

Data exchange for meteorology and oceanography in WCS: A profile to encode GRIB2 in coverages

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OGC Technical Committee Agenda, Sydney, Australia, December 2015



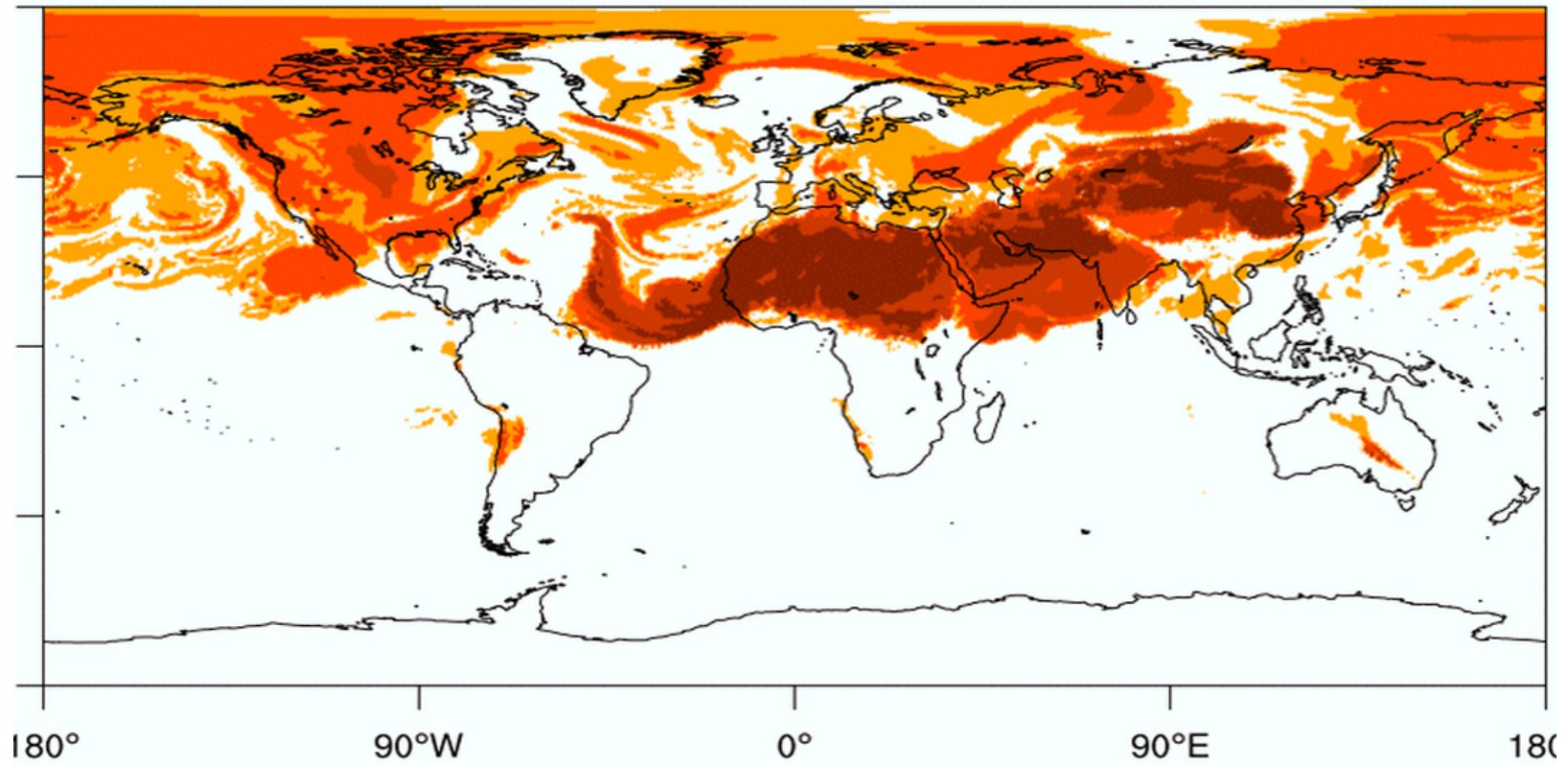
Agenda

1. GRIB2: an operational format by WMO
2. Scope of the proposal
3. Discussion with the community
4. Review of the proposal



GRIB2: A quick review

Deutscher Wetterdienst
Wetter und Klima aus einer Hand



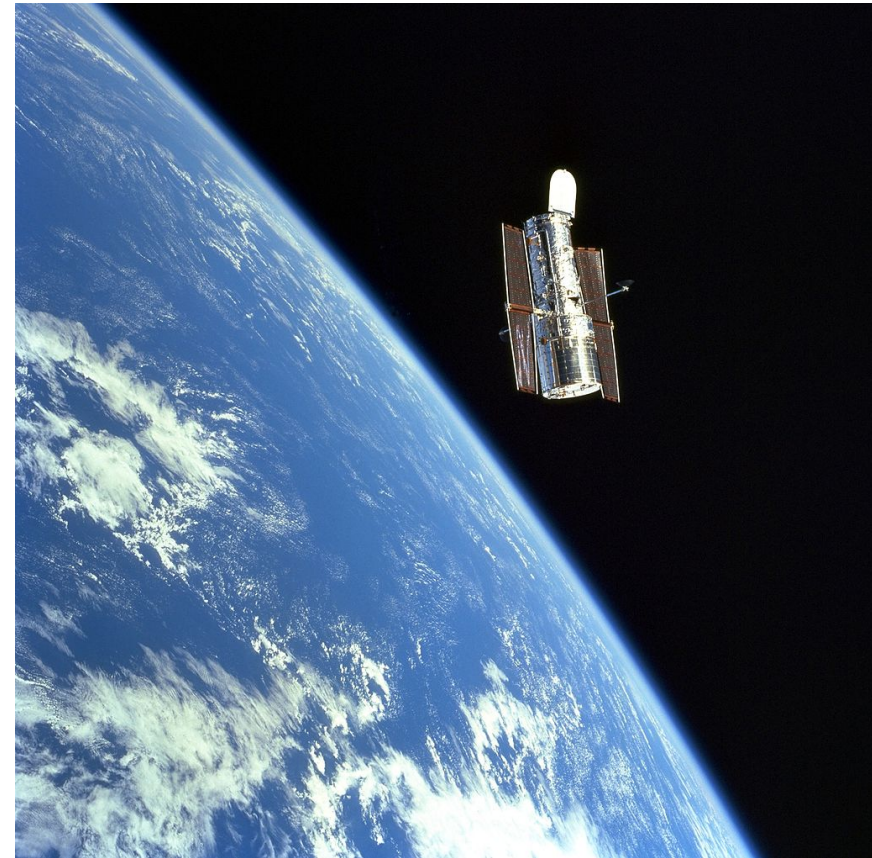
GRIB2: A quick review

- GRIB: General Regularly-distributed Information in Binary form
- Very compact
- Table driven
- Regulated by WMO
- Used for operational exchange of meteorological / oceanological data



Scope of the proposal

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Scope of the proposal

- Limited to GRIB2
- Not governing how people encode data in GRIB2
 - Tables, packing methods, ordering, etc.
- Only about how to map enough metadata from WCS and GRIB2 together so they can be used in tandem



Discussion with the community

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Discussion with the community: Dimensionality

- Initial restriction of coverages to 2 dimensions removed after discussion
- **Rationale:**
 - Make GRIBs simpler for clients to read
- **But:**
 - Many data exchanged in GRIB are n-D and coverages support this
 - Most GRIB decoding software can read n-D data



Dicussion with the community: Use of local tables

- Warning included about using local tables to describe data
 - **Rationale:** Many producers encode GRIB using local tables, so that it is impossible to interpret the data
 - **But:**
 - Tables are in the scope of WMO
 - They are part of GRIB, for better or worse
 - Controlling tables in OGC would mean 2 definitions of GRIB semantics
 - **Result:** Some unsatisfied, would like to restrict table usage in a stricter but unspecified manner



Dicussion with the community: Ordering

- Order of range types and range sets must match
 - Some community members wished to be able to describe several range types and then stream the corresponding range sets in a different order for performance optimization
 - As the coverage standard does not allow this practice, no exception is made for GRIB



Review of the proposal:

General

- Admonition: "... the use of Local tables in messages intended for non-local or international exchange is strongly discouraged."
- Requirements:
 - A GRIB2 encoded coverage shall follow the GRIB2 specification [GRIB2].
 - A GRIB2 encoded coverage shall be of type `gmlcov:GridCoverage`, `gmlcov:RectifiedGridCoverage`, or `gmlcov:ReferenceableGridCoverage`, or a subtype thereof.
 - If the usage of URIs is possible, GRIB2 encoding of a coverage shall be indicated by the following URI:
http://www.opengis.net/spec/GMLCOV_grib2-coverages/1.0/conf/grib2-coverage.



Review of the proposal:

Domain

- Requirements:
 - The coordinate reference system identified by the value of the srsName attribute of the gml:Envelope element of the gml:domainSet element of a GRIB2 encoded coverage shall be the same as the coordinate reference system used in the GRIB2 part.
 - The domain of a GRIB2 encoded coverage shall respect the coverage's raster space as defined in the GRIB2 specification [GRIB2], i.e. the grid point position described in code table 3.8 of the GRIB2's grid definition section.



Review of the proposal:

Request parameters

- Requirements:
 - The structure of an XML request requesting a GRIB encoded coverage instance shall be extended as defined in Table 2 and the respective XML Schema being part of this standard.
 - The structure of a KVP request requesting a GRIB encoded coverage instance shall be extended as defined in Table 2 where the parameter names shall be prefixed with `grib2`, for example `grib2:compression`.



Review of the proposal: Request parameters

Name	Definition	Data type and values	Multiplicity and use
<code>grib2:compression</code>	Compression type according to GRIB2 code table 5.0 "Data representation template number"	Integer between 0 and 65535	Zero or one (optional)

Review of the proposal:

Response parameters

- Requirements:
 - The response to a successful request for a GRIB2 encoded coverage containing a compression GRIB parameter shall consist of a GRIB2 encoded coverage using the specified compression.

Review of the proposal:

Exceptions

- Requirements:
 - When a server or service encounters an error described in column "meaning of exception code" in Table 3, it shall return the corresponding exception report message with the contents of the locator parameter value as specified in the right column of Table 3.



Review of the proposal: Exceptions

exceptionCode value	HTTP code	Meaning of code	locator value
CompressionNotSupported	404	Server does not support the requested compression	Value of compression parameter
CompressionInvalid	404	Invalid compression requested	Value of compression parameter

Review of the proposal:

Media type

- GRIB2 encoding of a coverage shall be indicated by the following MIME type identifier:
`application/wmo-grib`
- Note: new MIME type, application for registration will be made to IANA. Until granted, the MIME type
`application/x-grib`
will be used, based on Apache Tika

