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| --- | --- | --- |
| WORLD METEOROLOGICAL ORGANIZATION  COMMISSION FOR BASIC SYSTEMS  -----------------------------  FOURTH MEETING OF  INTER-PROGRAMME EXPERT TEAM ON DATA REPRESENTATION MAINTENANCE AND MONITORING  GENEVA, SWITZERLAND, 30 MAY - 3 JUNE 2016 |  | IPET-DRMM-IV / Doc. 3.2 (6)  (23. 5. 2016)  -------------------------  ITEM 3.2  ENGLISH ONLY |

BUFR AND CREX

**BUFR SEQUENCE FOR SYNOPTIC REPORTS FROM SEA STATIONS SUITABLE FOR VOS OBSERVATION DATA (editorial changes)**

*Submitted by JCOMM (David Berry)*

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**Summary and Purpose of Document**

Editorial changes to BUFR template for synoptic reports from sea stations suitable for VOS observation data.

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**ACTION PROPOSED**

Review the proposed changes and accept or reject those changes as appropriate.

**ANNEXES:**

A. Validation report submitted to PFC 2015-2

**DISCUSSIONS**

The BUFR elements and sequences for reporting VOS observations in BUFR on the GTS have previously been approved for validation. This was performed in December 2016 and the proposed changes were due to be implemented in FT2016-1. However, post validation two editorial chages were proposed, one a change of name for sequence 3-06-043 and the other the edition of a note to sequence 3-01-018 on the use of encrypted call sign or WMO identifier for VOS reports. Consequently, following discussion, the implementation has been delayed to enable these changes to be made. These are proposed in this document. The previous validation report is included in Annex 1. The changes are editorial in nature and should not effect the validation status.

**PROPOSAL**

**BUFR/CREX Table D**

**Category 01 – BUFR/CREX Location and identification sequences**

*Amend (changes in red)*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Table reference | | | Table references | | | Element name | Element description |
| F | XX | YYY | F | XX | YYY |  |  |
| 3 | 01 | 018 |  |  |  | (Encrypted ship's call sign and encryption method) | See notes 1 – 3 |
|  |  |  | 0 | 01 | 114 | Encrypted ship or mobile land station identifier |  |
|  |  |  | 0 | 25 | 185 | Encryption method |  |
|  |  |  | 0 | 25 | 186 | Encryption key version |  |

1. The ship's call sign or WMO identifier should be reported using descriptor 0 01 011.
2. However, if required by shipping companies when VOS ships are recruited or if subsequently requested, for ship reports using template 3 08 014 the Ship call sign or other identifier can be encrypted in BUFR reports using sequence 3 01 018 according to the following method:

* The normal callsign (i.e. descriptor 0 01 011) shall be encoded with missing value;
* The encryption method shall be indicated using the method indicated by 0 25 185;
* The version of the encryption key that is used shall be indicated by 0 25 186;

1. The encryption keys will be managed by the JCOMM Focal Point on Ship Masking.

**Category 06 – BUFR/CREX Meteorological or oceanographic sequences common to oceanographic observations**

*Amend (changes in red)*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Table reference | | | Table references | | | Element name | Element description |
| F | XX | YYY | F | XX | YYY |
| 3 | 06 | 043 |  |  |  | Marine biogeochemical and radiation observations |  |
|  |  |  | 0 | 41 | 001 | pCO2 |  |
|  |  |  | 0 | 08 | 043 | Atmospheric chemical or physical constituent type | set to 3 (carbon dioxide) |
|  |  |  | 0 | 15 | 028 | Mole fraction of atmospheric constituent / pollutant in dry air |  |
|  |  |  | 0 | 08 | 043 | Atmospheric chemical or physical constituent type | Cancel |
|  |  |  | 0 | 13 | 080 | pH |  |
|  |  |  | 0 | 41 | 005 | Turbidity |  |
|  |  |  | 0 | 41 | 003 | Dissolved nitrates |  |
|  |  |  | 0 | 22 | 188 | Dissolved oxygen |  |
|  |  |  | 0 | 41 | 002 | Fluorescence |  |
|  |  |  | 1 | 06 | 000 | Delayed replication of 6 descriptors |  |
|  |  |  | 0 | 31 | 000 | Short delayed replication factor |  |
|  |  |  | 0 | 04 | 024 | Time period or displacement (hours) | Set to -1 (preceding hour) |
|  |  |  | 0 | 14 | 002 | Long-wave radiation, integrated over period specified | Downwelling longwave radiation |
|  |  |  | 0 | 14 | 002 | Long-wave radiation, integrated over period specified | Upwelling longwave radiation |
|  |  |  | 0 | 14 | 012 | Net long-wave radiation, integrated over period specified |  |
|  |  |  | 0 | 14 | 004 | Short-wave radiation, integrated over period specified |  |
|  |  |  | 0 | 04 | 024 | Time period or displacement (hours) | Cancel |

Annex A

VALIDATION REPORT

New BUFR elements and sequences for the reporting of Synoptic Reports from Sea Stations Suitable for VOS Data

1. Responsible organization

UK National Oceanography Centre (NOC) (on behalf of JCOMM)

2. Requirements and purposes

The proposal updates the currently operational BUFR template for reporting VOS observations on the GTS. The new template is required to allow reporting of additional parameters from the VOS, meeting the needs of the operational oceanography and forecasting communities, additional instrumental metadata and the encryption of ships callsigns taking into account the security requirements of the ship owners.

3. Description of proposal

See Annex I.

4. Declaration of validation complete

Validated by David Berry (UK National Oceanography Centre on behalf of JCOMM), Enrico Fucile (ECMWF) and Jon Turton (UK Met Office).

See the following files for evidence:

BUFR file: vos308014\_v3.bufr

Decode files: vos308014\_v3.txt

vos308014\_v3\_ukmo.txt

5. Period of discussion and its conclusion

From prior to 2013 to December 2015. Discussion between NOC, UK Met Office, E-SURFMAR, Meteo France, JCOMM Ship Observations Team and JCOMM Expert Team on Marine Climatology. Discussions at IPET-DRMM (I, II, and III). Final template, sequences and descriptors agreed.

6. Proposed implementation date and its formality

If agreed, fast track 2016-1

7. Brief summary of discussion

* Modification of template to make sections optional through the use of delayed replication descriptors and to reduce the size of the messages.
* Inclusion of an optional sequence for the reporting of encrypted ships callsigns, addressing the security requirements of a number of ship owners and operators.
* Inclusion of additional observational metadata to account for the loss of callsign information (either through encryption, masking or missing values) and loss of the ability to link the observations to the WMO Publication Number 47 metadata.
* Inclusion of additional parameters, including optional biogeochemical data and surface radiation.
* Inclusion of optional parameters for the JCOMM VOSClim ships related to observation quality.
* Use of common observational metadata for marine and land based air temperature and humidity observations.

Annex I

**BUFR/CREX Table B**

**Class 01 – BUFR/CREX Identification**

*Add*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Table Reference | | | Element name | BUFR | | | | CREX | | |
| F | XX | YYY | Unit | Scale | Ref. value | Data width (bits) | Unit | Scale | Data width (char) |
| 0 | 01 | 114 | Encrypted ship or mobile land station identifier (base64 encoding) | CCITT IA5 | 0 | 0 | 352 | CCITT IA5 | 0 | 44 |

**Class 3 – BUFR/CREX Instrumentation**

*Add*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Table Reference | | | Element name | BUFR | | | | CREX | | |
| F | XX | YYY | Unit | Scale | Ref. value | Data width (bits) | Unit | Scale | Data width (char) |
| 0 | 03 | 001 | Surface station type | Code table | 0 | 0 | 5 | Code table | 0 | 2 |
| 0 | 03 | 003 | Thermometer / hygrometer housing | Code table | 0 | 0 | 4 | Code table | 0 | 2 |
| 0 | 03 | 004 | Type of screen / shelter / radiation shield | Code table | 0 | 0 | 4 | Code table | 0 | 2 |
| 0 | 03 | 005 | Horizontal width of screen or shield (x) | m | 3 | 0 | 16 | m | 3 | 5 |
| 0 | 03 | 006 | Horizontal depth of screen or shield (y) | m | 3 | 0 | 16 | m | 3 | 5 |
| 0 | 03 | 007 | Vertical height of screen or shield (z) | m | 3 | 0 | 16 | m | 3 | 5 |
| 0 | 03 | 008 | Artificially ventilated screen or shield | Code table | 0 | 0 | 3 | Code table | 0 | 1 |
| 0 | 03 | 009 | Amount of forced ventilation at time of reading | m s-1 | 1 | 0 | 9 | m s-1 | 1 | 3 |
| 0 | 03 | 020 | Material for thermometer / hygrometer housing | Code table | 0 | 0 | 3 | Code table | 0 | 1 |
| 0 | 03 | 021 | Hygrometer heating | Code table | 0 | 0 | 2 | Code table | 0 | 1 |
| 0 | 03 | 022 | Instrument owner | Code table | 0 | 0 | 3 | Code table | 0 | 1 |
| 0 | 03 | 023 | Configuration of louvers for thermometer / hygrometer screen | Code table | 0 | 0 | 3 | Code table | 0 | 1 |
| 0 | 03 | 024 | Psychrometric coefficient | K-1 | 6 | 0 | 10 | K-1 | 6 | 3 |

**Class 10 – BUFR/CREX Non coordinate location (vertical)**

*Add*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Table Reference | | | Element name | BUFR | | | | CREX | | |
| F | XX | YYY | Unit | Scale | Ref. value | Data width (bits) | Unit | Scale | Data width (char) |
| 0 | 10 | 038 | Maximum height of deck cargo above summer load line | m | 0 | 0 | 6 | m | 0 | 2 |
| 0 | 10 | 039 | Departure of reference level (summer maximum load line) from actual sea level | m | 0 | -32 | 6 | m | 0 | 3 |

**Class 11 – BUFR/CREX Wind and turbulence**

*Amend*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Table Reference | | | Element name | BUFR | | | | CREX | | |
| F | XX | YYY | Unit | Scale | Ref. value | Data width (bits) | Unit | Scale | Data width (char) |
| 0 | 11 | 104 | True heading of aircraft, ship or other mobile platform | Degree true | 0 | 0 | 9 | Degree true | 0 | 3 |

Note: Amendment is change of name.

*Add*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Table Reference | | | Element name | BUFR | | | | CREX | | |
| F | XX | YYY | Unit | Scale | Ref. value | Data width (bits) | Unit | Scale | Data width (char) |
| 0 | 11 | 007 | Relative wind direction (in degrees off bow) | Degree | 0 | 0 | 9 | Degree | 0 | 3 |
| 0 | 11 | 008 | Relative wind speed | m s-1 | 1 | 0 | 12 | m s-1 | 1 | 4 |

**Class 15 – BUFR/CREX Physical / chemical constituents**

*Add*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Table Reference | | | Element name | BUFR | | | | CREX | | |
| F | XX | YYY | Unit | Scale | Ref. value | Data width (bits) | Unit | Scale | Data width (char) |
| 0 | 15 | 028 | Mole fraction of atmospheric constituent / pollutant in dry air | ‰ | 5 | 0 | 16 | ‰ | 5 | 5 |

**Class 25 – BUFR/CREX Processing information**

*Add*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Table Reference | | | Element name | BUFR | | | | CREX | | |
| F | XX | YYY | Unit | Scale | Ref. value | Data width (bits) | Unit | Scale | Data width (char) |
| 0 | 25 | 185 | Encryption method | Code table | 0 | 0 | 8 | Code table | 0 | 3 |
| 0 | 25 | 186 | Encryption key version | CCITT IA5 | 0 | 0 | 96 | CCITT IA5 | 0 | 12 |
| 0 | 25 | 188 | Method for reducing pressure to sea level | Code Table | 0 | 0 | 5 | Code Table | 0 | 2 |

**Class 41 – BUFR/CREX Oceanographic / bio-geochemical parameters**

*Add*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Table Reference | | | Element name | BUFR | | | | CREX | | |
| F | XX | YYY | Unit | Scale | Ref. value | Data width (bits) | Unit | Scale | Data width (char) |
| 0 | 41 | 001 | pCO2 | Pa | 3 | 0 | 18 | Pa | 3 | 6 |
| 0 | 41 | 002 | Fluorescence | kg l-1 | 12 | 0 | 16 | kg l-1 | 12 | 5 |
| 0 | 41 | 003 | Dissolved nitrates | µmol kg-1 | 3 | 0 | 17 | µmol kg-1 | 3 | 5 |
| 0 | 41 | 005 | Turbidity | NTU | 2 | 0 | 12 | NTU | 2 | 4 |

**BUFR/CREX Table D**

**Category 01 – BUFR/CREX Location and identification sequences**

*Add*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Table reference | | | Table references | | | Element name | Element description |
| F | XX | YYY | F | XX | YYY |  |  |
| 3 | 01 | 018 |  |  |  | (Encrypted ship's call sign and encryption method) |  |
|  |  |  | 0 | 01 | 114 | Encrypted ship or mobile land station identifier |  |
|  |  |  | 0 | 25 | 185 | Encryption method |  |
|  |  |  | 0 | 25 | 186 | Encryption key version |  |

**Category 02 – BUFR/CREX Meteorological sequences common to surface data**

*Add*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Table reference | | | Table references | | | Element name | Element description |
| F | XX | YYY | F | XX | YYY |
| 3 | 02 | 062 |  |  |  | (Ship “instantaneous” data) |  |
|  |  |  | 0 | 25 | 188 | Method for reducing pressure report to sea level |  |
|  |  |  | 3 | 02 | 001 | Pressure and 3-hour pressure change |  |
|  |  |  | 3 | 02 | 093 | Extended ship temperature and humidity data |  |
|  |  |  | 1 | 03 | 000 | Delayed replication of 1 descriptor |  |
|  |  |  | 0 | 31 | 000 | Short delayed descriptor replication factor |  |
|  |  |  | 3 | 02 | 053 | Ship visibility data |  |
|  |  |  | 0 | 07 | 032 | Height of sensor above local ground (or deck of marine platform) | Set to missing (cancel) |
|  |  |  | 0 | 07 | 033 | Height of sensor above water surface | Set to missing (cancel) |
|  |  |  | 1 | 01 | 000 | Delayed replication of 1 descriptor |  |
|  |  |  | 0 | 31 | 000 | Short delayed descriptor replication factor |  |
|  |  |  | 3 | 02 | 004 | General cloud information |  |
|  |  |  | 1 | 01 | 000 | Delayed replication of 1 descriptor |  |
|  |  |  | 0 | 31 | 001 | Delayed descriptor replication factor |  |
|  |  |  | 3 | 02 | 005 | Cloud layer |  |
|  |  |  | 0 | 08 | 002 | Vertical significance (surface observations) | Set to missing (cancel) |
|  |  |  | 1 | 01 | 000 | Delayed replication of 1 descriptor |  |
|  |  |  | 0 | 31 | 000 | Short delayed descriptor replication factor |  |
|  |  |  | 3 | 02 | 055 | Icing and ice |  |
|  |  |  | 1 | 01 | 000 | Delayed replication of 1 descriptor |  |
|  |  |  | 0 | 31 | 000 | Short delayed descriptor replication factor |  |
|  |  |  | 3 | 02 | 056 | Sea/water temperature |  |
|  |  |  | 1 | 01 | 000 | Delayed replication of 1 descriptor |  |
|  |  |  | 0 | 31 | 000 | Short delayed descriptor replication factor |  |
|  |  |  | 3 | 02 | 021 | Waves |  |
|  |  |  | 1 | 01 | 000 | Delayed replication of 1 descriptor |  |
|  |  |  | 0 | 31 | 000 | Short delayed descriptor replication factor |  |
|  |  |  | 3 | 02 | 024 | Wind and swell waves |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Table reference | | | Table references | | | Element name | Element description |
| F | XX | YYY | F | XX | YYY |
| 3 | 02 | 063 |  |  |  | (Ship “period” data) |  |
|  |  |  | 3 | 02 | 038 | Present and past weather |  |
|  |  |  | 1 | 01 | 000 | Delayed replication of 1 descriptor |  |
|  |  |  | 0 | 31 | 000 | Short delayed descriptor replication factor |  |
|  |  |  | 3 | 02 | 040 | Precipitation measurement |  |
|  |  |  | 1 | 01 | 000 | Delayed replication of 1 descriptor |  |
|  |  |  | 0 | 31 | 000 | Short delayed descriptor replication factor |  |
|  |  |  | 3 | 02 | 034 | Precipitation past 24 hours |  |
|  |  |  | 0 | 07 | 032 | Height of sensor above local ground (or deck of marine platform) | Set to missing (cancel) |
|  |  |  | 1 | 01 | 000 | Delayed replication of 1 descriptor |  |
|  |  |  | 0 | 31 | 000 | Short delayed descriptor replication factor |  |
|  |  |  | 3 | 02 | 058 | Ship extreme temperature data |  |
|  |  |  | 1 | 01 | 000 | Delayed replication of 1 descriptor |  |
|  |  |  | 0 | 31 | 000 | Short delayed descriptor replication factor |  |
|  |  |  | 3 | 02 | 064 | Ship / or other marine platform wind data |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Table reference | | | Table references | | | Element name | Element description |
| F | XX | YYY | F | XX | YYY |
| 3 | 02 | 092 |  |  |  | (VOSClim data elements) |  |
|  |  |  | *0* | *11* | *104* | *True heading of aircraft, ship or other mobile platform* | *Ship’s true heading* |
|  |  |  | 0 | 01 | 012 | Direction of motion of moving observing platform | Ship’s course over ground |
|  |  |  | 0 | 01 | 013 | Speed of motion of moving observing platform | Ship’s speed over ground |
|  |  |  | 0 | 10 | 038 | Maximum height of deck cargo above summer load line |  |
|  |  |  | 0 | 10 | 039 | Departure of reference level (summer maximum load line) from actual sea level |  |
|  |  |  | 0 | 11 | 007 | Relative wind direction (in degrees off bow) |  |
|  |  |  | 0 | 11 | 008 | Relative wind speed |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Table reference | | | Table references | | | Element name | Element description |
| F | XX | YYY | F | X | YYY |
| 3 | 02 | 093 |  |  |  | (Extended ship temperature and humidity data) |  |
|  |  |  | 0 | 07 | 032 | Height of sensor above local ground (or deck of marine platform) |  |
|  |  |  | 0 | 07 | 033 | Height of sensor above water surface |  |
|  |  |  | 3 | 03 | 099 | Metadata common to temperature / humidity sensors |  |
|  |  |  | 0 | 12 | 101 | Temperature / air temperature |  |
|  |  |  | 1 | 03 | 000 | Delayed replication of 3 descriptors |  |
|  |  |  | 0 | 31 | 000 | Short delayed replication factor | set to 0 if no change from previous values, 1 if changes |
|  |  |  | 0 | 07 | 032 | Height of sensor above local ground (or deck of marine platform) |  |
|  |  |  | 0 | 07 | 033 | Height of sensor above water surface |  |
|  |  |  | 3 | 03 | 099 | Metadata common to temperature / humidity sensors |  |
|  |  |  | 0 | 02 | 039 | Method of wet-bulb temperature measurement |  |
|  |  |  | 0 | 02 | 097 | Type of humidity sensor |  |
|  |  |  | 0 | 03 | 024 | Psychrometric coefficient | Set to missing if type of humidity sensor is not psychrometer |
|  |  |  | 0 | 03 | 021 | Hygrometer heating |  |
|  |  |  | 0 | 12 | 102 | Wet-bulb temperature |  |
|  |  |  | 0 | 12 | 103 | Dewpoint temperature |  |
|  |  |  | 0 | 13 | 003 | Relative humidity |  |
|  |  |  | 0 | 07 | 032 | Height of sensor above local ground (or deck of marine platform) | Cancel (set to missing) |
|  |  |  | 0 | 07 | 033 | Height of sensor above water surface | Cancel (set to missing) |
|  |  |  | 3 | 03 | 099 | Metadata common to temperature / humidity sensors | Cancel (set all elements in sequence to missing) |
|  |  |  | 0 | 02 | 039 | Method of wet-bulb temperature measurement | Cancel (set to missing) |
|  |  |  | 0 | 02 | 097 | Type of humidity sensor | Cancel (set to missing) |
|  |  |  | 0 | 03 | 021 | Hygrometer heating | Cancel (set to missing) |
|  |  |  | 0 | 03 | 024 | Psychrometric coefficient | Cancel (set to missing) |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Table reference | | | Table references | | | Element name | Element description |
| F | XX | YYY | F | XX | YYY |
| 3 | 03 | 099 |  |  |  | Metadata common to temperature / humidity sensors |  |
|  |  |  | 0 | 03 | 005 | Horizontal width of screen or shield (x) |  |
|  |  |  | 0 | 03 | 006 | Horizontal depth of screen or shield (y) |  |
|  |  |  | 0 | 03 | 007 | Vertical height of screen or shield (z) |  |
|  |  |  | 0 | 02 | 096 | Type of thermometer |  |
|  |  |  | 0 | 03 | 022 | Instrument owner |  |
|  |  |  | 0 | 03 | 003 | Thermometer / hygrometer housing |  |
|  |  |  | 0 | 03 | 020 | Material for thermometer / hygrometer housing |  |
|  |  |  | 0 | 03 | 004 | Type of screen / shelter / radiation shield |  |
|  |  |  | 0 | 03 | 023 | Configuration of louvers for thermometer / hygrometer screen |  |
|  |  |  | 0 | 03 | 008 | Artificially ventilated screen or shield |  |
|  |  |  | 0 | 03 | 009 | Amount of forced ventilation at time of reading |  |

**Category 06 – BUFR/CREX Meteorological or oceanographic sequences common to oceanographic observations**

*Add*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Table reference | | | Table references | | | Element name | Element description |
| F | XX | YYY | F | XX | YYY |
| 3 | 06 | 043 |  |  |  | E-SURFMAR S-AWS Observations |  |
|  |  |  | 0 | 41 | 001 | pCO2 |  |
|  |  |  | 0 | 08 | 043 | Atmospheric chemical or physical constituent type | set to 3 (carbon dioxide) |
|  |  |  | 0 | 15 | 028 | Mole fraction of atmospheric constituent / pollutant in dry air |  |
|  |  |  | 0 | 08 | 043 | Atmospheric chemical or physical constituent type | Cancel |
|  |  |  | 0 | 13 | 080 | pH |  |
|  |  |  | 0 | 41 | 005 | Turbidity |  |
|  |  |  | 0 | 41 | 003 | Dissolved nitrates |  |
|  |  |  | 0 | 22 | 188 | Dissolved oxygen |  |
|  |  |  | 0 | 41 | 002 | Fluorescence |  |
|  |  |  | 1 | 06 | 000 | Delayed replication of 6 descriptors |  |
|  |  |  | 0 | 31 | 000 | Short delayed replication factor |  |
|  |  |  | 0 | 04 | 024 | Time period or displacement (hours) | Set to -1 (preceding hour) |
|  |  |  | 0 | 14 | 002 | Long-wave radiation, integrated over period specified | Downwelling longwave radiation |
|  |  |  | 0 | 14 | 002 | Long-wave radiation, integrated over period specified | Upwelling longwave radiation |
|  |  |  | 0 | 14 | 012 | Net long-wave radiation, integrated over period specified |  |
|  |  |  | 0 | 14 | 004 | Short-wave radiation, integrated over period specified |  |
|  |  |  | 0 | 04 | 024 | Time period or displacement (hours) | Cancel |

**Category 08 – BUFR/CREX Surface report sequences (sea)**

*Add*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Table reference | | | Table References | | | Element name | Element description |
| F | XX | YYY | F | XX | YYY |
| 3 | 08 | 014 |  |  |  | (Synoptic reports from sea stations suitable for VOS observation data) |  |
|  |  |  | 1 | 01 | 000 | Delayed replication of 1 descriptor |  |
|  |  |  | 0 | 31 | 000 | Short delayed descriptor replication factor |  |
|  |  |  | 3 | 01 | 018 | Encrypted ship’s call sign and encryption method |  |
|  |  |  | 0 | 03 | 001 | Surface station type |  |
|  |  |  | 3 | 01 | 093 | Ship identification, movement, date/time, horizontal and vertical coordinates |  |
|  |  |  | 2 | 08 | 032 | Change width of CCITT IA5 to 32 characters |  |
|  |  |  | 0 | 01 | 079 | Unique identifier for profile | Unique ID for report. |
|  |  |  | 2 | 08 | 000 | Change width of CCITT IA5 | Cancel |
|  |  |  | 3 | 02 | 062 | Ship “instantaneous” data |  |
|  |  |  | 3 | 02 | 063 | Ship “period” data |  |
|  |  |  | 1 | 01 | 000 | Delayed replication of 1 descriptor |  |
|  |  |  | 0 | 31 | 000 | Short delayed descriptor replication factor |  |
|  |  |  | 3 | 02 | 092 | VOSClim data elements |  |
|  |  |  | 1 | 01 | 000 | Delayed replication of 1 descriptor |  |
|  |  |  | 0 | 31 | 000 | Short delayed descriptor replication factor |  |
|  |  |  | 3 | 06 | 033 | Surface salinity |  |
|  |  |  | 1 | 01 | 000 | Delayed replication of 1 descriptor |  |
|  |  |  | 0 | 31 | 000 | Short delayed descriptor replication factor |  |
|  |  |  | 3 | 06 | 034 | Surface current |  |
|  |  |  | 1 | 01 | 000 | Delayed replication of 1 descriptor |  |
|  |  |  | 0 | 31 | 000 | Short delayed descriptor replication factor |  |
|  |  |  | 3 | 06 | 043 | E-SURFMAR S-AWS Observations |  |

**BUFR/CREX Code tables**

**Code/flag Tables 02**

***Amend***

**0 02 096**

**Type of temperature sensor**

|  |  |
| --- | --- |
| **Code figure** | **Meaning** |
| 0 | Rod thermistor |
| 1 | Bead thermistor |
| 2 | Capacitance bead |
| 3 | Capacitance wire |
| 4 | Resistive sensor |
| 5 | Chip thermistor |
| 6 | Mercury |
| 7 | Alcohol / glycol |
| 8 - 30 | Reserved (for future use) |
| 31 | Missing value |

**0 02 097**

**Type of humidity sensor**

|  |  |
| --- | --- |
| **Code figure** | **Meaning** |
| 0 | VIZ Mark II carbon hygristor |
| 1 | VIZ B2 hygristor |
| 2 | Vaisala A-Humicap |
| 3 | Vaisala H-Humicap |
| 4 | Capacitance sensor |
| 5 | Vaisala RS90 |
| 6 | Sippican Mark IIA carbon Hygristor |
| 7 | Twin alternatively heated Humicap capacitance sensor |
| 8 | Humicap capacitance sensor with active de-icing method |
| 9 | Psychrometer |
| 10 | Capacitive (polymer) |
| 11 | Capacitive (ceramic, incl. metal oxide) |
| 12 | Resistive (generic) |
| 13 | Resistive (salt polymer) |
| 14 | Resistive (conductive polymer) |
| 15 | Thermal conductivity |
| 16 | Gravimetric |
| 17 | Paper-metal coil |
| 18 | Ordinary human hair |
| 19 | Rolled hair (torsion) |
| 20 | Goldbeater's skin |
| 21 | Chilled mirror hygrometer |
| 22 | Dew cell |
| 23 | Optical absorption sensor |
| 24 – 30 | Reserved for future use |
| 31 | Missing value |

**Code/flag Tables 03**

*Add*

**0 03 001**

**Surface Station Type**

|  |  |
| --- | --- |
| **Code figure** | **Meaning** |
| 0 | Land station (synoptic network) |
| 1 | Shallow water station (fixed to sea/lake floor) |
| 2 | Ship |
| 3 | Rig/platform |
| 4 | Moored buoy |
| 5 | Drifting buoy (or drifter) |
| 6 | Ice buoy |
| 7 | Land station (local network) |
| 8 | Land vehicle |
| 9 | Autonomous marine vehicle |
| 10-30 | Reserved (for future use) |
| 31 | Missing value |

**0 03 003**

**Thermometer / hygrometer housing**

|  |  |
| --- | --- |
| **Code figure** | **Meaning** |
| 0 | Screen |
| 1 | Sling / Whirling |
| 2 | Unscreened |
| 3 | Radiation shield |
| 4 | Aspirated (e.g. Assmann) |
| 5 | Other Shelter |
| 6 | Handheld |
| 7-14 | Reserved for future use |
| 15 | Missing value |

**0 03 004**

**Type of screen / shelter / radiation shield**

|  |  |
| --- | --- |
| **Code figure** | **Meaning** |
| 0 | Stevenson screen |
| 1 | Marine Stevenson screen |
| 2 | Cylindrical section plate shield |
| 3 | Concentric tube |
| 4 | Rectangular section shield |
| 5 | Square section shield |
| 6 | Triangular section shield |
| 7 | Open covered lean to |
| 8 | Open covered inverted V roof |
| 9 | Integrated (e.g. Chilled Mirror) |
| 10-14 | Reserved for future use |
| 15 | Missing value |

**0 03 008**

**Artificially ventilated screen or shield**

|  |  |
| --- | --- |
| **Code figure** | **Meaning** |
| 0 | Natural ventilation in use |
| 1 | Artificial aspiration in use: constant flow at time of reading |
| 2 | Artificial aspiration in use: variable flow at time of reading |
| 3-6 | Reserved |
| 7 | Missing value |

**0 03 020**

**Material for thermometer / hygrometer housing**

|  |  |
| --- | --- |
| **Code figure** | **Meaning** |
| 0 | Wood |
| 1 | Metal alloy |
| 2 | Plastic / GRP |
| 3 | Reed / grass / leaf |
| 4-6 | Reserved for future use |
| 7 | Missing value |

**0 03 021**

**Hygrometer heating**

|  |  |
| --- | --- |
| **Code figure** | **Meaning** |
| 0 | Unheated |
| 1 | Heated |
| 2 | Not applicable |
| 3 | Missing value |

**0 03 022**

**Instrument owner**

|  |  |
| --- | --- |
| **Code figure** | **Meaning** |
| 0 | National hydro meteorological / weather service |
| 1 | Other |
| 2 | Standards institute |
| 3-6 | Reserved for future use |
| 7 | Missing value |

**0 03 023**

**Configuration of louvers for thermometer / hygrometer screen**

|  |  |
| --- | --- |
| **Code figure** | **Meaning** |
| 0 | Single v section louvers |
| 1 | Overlapping louvers |
| 2 | Double v section louvers |
| 3 | Non-overlapping louvers |
| 4 | Vented, non-louvered |
| 5 | Not applicable |
| 6 | Reserved for future use |
| 7 | Missing value |

**Code/flag Tables 25**

*Add*

**0 25 185**

**Encryption method**

|  |  |
| --- | --- |
| **Code Figure** | **Meaning** |
| 0 | AES 256 |
| 1 – 254 | Reserved |
| 255 | Missing value |

**0 25 188**

**Method for reducing pressure report to sea level**

|  |  |
| --- | --- |
| **Code Figure** | **Meaning** |
| 0 | Pressure adjusted to mean sea level following WMO 8 for low level (< 50m) stations |
| 1 | Pressure adjusted to mean sea level following WMO 8 for stations below 750 m |
| 2 | Pressure adjusted to sea level following national practice |
| 3 | Pressure adjusted to local water level following national practice |
| 4 | Pressure not corrected for height |
| 5 – 14 | Reserved |
| 15 | Missing |

**Common Code Table C6**

*Add*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Code figure** |  | **Conventional abbreviation** | **Abbreviation in IA5/ASCII** | **Abbreviation in IA2** | **Definition in base units** |
| 843 | Nephelometric Turbidity Units | NTU | NTU |  |  |