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| WORLD METEOROLOGICAL ORGANIZATION  COMMISSION FOR BASIC SYSTEMS  -----------------------------  FOURTH MEETING OF  INTER-PROGRAMME EXPERT TEAM ON DATA REPRESENTATION MAINTENANCE AND MONITORING  GENEVA, SWITZERLAND, 30 MAY - 3 JUNE 2016 |  | IPET-DRMM-IV / Doc. 2.2 (4)  (18. 5. 2016)  -------------------------  ITEM 2.2  ENGLISH ONLY |

GRIB

**Amendments in Common Table C-14 for Pollen,**

**new parameters in Table 4.2 and new entries in Table 4.5**

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**Summary and Purpose of Document**

This document proposes amendments in Table C-14 for pollen and new parameters in GRIB2 Code Table 4.2 and 4.5 for use with radionuclide and aerosol forecasts.

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**ACTION PROPOSED**

The meeting is requested to review the proposal and recommend the contents for fast-track approval in November 2016 (FT2016-2).

**ANNEXES:**

1. Zink, K., Pauling, A., Rotach, W., Vogel, H., Kaufmann, P., Clot, B. (2013), EMPOL 1.0: a new parameterization of pollen emission in numerical weather prediction models, Geosci. Model Dev., 6, 1961-1975

**DISCUSSIONS**

The ART module (Aerosols and Reactive Trace gases, Vogel et al., 2009), that can be coupled with DWD models COSMO and ICON, is used for specific applications of chemical constituents like volcanic ash, mineral dust and pollen. To encode these products entries in Common table C-14 and new entries in Tables 4.2 and 4.5 are needed.

*(Vogel, B., Vogel, H., Bäumer, D., Bangert, M., Lundgren, K., Rinke, R., Stanelle, T. (2009), The comprehensive model system COSMO-ART - Radiative impact of aerosol on the state of the atmosphere on the regional scale, Atmos. Chem. Phys., 9, 8661-8680)*

Pollen forecast

There exist different types of pollen which are released during the year. Some of them are allergenic and may cause health problems. To inform and warn the public, pollen counts and forecasts are performed. The ART module provides pollen concentration for several species. It is run operationally by MeteoSwiss.

To code these products in GRIB2 new entries for pollen in Common Table C-14 are needed.

New entries in Table 4.2 for radionuclides

With module ART it is possible to forecast activity concentration of radionuclides and to diagnose column integrated activity concentration and mean air concentration in a layer. For the last two new entries are needed.

New entries in Table 4.2 for atmospheric chemical constituents

In analogy to “maximum of mass density in layer” the mean in a layer can be computed. Therefore a new entry is required.

New entries in Table 4.5 for base and top level of chemical constituents depending on specified concentration

A special product of ART module forecast is the concentration of ash, mineral dust or radionuclides on model levels. The diagnosed base and top of these constituents (e.g. “ash cloud”), depending on a specified threshold of concentration, are provided as additional, compressed information. In analogy to entry 13 of Table 4.5 new entries for base and top for specified concentration are needed to circumvent the invention of new templates. The threshold is defined with scale factor and scaled value of the fixed surface.

**PROPOSAL**

Although pollen forecasts are generated only for alder (Alnus), birch (Betula), ragweed (Ambrosia) and grass (Poaceae) at the moment, a comprehensive list of pollen species is presented for future implementations. It could be used in BUFR/CREX as well.

Please add the following pollen types (trees, weed and grass), starting with entry 62100.

**COMMON CODE TABLE C–14: *Atmospheric chemical or physical constituent type***

Common Code table Code table 4.230 in GRIB Edition 2

Code figure Meaning

62026–62099 Reserved

62100 Abies (Fir)

62101 Acacia (Wattle)

62102 Acer (Maple)

62103 Ailanthus (Tree-of-Heaven)

62104 **Alnus (Alder)**

62105 Aesculus (Horse chestnut, Buckeye)

62106 **Betula (Birch)**

62107 Castanea (Chestnut)

62108 Carpinus (Hornbeam)

62109 Carya (Hickory)

62110 Celtis (Hackberry)

62111 Corylus (Hazel)

62112 Cupressus (Cypress)

62113 Fagus (Beech)

62114 Ficus (Sycamore, Fig)

62115 Fraxinus (Ash)

62116 Juglans (Walnut)

62117 Juniperus (Juniper)

62118 Larix (Larch)

62119 Ligustrum (Privet)

62120 Liquidambar (Sweet-Gum)

62121 Maclura (Osage-Orange)

62122 Malus (Apple, Crab apple)

62123 Morella (Bayberry)

62124 Morus (Mulberry)

62125 Olea (Olive)

62126 Ostrya (Hop-Hornbeam)

62127 Phoenix (Date palm)

62128 Picea (Spruce)

62129 Pinus (Pine)

62130 Platanus (Plane)

62131 Populus (Cottonwood, Poplar)

62132 Prosopis (Mesquite)

62133 Prunus (Almond, Cherry, Peach, Plum)

62134 Quercus (Oak)

62135 Robinia (Locust)

62136 Salix (Willow)

62137 Sambucus (Elder, Elderberry)

62138 Syringa (Lilac)

62139 Taxodium (Cypress)

62140 Taxus (Yew)

62141 Tilia (Lime, Linden)

62142 Ulmus (Elm)

62143-62199 Reserved

62200 Amaranthus (Amaranth, Pigweed, Tumbleweed)

62201 **Ambrosia (Ragweed, Burr-ragweed )**

62202 Artemisia (Sagebrush, Wormwood , Mugwort )

62203 Brassica (Rape, Broccoli, Brussels Sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard, Rutabaga)

62204 Cannabis (Hemp)

62205 Chenopodium (Goosefoot, Lamb's quarters)

62206 Humulus (Hop)

62207 Parietaria (Pellitory)

62208 Plantago (Plantain)

62209 Rumex (Dock, Sorrel)

62210 Solidago (Goldenrod)

62211 Taraxacum (Dandelion)

62212 Urtica (Nettle)

62213-62299 Reserved

62300 **Poaceae (Grass family)**

62301 Avena (Oat)

62302 Elymus (Bottle-Brush Grass, Wild Rye)

62303 Hordeum (Barley)

62304 Secale (Rye)

62305 Triticum (Wheat)

62306 Zea (Corn)

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62307-65534 Reserved

65535 Missing

Information about pollen species is collected from [www.pollen.com](http://www.pollen.com), [www.pollenflug.de](http://www.pollenflug.de), [www.metoffice.gov.uk](http://www.metoffice.gov.uk), www.polleninfo.org and [www.meteoswiss.admin.ch](http://www.meteoswiss.admin.ch).

If the expert team does not agree on the whole list, please add the red marked species.

Please add for radionuclide forecasts

**GRIB2 Table 4.2, discipline 0 (meteorological products), category 18 (nuclear/radiology)**

17 Column-integrated air concentration Bq m-2

18 Mean of air concentration in layer Bq m-3

Please add for atmospheric chemical constituents

**GRIB2 Table 4.2, discipline 0 (meteorological products), category 20 (atmospheric chemical constituents)**

63 Mean of mass density in layer kg m-3

Please add in

**GRIB2 Table 4.5 – Fixed surface types and units**

21 Lowest level where mass density exceeds the specified value

(base for a given threshold of mass density) kg m-3

22 Highest level where mass density exceeds the specified value

(top for a given threshold of mass density) kg m-3

23 Lowest level where air concentration exceeds the specified value

(base for a given threshold of air concentration) Bq m-3

24 Highest level where air concentration exceeds the specified value

(top for a given threshold of air concentration) Bq m-3