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| WORLD METEOROLOGICAL ORGANIZATION  COMMISSION FOR BASIC SYSTEMS  -----------------------------  THIRD MEETING OF  INTER-PROGRAMME EXPERT TEAM ON CODES MAINTENANCE  MARRAKECH, MOROCCO, 15 - 19 APRIL 2019 |  | IPET-CM-III / Doc. 2.4(3)  10.04.2019  -------------------------  ITEM 2.4  ENGLISH ONLY |

MANUAL ON CODES: TABLE-DRIVEN CODE FORMS

FM 94 BUFR/FM 95 CREX

**Reporting CryoSat-2 NOP observations using element 0-25-190 following BUFR sequence 3-12-071**

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**Summary and Purpose of Document**

Use of the BUFR element 0 25 190 following BUFR sequence 3-12-071 with the aim to report properly all observations from CryoSat-2 Ocean Processor Near-Real Time Ocean Products (NOP) which include observations obtained in the three operating modes (which involve different altimeter echo processing): LRM, SAR and SARIN.

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**ACTION PROPOSED**

The team is kindly invited to accept the use of BUFR element Altimeter echo processing mode 0-25-190 following the BUFR sequence 3-12-071 to enable reporting all new CryoSat-2 NOP observations from the three CryoSat-2 operating modes LRM, SAR and SARIN and consider introduction of a note in Manual on Codes to allow this practice.

**ANNEXES:**

1. (Title of annex)

**DISCUSSIONS**

ECMWF is preparing for the operational processing of CryoSat-2 NOP observations. Currently, CryoSat-2 Fast Delivery Marine (FDM) product which is a subset of the Low-Resolution Mode (LRM) data that is available in near real time (NRT). Therefore, there was no need to distinguish the altimeter echo processing mode as all of the reported observations were from the LRM.

ESA is replacing all NRT data including FDM by the Near-Real Time Ocean Products (NOP) which includes observations produced from the three modes of operation: LRM, SAR and SARIN. Each mode provides observations with different error characteristics. Therefore, there is a need to distinguish the operating mode (or echo processing mode) in order to assimilate the observations properly using their correct error characteristics.

In the context of this activity ECMWF collaborates with ESA on providing data in BUFR which is of interest for the data assimilation in NWP models and exchanging CryoSat-2 NOP data activities.

BUFR sequence 3-12-071 (CryoSat-2 SIRAL altimeter) is used for reporting CryoSat-2 NOP data. The BUFR element 0-25-190 is needed to be used to aid distinguishing the data from different operational modes.

**PROPOSAL**

Observations from CryoSat-2 NOP to be reported using BUFR sequence 3-12-071 following BUFR descriptor 0-25-190 as below:

|  |  |  |  |
| --- | --- | --- | --- |
| TABLE  REFERENCE | TABLE  REFERENCES | ELEMENT NAME | ELEMENT DESCRIPTION |
| F X Y |
|  |  | (CryoSat-2 SIRAL altimeter) |  |
| 3 12 071 | 0 01 007 | Satellite identifier |  |
|  | 0 02 019 | Satellite instruments |  |
|  | 0 02 139 | SIRAL instrument configuration |  |
|  | 0 01 096 | Station acquisition | Acquisition station name |
|  | 0 01 040 | Processing centre ID code |  |
|  | 0 25 061 | Software identification and version number |  |
|  | 0 05 040 | Orbit number |  |
|  | 0 05 044 | Satellite cycle number |  |
|  | 0 08 075 | Ascending/descending orbit qualifier |  |
|  | 0 08 077 | Radiometer sensed surface type |  |
|  | 0 04 001 | Year |  |
|  | 0 04 002 | Month |  |
|  | 0 04 003 | Day |  |
|  | 0 04 004 | Hour |  |
|  | 0 04 005 | Minute |  |
|  | 0 04 006 | Second |  |
|  | 0 05 001 | Latitude (high accuracy) |  |
|  | 0 06 001 | Longitude (high accuracy) |  |
|  | 0 10 081 | Altitude of COG above reference ellipsoid |  |
|  | 0 22 156 | Ku band significant wave height |  |
|  | 0 22 142 | Square of significant wave height |  |
|  | 1 01 020 | Replicate 1 descriptor 20 times |  |
|  | 0 22 149 | 20 Hz significant wave height squared |  |
|  | 0 22 143 | STD of 20 Hz SWH squared |  |
|  | 0 22 144 | Number of 20 Hz valid points for SWH squared |  |
|  | 0 21 137 | Ku band corrected ocean backscatter coefficient |  |
|  | 1 01 020 | Replicate 1 descriptor 20 times |  |
|  | 0 21 181 | 20 Hz ocean backscatter coefficient |  |
|  | 0 21 138 | STD Ku band corrected ocean backscatter coefficient |  |
|  | 0 21 180 | Number of 20 Hz valid points for ocean backscatter coefficient |  |
|  | 0 21 177 | Corrected OCOG backscatter coefficient |  |
|  | 0 21 178 | STD of 20 Hz OCOG backscatter coefficient |  |
|  | 0 21 179 | Number of 20 Hz valid points for OCOG backscatter coefficient |  |
|  | 0 10 079 | Off nadir angle of the satellite from platform data |  |
|  | 0 10 085 | Mean sea-surface height |  |
|  | 0 10 086 | Geoid’s height |  |
|  | 0 10 087 | Ocean depth/land elevation |  |
|  | 0 10 089 | Total geocentric ocean tide height (solution 2) |  |
|  | 0 10 090 | Long period tide height |  |
|  | 0 10 091 | Tidal loading height |  |
|  | 0 10 092 | Solid Earth tide height |  |
|  | 0 10 093 | Geocentric pole tide height |  |
|  | 0 11 097 | Wind speed from altimeter |  |
|  | 0 21 093 | Ku band peakiness | Average of 20 Hz values |
|  | 1 01 020 | Replicate 1 descriptor 20 times |  |
|  | 0 21 182 | 20 Hz Ku band peakiness | 20 values |
|  | 0 33 053 | Ku band ocean retracking quality |  |
|  | 0 22 151 | Ku band ocean range |  |
|  | 0 22 145 | STD of 20 Hz ocean range |  |
|  |  |  |  |
|  | 0 22 148 | Number of 20 Hz valid points for ocean range |  |
|  | 0 22 146 | OCOG range |  |
|  | 0 22 147 | STD of 20 Hz OCOG range |  |
|  | 0 25 126 | Model dry tropospheric correction |  |
|  | 0 25 128 | Model wet tropospheric correction |  |
|  | 0 25 127 | Inverted barometer correction |  |
|  | 0 21 176 | High frequency variability correction |  |
|  | 0 25 132 | Ionospheric correction from model on Ku band |  |
|  | 0 25 133 | Sea state bias correction on Ku band |  |
|  | 0 25 182 | L1 processing flag |  |
|  | 0 25 183 | L1 processing quality |  |
|  | 0 25 180 | LRM mode per cent |  |
|  | 0 25 184 | L2 product status |  |
|  | 0 25 181 | L2 processing flag |  |
|  | 0 33 080 | Scan level quality flags | L2 processing quality |
| 0 25 190 |  | Altimeter echo processing mode |  |

The following note could be included

Under Category 12 –Single level report sequences (satellite data)

(4) BUFR sequence 3-12-071 can be followed by BUFR descriptor 0-25-190 to enable reporting data from different Altimeter echo processing mode.