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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 (7)  23.05.2018  -------------------------  ITEM 2.4  ENGLISH ONLY |

BUFR

New BUFR sequence for describing the "First five" Fourier components of the directional wave spectrum

*Submitted by JCOMM / DBCP (Jon Turton, presented by David Berry)*

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**Summary and Purpose of Document**

This document proposes a new BUFR sequence for the minimum set of parameters required to accurately describe the directional wave spectrum.

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**ACTION PROPOSED**

The meeting is requested to approve the contents of this proposal for validation status.

**ANNEXES:**

1. (Title of annex)

**DISCUSSIONS**

In order for a wave observing system to satisfy the widest range of activities the "First five" Fourier components of the directional spectral wave field are required (e.g. Swail et al., 2010). These are defined as the wave energy and the first four coefficients (a1, b1, a2, and b2) of the Fourier series defining the directional distribution of that energy for each frequency band.

The Table B elements and Table D sequence proposed in this document provide the capability to report the "First five" in BUFR.

Swail, V. & Co-Authors (2010). "Wave Measurements, Needs and Developments for the Next Decade" in Proceedings of OceanObs’09: Sustained Ocean Observations and Information for Society (Vol. 2), Venice, Italy, 21-25 September 2009, Hall, J., Harrison, D.E. & Stammer, D., Eds., ESA Publication WPP-306, doi:10.5270/OceanObs09.cwp.87

**PROPOSAL**

Add new entries to BUFR Table B

**Class 42 (Oceanographic elements)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Table Reference | Element name | BUFR | | | | CREX | | |
| Unit | Scale | Reference value | Data width (bits) | Unit | Scale | Data width (characters) |
| F XX YYY |
| 0 42 011 | a1 coefficient of the directional Fourier series | Numeric | 4 | -2 | 15 | Numeric | 4 | 6 |
| 0 42 012 | b1 coefficient of the directional Fourier series | Numeric | 4 | -2 | 15 | Numeric | 4 | 6 |
| 0 42 013 | a2 coefficient of the directional Fourier series | Numeric | 4 | -2 | 15 | Numeric | 4 | 6 |
| 0 42 014 | b2 coefficient of the directional Fourier series | Numeric | 4 | -2 | 15 | Numeric | 4 | 6 |
| 0 42 015 | Check factor K | Numeric | 2 | 0 | 12 | Numeric | 2 | 4 |

Add new entry to BUFR Table D

**Category 15 (Oceanographic report sequences)**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **First five Fourier components of the wave spectrum** |  |
| 3 15 010 | 1 08 000 | Delayed replication of 8 descriptors |  |
|  | 0 31 001 | Delayed descriptor replication factor |  |
|  | 0 22 080 | Waveband central frequency (Hz) |  |
|  | 0 22 096 | Spectral band width (Hz) |  |
|  | 0 22 069 | Spectral wave density (m2 Hz-1) |  |
|  | 0 42 011 | a1 coefficient of the directional Fourier series | First moment of the directional wave spectrum |
|  | 0 42 012 | b1 coefficient of the directional Fourier series | First moment of the directional wave spectrum |
|  | 0 42 013 | a2 coefficient of the directional Fourier series | Second moment of the directional wave spectrum |
|  | 0 42 014 | b2 coefficient of the directional Fourier series | Second moment of the directional wave spectrum |
|  | 0 42 015 | Check factor K | Inverse of wave ellipticity |