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| WORLD METEOROLOGICAL ORGANIZATION  COMMISSION FOR BASIC SYSTEMS  -----------------------------  SECOND MEETING OF  INTER-PROGRAMME EXPERT TEAM ON CODES MAINTENANCE  OFFENBACH, GERMANY, 28 MAY - 1 JUNE 2018 |  | IPET-CM-II / Doc. 2.4(11)  (28.05.2018)  -------------------------  ITEM 2.4  ENGLISH ONLY |

BUFR

**New BUFR sequence and code and flag tables for Sentinel-3 SRAL product**

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**Summary and Purpose of Document**

This document proposes new BUFR sequences and quality flags in order to encode the Sentinel-3 Water product produced by EUMETSAT.

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**ACTION PROPOSED**

The meeting is requested to approve the contents for inclusion within the next update to the WMO Manual on Codes.

**DISCUSSIONS**

EUMETSAT intends to disseminate Level 2 Water Near-Real Time Water Products produced from observations encoded in BUFR, derived from data produced by the Sentinel-3 Ku/C Radar Altimeter (SRAL) instrument on board the Sentinel-3 satellite.

It is proposed to add a sequence to the Manual on Codes which the products’ contents, as well as two Code Tables and Flag Tables to encode new metadata which is necessary in order to interpret the product.

**PROPOSAL**

***“Amend”, “add”, “delete” are the keywords***

*Add* the following sequence “Sentinel-3 (S3) Level 2 Water Product” to BUFR Table D/40:

|  |  |  |
| --- | --- | --- |
| TABLE REFERENCE | TABLE REFERENCES | ELEMENT NAME |
| 3 40 016 | 001007 | Satellite identifier |
| 002019 | Satellite instruments |
| 005044 | Satellite cycle number |
| 001096 | Station acquisition |
| 005040 | Orbit number |
| 001040 | Processing centre id code |
| 025061 | Software identification and version number |
| 025182 | L1 processing flag |
| 025183 | L1 processing quality |
| 025181 | L2 processing flag |
| 025184 | L2 product status |
| 301011 | Year, month, day |
| 301013 | Hour, minute, second |
| 004007 | Seconds within a minute (microsecond accuracy) |
| 301021 | Latitude/longitude (high accuracy) |
| 005063 | Spacecraft roll |
| 005064 | Spacecraft pitch |
| 005066 | Spacecraft yaw |
| 010081 | Altitude of cog above reference ellipsoid |
| 010082 | Instantaneous altitude rate |
| 008075 | Ascending/descending orbit qualifier |
| 025090 | Orbit state flag |
| 008029 | Surface type |
| 201137 | Increase data width by 9 bits |
| 202129 | Add 1 to scale |
| 006021 | Distance |
| 202000 | Cancel |
| 201000 | Cancel |
| 010087 | Ocean depth/land elevation |
| 025096 | Radiometer state flag |
| 040012 | Radiometer data quality flag |
| 008077 | Radiometer sensed surface type |
| 002153 | Satellite channel centre frequency |
| 012063 | Brightness temperature |
| 012065 | Standard deviation brightness temperature |
| 040013 | Radiometer brightness temperature interpretation flag |
| 002153 | Satellite channel centre frequency |
| 012063 | Brightness temperature |
| 012065 | Standard deviation brightness temperature |
| 040013 | Radiometer brightness temperature interpretation flag |
| 007002 | Height or altitude |
| 011098 | Wind speed from radiometer |
| 013090 | Radiometer water vapour content |
| 013091 | Radiometer liquid content |
| 025164 | Radiometer wet tropospheric correction |
| 025095 | Altimeter state flag |
| 040023 | Auxiliary altimeter state flags |
| 025113 | Band specific altimeter correction quality flag |
| 008074 | Altimeter echo type |
| 025190 | Altimeter echo processing mode |
| 021144 | Altimeter rain flag |
| 025191 | Altimeter tracking mode |
| 021143 | Ku band rain attenuation |
| 013055 | Intensity of precipitation |
| 021169 | Ice presence indicator |
| 010101 | Squared off nadir angle of the satellite from waveform data |
| 015012 | Total electron count per square metre |
| 007002 | Height or altitude |
| 011097 | Wind speed from altimeter |
| 040024 | Meteorological map availability |
| 007002 | Height or altitude |
| 025126 | Model dry tropospheric correction |
| 025128 | Model wet tropospheric correction |
| 040011 | Interpolation flag |
| 007002 | Height or altitude |
| 011095 | U-component of the model wind vector |
| 011096 | V-component of the model wind vector |
| 010088 | Total geocentric ocean tide height (solution 1) |
| 010089 | Total geocentric ocean tide height (solution 2) |
| 010090 | Long period tide height |
| 010092 | Solid earth tide height |
| 010093 | Geocentric pole tide height |
| 010098 | Loading tide height geocentric ocean tide solution 1 |
| 010099 | Loading tide height geocentric ocean tide solution 2 |
| 010100 | Non-equilibrium long period tide height |
| 025127 | Inverted barometer correction |
| 040014 | High-frequency fluctuations of the sea-surface topography corr |
| 010085 | Mean sea surface height |
| 010086 | Geoid's height |
| 010096 | Mean dynamic topography |
| 010103 | Mean dynamic topography accuracy |
| 010102 | Sea surface height anomaly |
| 022080 | Waveband central frequency |
| 008076 | Type of band |
| 022189 | Specific band ocean range |
| 022191 | Rms of specific band ocean range |
| 022130 | Number of valid points for specific band |
| 025165 | Ionospheric correction from model on specific band |
| 025166 | Sea state bias correction on specific band |
| 025167 | Specific band net instrumental correction |
| 021183 | Specific band corrected ocean backscatter coefficient |
| 021184 | Std specific band corrected ocean backscatter coefficient |
| 022134 | Number of valid points for specific band backscatter |
| 021122 | Attenuation correction on sigma-0 (from tb) |
| 022190 | Specific band significant wave height |
| 022131 | Rms specific band significant wave height |
| 022132 | Number of valid points for specific band sign. Wave height |
| 022133 | Specific band net instr. Correction for significant wave height |
| 021186 | Specific band automatic gain control |
| 021187 | Rms specific band automatic gain control |
| 021188 | Number of valid points for specific band automatic gain control |
| 021185 | Specific band net instrumental correction for agc |
| 025112 | Band specific altimeter data quality flag |
| 025113 | Band specific altimeter correction quality flag |
| 033092 | Band specific ocean quality flag |
| 008076 | Type of band |
| 022189 | Specific band ocean range |
| 022191 | Rms of specific band ocean range |
| 022130 | Number of valid points for specific band |
| 025165 | Ionospheric correction from model on specific band |
| 025166 | Sea state bias correction on specific band |
| 025167 | Specific band net instrumental correction |
| 021183 | Specific band corrected ocean backscatter coefficient |
| 021184 | Std specific band corrected ocean backscatter coefficient |
| 022134 | Number of valid points for specific band backscatter |
| 021122 | Attenuation correction on sigma-0 (from tb) |
| 022190 | Specific band significant wave height |
| 022131 | Rms specific band significant wave height |
| 022132 | Number of valid points for specific band sign. Wave height |
| 022133 | Specific band net instr. Correction for significant wave height |
| 021186 | Specific band automatic gain control |
| 021187 | Rms specific band automatic gain control |
| 021188 | Number of valid points for specific band automatic gain control |
| 021185 | Specific band net instrumental correction for agc |
| 025112 | Band specific altimeter data quality flag |
| 025113 | Band specific altimeter correction quality flag |
| 033092 | Band specific ocean quality flag |
| 025190 | Altimeter echo processing mode |
| 011097 | Wind speed from altimeter |
| 013090 | Radiometer water vapour content |
| 013091 | Radiometer liquid content |
| 021143 | Ku band rain attenuation |
| 021184 | Std specific band corrected ocean backscatter coefficient |
| 025128 | Model wet tropospheric correction |
| 025163 | Altimeter ionospheric correction on ku band |
| 025164 | Radiometer wet tropospheric correction |
| 010102 | Sea surface height anomaly |
| 022189 | Specific band ocean range |
| 022191 | Rms of specific band ocean range |
| 022130 | Number of valid points for specific band |
| 025166 | Sea state bias correction on specific band |
| 021183 | Specific band corrected ocean backscatter coefficient |
| 021184 | Std specific band corrected ocean backscatter coefficient |
| 022134 | Number of valid points for specific band backscatter |
| 022190 | Specific band significant wave height |
| 022131 | Rms specific band significant wave height |
| 022132 | Number of valid points for specific band sign. Wave height |
| 025112 | Band specific altimeter data quality flag |
| 025113 | Band specific altimeter correction quality flag |
| 033092 | Band specific ocean quality flag |
| 008049 | Number of observations |
| 022080 | Waveband central frequency |
| 134021 | Repeat 34 descriptors 21 times |
| 301011 | Year, month, day |
| 301013 | Hour, minute, second |
| 004007 | Seconds within a minute (microsecond accuracy) |
| 301021 | Latitude/longitude (high accuracy) |
| 010081 | Altitude of cog above reference ellipsoid |
| 010082 | Altitude of cog above reference ellipsoid |
| 008029 | Surface type |
| 201137 | Add 9 bits to data width |
| 202129 | Add 1 to scale |
| 006021 | Distance |
| 202000 | Cancel |
| 201000 | Cancel |
| 025191 | Altimeter tracking mode |
| 021071 | Peakiness |
| 010085 | Mean sea surface height |
| 040011 | Interpolation flag |
| 010102 | Sea surface height anomaly |
| 022189 | Specific band ocean range |
| 022146 | Ocog range |
| 025165 | Ionospheric correction from model on specific band |
| 025167 | Specific band net instrumental correction |
| 021183 | Specific band corrected ocean backscatter coefficient |
| 022190 | Specific band significant wave height |
| 022133 | Specific band net instr. Correction for significant wave height |
| 021177 | Corrected ocog backscatter coefficient |
| 021185 | Specific band net instrumental correction for agc |
| 013163 | Sea ice freeboard |
| 202126 | Subtract 2 bits from scale |
| 022046 | Sea ice fraction |
| 202000 | Cancel |
| 013117 | Snow density (liquid water content) |
| 013013 | Total snow depth |
| 025112 | Band specific altimeter data quality flag |
| 033092 | Band specific ocean quality flag |

*Add* the following element to BUFR Table B/25:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Descriptor** | **Name** | **Units** | **Scale** | **Reference** | **Width** |
| 0-25-190 | Altimeter echo processing mode | Code table | 0 | 0 | 8 |

*Add* the following associated code table:

0-25-190 Altimeter echo processing mode

|  |  |
| --- | --- |
| *Code figure* | *Description* |
| 0 | LRM |
| 1 | SAR |
| 2 | LRM and SAR (interleaved) |
| 3 | Reserved |
| 4 | PLRM |
| 5 | SARIN |
| 6-254 | Reserved |
| 255 | Missing value |

*Add* the following element to BUFR Table B/25:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Descriptor** | **Name** | **Units** | **Scale** | **Reference** | **Width** |
| 0-25-191 | Altimeter tracking mode | Code table | 0 | 0 | 8 |

*Add* the following associated code table:

0-25-191 Altimeter tracking mode

|  |  |
| --- | --- |
| *Code figure* | *Description* |
| 0 | Open loop |
| 1 | Closed loop |
| 2 | Open Loop Fixed Gain |
| 3-254 | Reserved |
| 255 | Missing value |

*Add* the following element to BUFR Table B/10:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Descriptor** | **Name** | **Units** | **Scale** | **Reference** | **Width** |
| 0-10-103 | Mean dynamic topography accuracy | M | 3 | -131072 | 18 |

*Add* the following element to BUFR Table B/33:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Descriptor** | **Name** | **Units** | **Scale** | **Reference** | **Width** |
| 0-33-092 | Band specific ocean quality flag | Flag table | 0 | 0 | 9 |

*Add* the following associated flag table:

0-33-092 Band specific ocean quality flag

|  |  |
| --- | --- |
| *Bit* | *Description* |
| 1 | Altimeter operating |
| 2 | MWR operating |
| 3-9 | Reserved |
| All 9 | Missing value |

*Add* the following element to BUFR Table B/13:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Descriptor** | **Name** | **Units** | **Scale** | **Reference** | **Width** |
| 0-13-163 | Sea ice freeboard | M | 3 | -131072 | 18 |