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| WORLD METEOROLOGICAL ORGANIZATIONCOMMISSION FOR BASIC SYSTEMS-----------------------------SECOND MEETING OFINTER-PROGRAMME EXPERT TEAM ONCODES MAINTENANCEOFFENBACH, GERMANY, 28 MAY - 1 JUNE 2018 |  | IPET-CM-II / Doc. 2.2(2)13.04.2018-------------------------ITEM 2.2ENGLISH ONLY |

MANUAL ON CODES: TABLE-DRIVEN CODE FORMS

FM 92 GRIB

New fixed surface type in Code Table 4.5

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**Summary and Purpose of Document**

The encoding of echo top as pressure value for a specified level of radar reflectivity in a way which is flexible enough to be used in GRIB2 deterministic and ensemble model output requires a new entry in Code Table 4.5 - Fixed surface types and units.

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**ACTION PROPOSED**

The meeting is requested to review the proposed new entry and approve it for pre-operational use and inclusion within the next update to the WMO Manual on Codes.

**ANNEXES:**

**DISCUSSIONS**

Within the framework of the SESAR (“Single European Sky Air Traffic Management Research”) project “Meteorological Information Services”, several meteorological products related to a subtask dealing with “Adverse Weather” are to be provided operationally.

A frequently used product is the forecast of Echotop for a specified threshold of radar reflectivity.

The proposal aims at a flexible way to encode echo top by encoding the variable which is actually stored in the GRIB2 file (here: pressure) and using level information to refer to the definition of echo top and to specify a threshold of radar reflectivity. The level information is then defined by “Highest level where radar reflectivity exceeds the specified value (echo top for a given threshold of reflectivity), unit dBZ”.

Such a definition of a surface type is in analogy to other existing specifications (e.g. entry 13 in Code Table 4.5: “Lowest level where vertically integrated cloud cover exceeds the specified percentage (cloud base for a given percentage cloud cover)”).

This proposal furthermore enables the flexible use of echo top together with the information on the associated dBZ threshold in several aspects of GRIB2 encoding (e.g. as deterministic or ensemble forecasts, probabilistic forecasts like percentiles, exceedance probabilities, statistical processes).

Example: The encoding of echo top in pressure would be a combination of the standard encoding for pressure as variable (dis=0, cat=3, param=0), the new surface type and the reflectivity threshold as level value:

‘ECHOTOP’ = =>

 discipline = 0 ;

 parameter category = 3 ;

 parameter number = 0 ;

 type of first fixed surface = 25;

with „18 dBZ“ in the level specification:

 scale factor of first fixed surface = 0 ;

 scaled value of first fixed surface = 18 ;

The encoding of echo top in meter could be done analogously by using parameter number=6 for geometric height or parameter number=3 for ICAO Standard Atmosphere reference height.

The existing way to encode ‘echo top in meter’ (dis=0, cat=16, param=3) with the threshold value in octet 38 of Product Definition Template 4.20 has the drawback, that it does not allow for echotop in pressure without defining a new parameter in category 16/discipline 0 and that there is no analogy of PDT4.20 for ensemble and probabilistic forecasts.

The proposed way to encode echotop resolves this drawback.

**PROPOSAL**

Please add a new entry in

**Code table 4.5 – *Fixed surface types and units***

Code figure Meaning Unit

 25 Highest level where radar reflectivity exceeds dBZ

 the specified value

 (echo top for a given threshold of reflectivity)

 26–99 Reserved