS                              | Numeric             | 5     | 0                  | 17                      | Numeric             | 5     | 6                             |
| 0                  | 25 | 079 | Albedo-radiance solar filtered irradiance for ATOVS                       | W m <sup>-2</sup>   | 4     | 0                  | 24                      | W m <sup>-2</sup>   | 4     | 8                             |
| 0                  | 25 | 080 | Albedo-radiance equivalent filter width for ATOVS                         | m                   | 10    | 0                  | 14                      | m                   | 10    | 5                             |
| 0                  | 25 | 081 | Incidence angle   | Degree              | 3     | 0                  | 17                      | Degree              | 3     | 6                             |
| 0                  | 25 | 082 | Azimuth angle   | Degree              | 3     | 0                  | 19                      | Degree              | 3     | 6                             |
| 0                  | 25 | 083 | Faraday rotational angle  | Degree              | 3     | 0                  | 19                      | Degree              | 3     | 6                             |
| 0                  | 25 | 084 | Geometric rotational angle  | Degree              | 5     | 0                  | 26                      | Degree              | 5     | 8                             |
| 0                  | 25 | 085 | Fraction of clear pixels in HIRS FOV                                      | Numeric             | 0     | 0                  | 7                       | Numeric             | 0     | 3                             |
| 0                  | 25 | 086 | Depth correction indicator  | Code table          | 0     | 0                  | 2                       | Code table          | 0     | 1                             |
| 0                  | 25 | 090 | Orbit state flag  | Code table          | 0     | 0                  | 4                       | Code table          | 0     | 2                             |
| 0                  | 25 | 091 | Structure constant of the refraction index (C <sub>n</sub> <sup>2</sup> ) | dB                  | 3     | -18192             | 13                      | dB                  | 3     | 5                             |
| 0                  | 25 | 092 | Acoustic propagation velocity   | m s <sup>-1</sup>   | 2     | 28000              | 14                      | m s <sup>-1</sup>   | 2     | 5                             |
| 0                  | 25 | 093 | RASS computation correction   | Flag table          | 0     | 0                  | 8                       | Flag table          | 0     | 3                             |
| 0                  | 25 | 095 | Altimeter state flag  | Flag table          | 0     | 0                  | 2                       | Flag table          | 0     | 1                             |
| 0                  | 25 | 096 | Radiometer state flag   | Flag table          | 0     | 0                  | 5                       | Flag table          | 0     | 2                             |
| 0                  | 25 | 097 | Three dimensional error estimate of the navigator orbit                   | Code table          | 0     | 0                  | 4                       | Code table          | 0     | 2                             |
| 0                  | 25 | 098 | Altimeter data quality flag   | Flag table          | 0     | 0                  | 9                       | Flag table          | 0     | 3                             |
| 0                  | 25 | 099 | Altimeter correction quality flag   | Flag table          | 0     | 0                  | 9                       | Flag table          | 0     | 3                             |
| 0                  | 25 | 100 | XBT/XCTD fall rate equation coefficient a                                 | Numeric             | 5     | 0                  | 20                      | Numeric             | 5     | 6                             |
| 0                  | 25 | 101 | XBT/XCTD fall rate equation coefficient b                                 | Numeric             | 5     | -500000            | 21                      | Numeric             | 5     | 6                             |
| 0                  | 25 | 102 | Number of missing lines excluding data gaps                               | Numeric             | 0     | 0                  | 8                       | Numeric             | 0     | 3                             |
| 0                  | 25 | 103 | Number of directional bins  | Numeric             | 0     | 0                  | 8                       | Numeric             | 0     | 3                             |
| 0                  | 25 | 104 | Number of wave-length bins  | Numeric             | 0     | 0                  | 8                       | Numeric             | 0     | 3                             |
| 0                  | 25 | 105 | First directional bin   | Degree              | 3     | 0                  | 19                      | Degree              | 3     | 6                             |
| 0                  | 25 | 106 | Directional bin step  | Degree              | 3     | 0                  | 19                      | Degree              | 3     | 6                             |
| 0                  | 25 | 107 | First wave-length bin   | m                   | 3     | 0                  | 29                      | m                   | 3     | 9                             |
| 0                  | 25 | 108 | Last wave-length bin  | m                   | 3     | 0                  | 29                      | m                   | 3     | 9                             |

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| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME  | BUFR       |       |                    |                         | CREX       |       |                               |
|--------------------|----|-----|--|------------|-------|--------------------|-------------------------|------------|-------|-------------------------------|
| F                  | X  | Y   |  | UNIT       | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT       | SCALE | DATA<br>WIDTH<br>(Characters) |
| 0                  | 25 | 110 | Image processing summary   | Flag table | 0     | 0                  | 10                      | Flag table | 0     | 4                             |
| 0                  | 25 | 111 | Number of input data gaps  | Numeric    | 0     | 0                  | 8                       | Numeric    | 0     | 3                             |
| 0                  | 25 | 120 | RA2-L2-processing flag   | Code table | 0     | 0                  | 2                       | Code table | 0     | 1                             |
| 0                  | 25 | 121 | RA2-L2-processing quality  | %          | 0     | 0                  | 7                       | %          | 0     | 3                             |
| 0                  | 25 | 122 | Hardware configuration for RF                                      | Code table | 0     | 0                  | 2                       | Code table | 0     | 1                             |
| 0                  | 25 | 123 | Hardware configuration for HPA                                     | Code table | 0     | 0                  | 2                       | Code table | 0     | 1                             |
| 0                  | 25 | 124 | MWR L2 Processing flag   | Code table | 0     | 0                  | 2                       | Code table | 0     | 1                             |
| 0                  | 25 | 125 | MWR L2-processing quality  | %          | 0     | 0                  | 7                       | %          | 0     | 3                             |
| 0                  | 25 | 126 | Model dry tropospheric correction                                  | m          | 3     | -32768             | 16                      | m          | 3     | 5                             |
| 0                  | 25 | 127 | Inverted barometer correction                                      | m          | 3     | -32768             | 16                      | m          | 3     | 5                             |
| 0                  | 25 | 128 | Model wet tropospheric correction                                  | m          | 3     | -32768             | 16                      | m          | 3     | 5                             |
| 0                  | 25 | 129 | MWR derived wet tropospheric correction                            | m          | 3     | -32768             | 16                      | m          | 3     | 5                             |
| 0                  | 25 | 130 | RA2 ionospheric correction on KU band                              | m          | 3     | -32768             | 16                      | m          | 3     | 5                             |
| 0                  | 25 | 131 | Ionospheric correction from Doris on KU band                       | m          | 3     | -32768             | 16                      | m          | 3     | 5                             |
| 0                  | 25 | 132 | Ionospheric correction from model on KU band                       | m          | 3     | -32768             | 16                      | m          | 3     | 5                             |
| 0                  | 25 | 133 | Sea state bias correction on KU band                               | m          | 3     | -32768             | 16                      | m          | 3     | 5                             |
| 0                  | 25 | 134 | RA2 ionospheric correction on S band                               | m          | 3     | -32768             | 16                      | m          | 3     | 5                             |
| 0                  | 25 | 135 | Ionospheric correction from Doris on S band                        | m          | 3     | -32768             | 16                      | m          | 3     | 5                             |
| 0                  | 25 | 136 | Ionospheric correction from model on S band                        | m          | 3     | -32768             | 16                      | m          | 3     | 5                             |
| 0                  | 25 | 137 | Sea state bias correction on S band                                | m          | 3     | -32768             | 16                      | m          | 3     | 5                             |
| 0                  | 25 | 138 | Average signal to noise ratio                                      | Numeric    | 0     | -2048              | 12                      | Numeric    | 0     | 4                             |
| 0                  | 25 | 140 | Start channel  | Numeric    | 0     | 0                  | 14                      | Numeric    | 0     | 5                             |
| 0                  | 25 | 141 | End channel  | Numeric    | 0     | 0                  | 14                      | Numeric    | 0     | 5                             |
| 0                  | 25 | 142 | Channel scale factor   | Numeric    | 0     | 0                  | 6                       | Numeric    | 0     | 2                             |
| 0                  | 25 | 143 | Linear coefficient   | Numeric    | 6     | -5000000           | 24                      | Numeric    | 6     | 8                             |
| 0                  | 25 | 150 | Method of tropical cyclone intensity analysis using satellite data | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 25 | 160 | Ku band net instrumental correction                                | m          | 4     | -120000            | 18                      | m          | 4     | 6                             |
| 0                  | 25 | 161 | C band net instrumental correction                                 | m          | 4     | -120000            | 18                      | m          | 4     | 6                             |
| 0                  | 25 | 162 | Sea state bias correction on C band                                | m          | 4     | -6000              | 13                      | m          | 4     | 4                             |
| 0                  | 25 | 163 | Altimeter ionospheric correction on Ku band                        | m          | 3     | -32768             | 16                      | m          | 3     | 5                             |
| 0                  | 25 | 164 | Radiometer wet tropospheric correction                             | m          | 4     | -5000              | 13                      | m          | 4     | 4                             |
| 0                  | 25 | 174 | SMOS information flag  | Flag table | 0     | 0                  | 14                      | Flag table | 0     | 5                             |



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### Notes:

- (1) 0 25 014 nominal input range 0 - 2300
- (2) The actual meaning may be obtained from the originator of the data.
- (3) Descriptor 0 25 009 is deprecated. 0 25 029 should be used instead.
- (4) Descriptor 0 25 143 is intended for numerical, non-dimensional values to be used as coefficients in statistical or linear processing. Each instance of 0 25 143 should be characterized by using an appropriate significance qualifier, such as 0 08 026.

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### Class 26 - Non-coordinate location (time)

| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME   | BUFR       |       |                    |                         | CREX       |       |                               |
|--------------------|----|-----|---|------------|-------|--------------------|-------------------------|------------|-------|-------------------------------|
| F                  | X  | Y   |   | UNIT       | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT       | SCALE | DATA<br>WIDTH<br>(Characters) |
| 0                  | 26 | 001 | Principal time of daily reading in UTC of maximum temperature | Hour       | 1     | 0                  | 12                      | Hour       | 1     | 3                             |
| 0                  | 26 | 002 | Principal time of daily reading in UTC of minimum temperature | Hour       | 1     | 0                  | 12                      | Hour       | 1     | 3                             |
| 0                  | 26 | 003 | Time difference   | Minute     | 0     | −1440              | 12                      | Minute     | 0     | 4                             |
| 0                  | 26 | 010 | Hours included  | Flag table | 0     | 0                  | 26                      | Flag table | 0     | 9                             |
| 0                  | 26 | 020 | Duration of precipitation                                     | Minute     | 0     | 0                  | 11                      | Minute     | 0     | 4                             |
| 0                  | 26 | 030 | Measurement integration time                                  | Second     | 2     | 0                  | 8                       | Second     | 2     | 3                             |

Note: Descriptor 0 26 003 is to be used with 0 08 025 (time difference qualifier).

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### Class 27 - Non-coordinate location (horizontal - 1)

| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME   | BUFR        |       |                    |                         | CREX        |       |                               |
|--------------------|----|-----|---|-------------|-------|--------------------|-------------------------|-------------|-------|-------------------------------|
| F                  | X  | Y   |   | UNIT        | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT        | SCALE | DATA<br>WIDTH<br>(Characters) |
| 0                  | 27 | 001 | Latitude (high accuracy)  | Degree      | 5     | −9000000           | 25                      | Degree      | 5     | 7                             |
| 0                  | 27 | 002 | Latitude (coarse accuracy)  | Degree      | 2     | −9000              | 15                      | Degree      | 2     | 4                             |
| 0                  | 27 | 003 | Alternate latitude (coarse accuracy)                                  | Degree      | 2     | −9000              | 15                      | Degree      | 2     | 4                             |
| 0                  | 27 | 004 | Alternate latitude (high accuracy)                                    | Degree      | 5     | −9000000           | 25                      | Degree      | 5     | 7                             |
| 0                  | 27 | 010 | Footprint axis 1  | m           | −1    | 0                  | 14                      | m           | −1    | 5                             |
| 0                  | 27 | 020 | Satellite location counter  | Numeric     | 0     | 0                  | 16                      | Numeric     | 0     | 5                             |
| 0                  | 27 | 021 | Satellite sublocation dimension                                       | Numeric     | 0     | 0                  | 16                      | Numeric     | 0     | 5                             |
| 0                  | 27 | 031 | In direction of 0 degrees longitude, distance from the Earth's centre | m           | 2     | −1073741824        | 31                      | m           | 2     | 10                            |
| 0                  | 27 | 080 | Viewing Azimuth angle   | Degree true | 2     | 0                  | 16                      | Degree true | 0     | 5                             |

Notes:

- (1) The alternate latitude may be used when the computation of the position yields multiple solutions and there is no a priori way to distinguish between them.
- (2) The satellite location counter is calculated as:  
counter = superswath no. x 1000 + box no. x 10 + minibox no.
- (3) The satellite sublocation dimension is calculated as:  
dimension = minibox dimension + box dimension  
where:   minibox dimension   = lines x 1000   + spots x 100  
          box dimension       = lines x 10       + spots
- (4) The value for descriptor 0 27 031 has been chosen to be suitable for polar orbiting satellites in approximately sun-synchronous orbits. Geostationary orbits would require greater data widths for distance and slightly less for speed.
- (5) Left handed xyz axes have been chosen for descriptor 0 27 031.

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### Class 28 - Non-coordinate location (horizontal - 2)

| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME  | BUFR   |       |                    |                         | CREX   |       |                               |
|--------------------|----|-----|--|--------|-------|--------------------|-------------------------|--------|-------|-------------------------------|
| F                  | X  | Y   |  | UNIT   | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT   | SCALE | DATA<br>WIDTH<br>(Characters) |
| 0                  | 28 | 001 | Longitude (high accuracy)                                      | Degree | 5     | −18000000          | 26                      | Degree | 5     | 8                             |
| 0                  | 28 | 002 | Longitude (coarse accuracy)                                    | Degree | 2     | −18000             | 16                      | Degree | 2     | 5                             |
| 0                  | 28 | 003 | Alternate longitude (coarse accuracy)                          | Degree | 2     | −18000             | 16                      | Degree | 2     | 5                             |
| 0                  | 28 | 004 | Alternate longitude (high accuracy)                            | Degree | 5     | −18000000          | 26                      | Degree | 5     | 8                             |
| 0                  | 28 | 010 | Footprint axis 2   | m      | -1    | 0                  | 14                      | m      | -1    | 5                             |
| 0                  | 28 | 031 | In direction 90 degrees East, distance from the Earth's centre | m      | 2     | −1073741824        | 31                      | m      | 2     | 10                            |

Notes:

- (1) The alternate longitude may be used when the computation of the position yields multiple solutions and there is no a priori way to distinguish between them.
- (2) The value for descriptor 0 28 031 has been chosen to be suitable for polar orbiting satellites in approximately sun-synchronous orbits. Geostationary orbits would require greater data widths for distance and slightly less for speed.
- (3) Left handed xyz axes have been chosen for descriptor 0 28 031.

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### Class 29 - Map data

| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME | BUFR       |       |                    |                         | CREX       |       |                               |
|--------------------|----|-----|-----------------------|------------|-------|--------------------|-------------------------|------------|-------|-------------------------------|
| F                  | X  | Y   |                       | UNIT       | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT       | SCALE | DATA<br>WIDTH<br>(Characters) |
| 0                  | 29 | 001 | Projection type       | Code table | 0     | 0                  | 3                       | Code table | 0     | 1                             |
| 0                  | 29 | 002 | Co-ordinate grid type | Code table | 0     | 0                  | 3                       | Code table | 0     | 1                             |

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### Class 30 - Image

| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME       | BUFR       |       |                    |                         | CREX       |       |                               |
|--------------------|----|-----|-----------------------------|------------|-------|--------------------|-------------------------|------------|-------|-------------------------------|
| F                  | X  | Y   |                             | UNIT       | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT       | SCALE | DATA<br>WIDTH<br>(Characters) |
| 0                  | 30 | 001 | Pixel value (4 bits)        | Numeric    | 0     | 0                  | 4                       | Numeric    | 0     | 2                             |
| 0                  | 30 | 002 | Pixel value (8 bits)        | Numeric    | 0     | 0                  | 8                       | Numeric    | 0     | 3                             |
| 0                  | 30 | 004 | Pixel value (16 bits)       | Numeric    | 0     | 0                  | 16                      | Numeric    | 0     | 5                             |
| 0                  | 30 | 010 | Number of grid points       | Numeric    | 0     | 0                  | 13                      | Numeric    | 0     | 4                             |
| 0                  | 30 | 021 | Number of pixels per row    | Numeric    | 0     | 0                  | 12                      | Numeric    | 0     | 4                             |
| 0                  | 30 | 022 | Number of pixels per column | Numeric    | 0     | 0                  | 12                      | Numeric    | 0     | 4                             |
| 0                  | 30 | 031 | Picture type                | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 30 | 032 | Combination with other data | Flag table | 0     | 0                  | 16                      | Flag table | 0     | 6                             |

Notes:

- (1) Pixel data width can be changed with descriptor 2 01 YYY.
- (2) In order to distinguish unambiguously the cases of missing data and saturated pixels, n-bit image data should be encoded using a data width of n+1. Where such a descriptor is not already available in Class 30, operator descriptor 2 01 YYY should be used to modify the data width of the existing entry as required.

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### Class 31 - Data description operator qualifiers

| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME                                  | BUFR       |       |                    |                         | CREX                 |       |                               |
|--------------------|----|-----|--|------------|-------|--------------------|-------------------------|----------------------|-------|-------------------------------|
| F                  | X  | Y   |  | UNIT       | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT                 | SCALE | DATA<br>WIDTH<br>(Characters) |
| 0                  | 31 | 000 | Short delayed descriptor replication factor            | Numeric    | 0     | 0                  | 1                       | Non-existent in CREX |       |                               |
| 0                  | 31 | 001 | Delayed descriptor replication factor                  | Numeric    | 0     | 0                  | 8                       |                      |       |                               |
| 0                  | 31 | 002 | Extended delayed descriptor replication factor         | Numeric    | 0     | 0                  | 16                      |                      |       |                               |
| 0                  | 31 | 011 | Delayed descriptor and data repetition factor          | Numeric    | 0     | 0                  | 8                       |                      |       |                               |
| 0                  | 31 | 012 | Extended delayed descriptor and data repetition factor | Numeric    | 0     | 0                  | 16                      |                      |       |                               |
| 0                  | 31 | 021 | Associated field significance                          | Code table | 0     | 0                  | 6                       |                      |       |                               |
| 0                  | 31 | 031 | Data present indicator                                 | Flag table | 0     | 0                  | 1                       |                      |       |                               |

Notes:

- (1) The “delayed descriptor and data repetition factor” is intended for run-length encoding (e.g. scanning an image). It specifies a count N which applies to both descriptor and data, i.e. the value of the single element defined by the following descriptor is repeated N times (at intervals already specified).
- (2) Descriptor 0 31 031, used in conjunction with quality control or statistics operators 2 22 YYY through 2 32 YYY, shall indicate the presence of quality control information when the indicator value is set to zero. It may be used, in conjunction with the replication operator 1 01 YYY, to construct a table of data present/not present indicators, forming a data present bit-map as defined in Regulation 94.5.5.3. This makes it possible to present quality control information and statistical information for selected data corresponding to element descriptors which precede the 2 22 to 32 YYY operators.
- (3) Other applications of the data present indicator may be developed.

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## Class 33 - Quality information

| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME                                       | BUFR       |       |                    |                         | CREX       |       |                               |
|--------------------|----|-----|---|------------|-------|--------------------|-------------------------|------------|-------|-------------------------------|
| F                  | X  | Y   |   | UNIT       | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT       | SCALE | DATA<br>WIDTH<br>(Characters) |
| 0                  | 33 | 001 | Reserved  |            |       |                    |                         |            |       |                               |
| 0                  | 33 | 002 | Quality information   | Code table | 0     | 0                  | 2                       | Code table | 0     | 1                             |
| 0                  | 33 | 003 | Quality information   | Code table | 0     | 0                  | 3                       | Code table | 0     | 1                             |
| 0                  | 33 | 004 | Reserved  |            |       |                    |                         |            |       |                               |
| 0                  | 33 | 005 | Quality information (AWS data)                              | Flag table | 0     | 0                  | 30                      | Flag table | 0     | 10                            |
| 0                  | 33 | 006 | Internal measurement status information (AWS)               | Code table | 0     | 0                  | 3                       | Code table | 0     | 1                             |
| 0                  | 33 | 007 | Per cent confidence   | %          | 0     | 0                  | 7                       | %          | 0     | 3                             |
| 0                  | 33 | 015 | Data quality check indicator                                | Code table | 0     | 0                  | 6                       | Code table | 0     | 2                             |
| 0                  | 33 | 020 | Quality control indication of following value               | Code table | 0     | 0                  | 3                       | Code table | 0     | 1                             |
| 0                  | 33 | 021 | Quality of following value                                  | Code table | 0     | 0                  | 2                       | Code table | 0     | 1                             |
| 0                  | 33 | 022 | Quality of buoy satellite transmission                      | Code table | 0     | 0                  | 2                       | Code table | 0     | 1                             |
| 0                  | 33 | 023 | Quality of buoy location                                    | Code table | 0     | 0                  | 2                       | Code table | 0     | 1                             |
| 0                  | 33 | 024 | Station elevation quality mark (for mobile stations)        | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 33 | 025 | ACARS interpolated values                                   | Code table | 0     | 0                  | 3                       | Code table | 0     | 1                             |
| 0                  | 33 | 026 | Moisture quality  | Code table | 0     | 0                  | 6                       | Code table | 0     | 2                             |
| 0                  | 33 | 027 | Location quality class (range of radius of 66 % confidence) | Code table | 0     | 0                  | 3                       | Code table | 0     | 1                             |
| 0                  | 33 | 028 | Snapshot overall quality                                    | Code table | 0     | 0                  | 3                       | Code table | 0     | 1                             |
| 0                  | 33 | 030 | Scan line status flags for ATOVS                            | Flag table | 0     | 0                  | 24                      | Flag table | 0     | 8                             |
| 0                  | 33 | 031 | Scan line quality flags for ATOVS                           | Flag table | 0     | 0                  | 24                      | Flag table | 0     | 8                             |
| 0                  | 33 | 032 | Channel quality flags for ATOVS                             | Flag table | 0     | 0                  | 24                      | Flag table | 0     | 8                             |
| 0                  | 33 | 033 | Field of view quality flags for ATOVS                       | Flag table | 0     | 0                  | 24                      | Flag table | 0     | 8                             |
| 0                  | 33 | 035 | Manual/automatic quality control                            | Code table | 0     | 0                  | 4                       | Code table | 0     | 2                             |
| 0                  | 33 | 036 | Nominal confidence threshold                                | %          | 0     | 0                  | 7                       | %          | 0     | 3                             |
| 0                  | 33 | 037 | Wind correlation error                                      | Flag table | 0     | 0                  | 20                      | Flag table | 0     | 7                             |
| 0                  | 33 | 038 | Quality flags for ground-based GNSS data                    | Flag table | 0     | 0                  | 10                      | Flag table | 0     | 4                             |
| 0                  | 33 | 039 | Quality flags for Radio Occultation data                    | Flag table | 0     | 0                  | 16                      | Flag table | 0     | 6                             |
| 0                  | 33 | 040 | Confidence interval   | %          | 0     | 0                  | 7                       | Percent    | 0     | 3                             |
| 0                  | 33 | 041 | Attribute of following value                                | Code table | 0     | 0                  | 2                       | Code table | 0     | 1                             |
| 0                  | 33 | 042 | Type of limit represented by following value                | Code table | 0     | 0                  | 3                       | Code table | 0     | 1                             |
| 0                  | 33 | 043 | AST confidence  | Flag table | 0     | 0                  | 8                       | Flag table | 0     | 3                             |
| 0                  | 33 | 044 | ASAR quality information                                    | Flag table | 0     | 0                  | 15                      | Flag table | 0     | 5                             |
| 0                  | 33 | 045 | Probability of following event (see Notes 1 and 3)          | %          | 0     | 0                  | 7                       | %          | 0     | 3                             |



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|   |    |     |  |            |   |   |    |            |   |    |
|---|----|-----|--|------------|---|---|----|------------|---|----|
| 0 | 33 | 046 | Conditional probability of following event with respect to specified conditioning event (see Notes 1, 2 and 3) | %          | 0 | 0 | 7  | %          | 0 | 3  |
| 0 | 33 | 047 | Measurement confidence data  | Flag table | 0 | 0 | 31 | Flag table | 0 | 11 |
| 0 | 33 | 048 | Confidence measure of SAR inversion  | Code table | 0 | 0 | 2  | Code table | 0 | 1  |
| 0 | 33 | 049 | Confidence measure of wind retrieval   | Code table | 0 | 0 | 2  | Code table | 0 | 1  |
| 0 | 33 | 050 | Global GTSP quality flag   | Code table | 0 | 0 | 4  | Code table | 0 | 2  |
| 0 | 33 | 052 | S band ocean retracking quality  | Flag table | 0 | 0 | 21 | Flag table | 0 | 7  |
| 0 | 33 | 053 | KU band ocean retracking quality   | Flag table | 0 | 0 | 21 | Flag table | 0 | 7  |
| 0 | 33 | 060 | GqisFlagQual - individual IASI-System quality flag   | Code Table | 0 | 0 | 2  | Code Table | 0 | 1  |
| 0 | 33 | 061 | GqisQualIndex - indicator for instrument noise performance (contributions from spectral and radiometric)       | %          | 0 | 0 | 7  | %          | 0 | 3  |
| 0 | 33 | 062 | GqisQualIndexLoc - indicator for geometric quality index   | %          | 0 | 0 | 7  | %          | 0 | 3  |
| 0 | 33 | 063 | GqisQualIndexRad - indicator for instrument noise performance (contributions from radiometric calibration)     | %          | 0 | 0 | 7  | %          | 0 | 3  |
| 0 | 33 | 064 | GqisQualIndexSpect - indicator for instrument noise performance (contributions from spectral calibration)      | %          | 0 | 0 | 7  | %          | 0 | 3  |
| 0 | 33 | 065 | GqisSysTecSondQual - output of system TEC (Technical Expertise Centre) quality function                        | Numeric    | 0 | 0 | 24 | Numeric    | 0 | 8  |
| 0 | 33 | 070 | Total ozone quality  | Code table | 0 | 0 | 4  | Code table | 0 | 2  |
| 0 | 33 | 071 | Profile ozone quality  | Code table | 0 | 0 | 4  | Code table | 0 | 2  |
| 0 | 33 | 072 | Ozone error  | Code table | 0 | 0 | 5  | Code table | 0 | 2  |

Notes:

- (1) When using descriptor 0-33-045 or 0-33-046, operator 2-41-000 shall be used in order to define the following event to which the reported probability value applies.
- (2) When using descriptor 0-33-046, operator 2-42-000 shall precede the occurrence of this descriptor in order to define the event upon which the reported probability value is conditioned.
- (3) When defining an event for use with descriptor 0-33-045 or 0-33-046, descriptor 0-33-042 may be employed in order to indicate that the following value is actually a bound for a range of values.

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### Class 35 - Data monitoring information

| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME   | BUFR       |       |                    |                         | CREX       |       |                               |
|--------------------|----|-----|---|------------|-------|--------------------|-------------------------|------------|-------|-------------------------------|
| F                  | X  | Y   |   | UNIT       | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT       | SCALE | DATA<br>WIDTH<br>(Characters) |
| 0                  | 35 | 000 | FM and regional code number   | Code table | 0     | 0                  | 10                      | Code table | 0     | 3                             |
| 0                  | 35 | 001 | Time-frame for monitoring   | Code table | 0     | 0                  | 3                       | Code table | 0     | 1                             |
| 0                  | 35 | 011 | Number of reports actually received                                       | Numeric    | 0     | 0                  | 14                      | Numeric    | 0     | 4                             |
| 0                  | 35 | 021 | Bulletin being monitored (TTAAii)   | CCITT IA5  | 0     | 0                  | 48                      | Character  | 0     | 6                             |
| 0                  | 35 | 022 | Bulletin being monitored (YYGGgg)   | CCITT IA5  | 0     | 0                  | 48                      | Character  | 0     | 6                             |
| 0                  | 35 | 023 | Bulletin being monitored (CCCC)   | CCITT IA5  | 0     | 0                  | 32                      | Character  | 0     | 4                             |
| 0                  | 35 | 024 | Bulletin being monitored (BBB)  | CCITT IA5  | 0     | 0                  | 24                      | Character  | 0     | 3                             |
| 0                  | 35 | 030 | Discrepancies in the availability of expected data                        | Code table | 0     | 0                  | 4                       | Code table | 0     | 1                             |
| 0                  | 35 | 031 | Qualifier on monitoring results   | Code table | 0     | 0                  | 7                       | Code table | 0     | 2                             |
| 0                  | 35 | 032 | Cause of missing data   | Code table | 0     | 0                  | 4                       | Code table | 0     | 1                             |
| 0                  | 35 | 033 | Observation and collection deficiencies                                   | Code table | 0     | 0                  | 7                       | Code table | 0     | 2                             |
| 0                  | 35 | 034 | Statistical trends for availability of data (during the survey period(s)) | Code table | 0     | 0                  | 3                       | Code table | 0     | 1                             |
| 0                  | 35 | 035 | Reason for termination  | Code table | 0     | 0                  | 5                       | Code table | 0     | 2                             |

## World Meteorological Organization

### Class 40 – Satellite data

| TABLE<br>REFERENCE |    |     | TABLE<br>ELEMENT NAME  | BUFR       |       |                    |                         | CREX       |       |                               |
|--------------------|----|-----|--|------------|-------|--------------------|-------------------------|------------|-------|-------------------------------|
| F                  | X  | Y   |  | UNIT       | SCALE | REFERENCE<br>VALUE | DATA<br>WIDTH<br>(Bits) | UNIT       | SCALE | DATA<br>WIDTH<br>(Characters) |
| 0                  | 40 | 001 | Surface soil moisture (ms)   | %          | 1     | 0                  | 10                      | %          | 1     | 4                             |
| 0                  | 40 | 002 | Estimated error in surface soil moisture                             | %          | 1     | 0                  | 10                      | %          | 1     | 4                             |
| 0                  | 40 | 003 | Mean surface soil moisture   | Numeric    | 3     | 0                  | 10                      | Numeric    | 3     | 4                             |
| 0                  | 40 | 004 | Rain fall detection  | Numeric    | 3     | 0                  | 10                      | Numeric    | 3     | 4                             |
| 0                  | 40 | 005 | Soil moisture correction flag  | Flag table | 0     | 0                  | 8                       | Flag table | 0     | 3                             |
| 0                  | 40 | 006 | Soil moisture processing flag  | Flag table | 0     | 0                  | 16                      | Flag table | 0     | 6                             |
| 0                  | 40 | 007 | Soil moisture quality  | %          | 1     | 0                  | 10                      | %          | 1     | 4                             |
| 0                  | 40 | 008 | Frozen land surface fraction   | %          | 1     | 0                  | 10                      | %          | 1     | 4                             |
| 0                  | 40 | 009 | Inundation and wetland fraction                                      | %          | 1     | 0                  | 10                      | %          | 1     | 4                             |
| 0                  | 40 | 010 | Topographic complexity   | %          | 1     | 0                  | 10                      | %          | 1     | 4                             |
| 0                  | 40 | 011 | Interpolation flag   | Flag table | 0     | 0                  | 8                       | Flag table | 0     | 3                             |
| 0                  | 40 | 012 | Radiometer data quality flag   | Flag table | 0     | 0                  | 8                       | Flag table | 0     | 3                             |
| 0                  | 40 | 013 | Radiometer brightness temperature interpretation flag                | Code table | 0     | 0                  | 3                       | Code table | 0     | 1                             |
| 0                  | 40 | 014 | High frequency fluctuations of the sea surface topography correction | m          | 4     | -3000              | 13                      | m          | 4     | 4                             |