|  |  |  |
| --- | --- | --- |
| 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(1)  05.04.2019  -------------------------  ITEM 2.4  ENGLISH ONLY |

MANUAL ON CODES: TABLE-DRIVEN CODE FORMS

Additions to BUFR/CREX tables

New BUFR descriptors for limb profiler ozone data

*Submitted by Jeff Ator (U.S.A.)*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Summary and Purpose of Document**

This document proposes new BUFR Table B descriptors for pre-operational approval.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**ACTION PROPOSED**

The meeting is requested to approve the proposal for pre-operational use.

**DISCUSSIONS**

The U.S. National Environmental Satellite, Data and Information Service (NESDIS) is planning to make limb profiler data available in BUFR from the Ozone Mapping Profiler Suite (OMPS) instruments on the Suomi-NPP satellite. To this end, a proposal for a new BUFR Table D sequence and three new Table B descriptors was developed.

The original proposal was submitted for review by the CGMS satellite team in October 2018, and no adverse comments were received. Subsequently, the same proposal was forwarded to the full IPET-CM team for review in early February 2019, along with a sample encoded BUFR message for validation. The message was encoded using ECMWF’s ecCodes software, and a sample decode listing using NCEP’s BUFRLIB software was also provided to further illustrate the use of the sequence and to meet the minimum requirements for validation. We invited other IPET-CM members to participate in the validation and provide their own feedback, and we gratefully acknowledge the replies received in particular from DWD and ECMWF.

The feedback that was received included a request from ECMWF as to whether some additional Table B elements could be included within the proposed Table D sequence. For background, the original proposed sequence is shown here.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **3-10-031** |  | **Limb profiler ozone data** | **Annotation** | |
|  | 001007 | Satellite identifier |  |
|  | 001033 | Identification of originating/generating centre |  |
|  | 001034 | Identification of originating/generating sub-centre |  |
|  | 002019 | Satellite instruments |  |
|  | 002020 | Satellite classification |  |
|  | 301011 | (Year, month, day) |  |
|  | 301013 | (Hour, minute, second) |  |
|  | 005040 | Orbit number |  |
|  | 301021 | (Latitude/longitude (high accuracy) |  |
|  | 007024 | Satellite zenith angle |  |
|  | 005021 | Bearing or azimuth |  |
|  | 007025 | Solar zenith angle |  |
|  | 005022 | Solar azimuth |  |
|  | 115081 |  |  |
|  | 007002 | Height or altitude |  |
|  | 207003 | Increase scale/reference value/data width |  |
|  | 010004 | Pressure |  |
|  | 207000 | Cancel scale/reference value/data width change |  |
|  | 015006 | Log10 of number density of atmosphere |  |
|  | 012001 | Temperature/air temperature |  |
|  | 102002 |  |  |
|  | 002092 | Ozone profile computation method | 0=UV based  1=Visible based |
|  | 015009 | Log10 of number density of ozone |  |
|  | 002092 | Ozone profile computation method | 2=combined UV and vis |
|  | 008090 | Decimal scale of following significands |  |
|  | 207006 | Increase scale, reference value and data width |  |
|  | 015008 | Significand of volumetric mixing ratio |  |
|  | 207000 | Cancel data width change |  |
|  | 008090 | Decimal scale of following significands | Missing=Cancel |
|  | 222000 | Quality information follows |  |
|  | 236000 | Define data present bit-map |  |
|  | 101000 | Repeat the following descriptor |  |
|  | 031002 | Extended delayed descriptor replication factor |  |
|  | 031031 | Data present indicator |  |
|  | 101243 | Repeat next element 243 times |  |
|  | 033003 | Quality information |  |
|  | 224000 | First order statistical values follow |  |
|  | 237000 | Use defined data present bit-map |  |
|  | 008023 | First-order statistics | 10=Standard deviation |
|  | 101243 | Repeat next element 243 times |  |
|  | 224255 | First-order statistical values marker operator |  |

Some further discussion ensued via email; however, there was not enough time prior to IPET-CM-3 for all of the issues to be resolved between the subject-matter experts from NESDIS and ECMWF, so we have now adjusted the proposal as shown below for IPET-CM-3. In short, we would like to go ahead with the proposal for the three new Table B descriptors which are not in dispute, as this would allow NESDIS to begin disseminating their data, albeit with a longer list of descriptors in Section 3 of their BUFR messages. Then, at a later date, and once any remaining issues with the proposed Table D sequence have been resolved, we can come back to the IPET-CM with a follow-on proposal for the revised sequence to replace the longer list of descriptors in Section 3.

NESDIS would like to make their limb profiler ozone data available to users beginning in May 2019, so we respectfully ask for pre-operational approval of the following proposal.

**PROPOSAL**

**Add new entries to BUFR Table B**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| DESCRIPTOR | ELEMENT NAME | UNIT | SCALE | REFERENCE VALUE | DATA WIDTH |
| 0-02-092 | Ozone profile computation method | Code table | 0 | 0 | 3 |
| 0-15-006 | Log10 of number density of atmosphere | log(m-3) | 5 | 1800000 | 20 |
| 0-15-009 | Log10 of number density of ozone | log(m-3) | 5 | 1200000 | 20 |

0-02-092

Ozone profile computation method

|  |  |
| --- | --- |
| Code figure | Meaning |
| 0 | UV channel based retrieval |
| 1 | Visible channel based retrieval |
| 2 | Combined UV based retrieval and visible based retrieval |
| 3-6 | Reserved |
| 7 | Missing value |