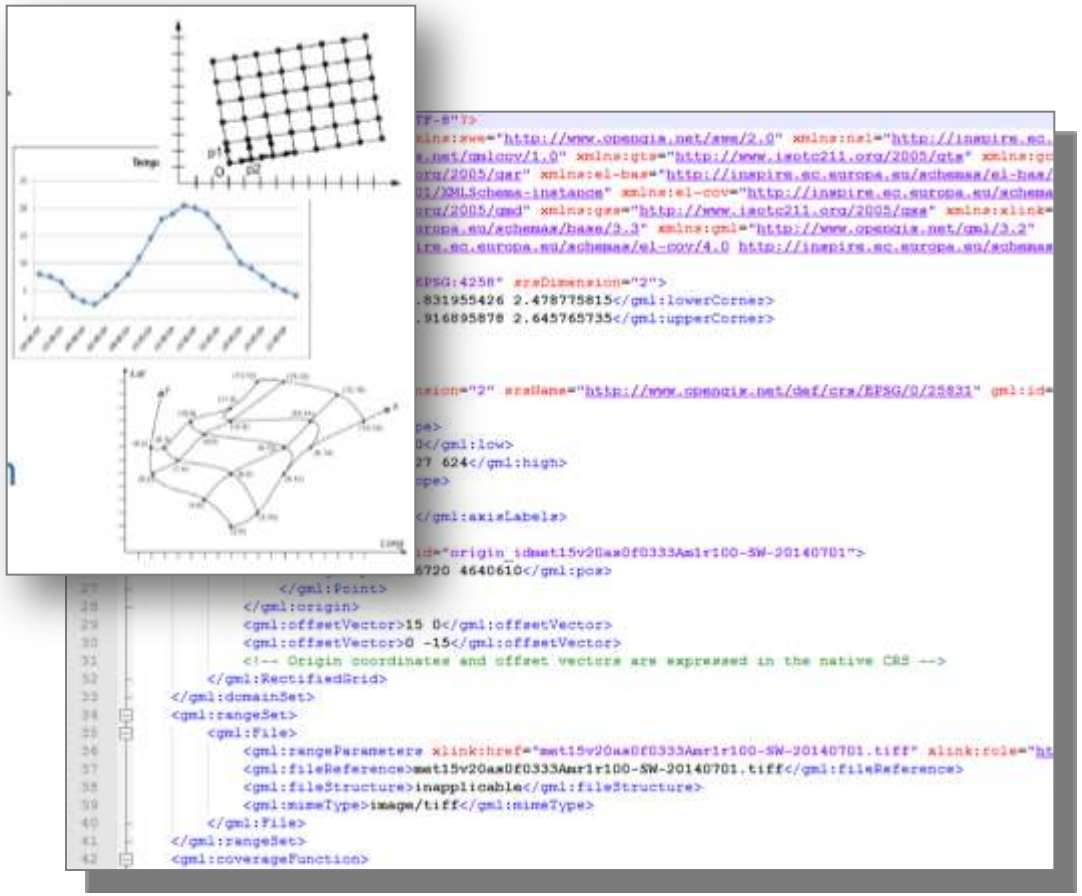
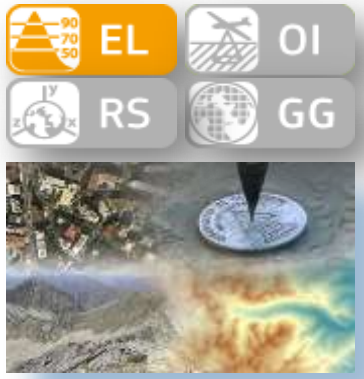
Follow-up Webinar on Coverages & WCS: Open items from the WS in Barcelona





Thematic Cluster #3

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Joint Research Centre

INSPIRE-KEN & TC #3 Workshop on Transformation of Coverage-based Data Themes and WCS

Barcelona 09/15

https://themes.jrc.ec.europa.eu/pages/view/45690/workshop-about-transformation-of-coverage-based-data-themes-and-wcs-barcelona-29-30-september-2015

Overview:

- Training Session on Coverages (Alex Dumitru).
- Experiences on data transformation (EL & OI).
- Experiences on use of WCS.
- Update on MIG-T MIWP-7b (WCS).
- Related discussions from Thematic Clusters 2 & 3.

Development of an Elevation Grid Coverage Example

- **Thread in Thematic Clusters asking for more guidelines in the Elevation Data Specification (TG)**:

  https://themes.jrc.ec.europa.eu/discussion/view/42326/need-more-guidance-for-elevation-encoding-and-correct-example-for-elevationgridcoverage-on-the-basis-of-gmlcov-schema

- **Specifics aspects requested**:
  - **Replace coverage example in Section 9.4.1.2 of the TG**

    Copied from OGC 09-146r2 GML Application Schema – Coverages, Section 6.7 (coverage with Radiance values).
  - **Address how to inform / identify the Vertical CRS within the coverage** (only treated at conceptual level in the TG).

Development of an Elevation Grid Coverage Example

- **Discussion thread was closed**.
- **Conclusions** were documented in the following Page of Thematic Cluster #3:
- https://themes.jrc.ec.europa.eu/pages/view/60561/provide-an-elevationgridcoverage-encoding-example-and-guidelines-for-identifying-the-vertical-crs

GMLCOV EL Example proposed

- **Developed from the experiences shared in Thematic Cluster #3 - GMLCOV File:** https://themes.jrc.ec.europa.eu/file/view/59232/example-elevation-grid-coverages-single-coverage-tested-final

```
<?xml version="1.0" encoding="UTF-8"?>
<el-cov:ElevationGridCoverage xmlns:swe="http://www.opengis.net/swe/2.0" xmlns:nsl="http://inspire.ec.europa.eu/schemas/cvbase/1.0"
xmlns:gmlcov="http://www.opengis.net/gmlcov/1.0" xmlns:gts="http://www.isotc211.org/2005/gts" xmlns:gco="http://www.isotc211.org/2005/gco"
xmlns:gsr="http://www.isotc211.org/2005/gsr" xmlns:el-bas="http://inspire.ec.europa.eu/schemas/el-bas/3.0"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:el-cov="http://inspire.ec.europa.eu/schemas/el-cov/4.0"
xmlns:gmd="http://www.isotc211.org/2005/gmd" xmlns:gss="http://www.isotc211.org/2005/gss" xmlns:xlink="http://www.w3.org/1999/xlink"
xmlns:base="http://inspire.ec.europa.eu/schemas/base/3.3" xmlns:gml="http://www.opengis.net/gml/3.2"  gml:id="idmet15v20as0f0333Amlr100-SW-20140701"
xsi:schemaLocation="http://inspire.ec.europa.eu/schemas/el-cov/4.0 http://inspire.ec.europa.eu/schemas/el-cov/4.0/ElevationGridCoverage.xsd">
    <gml:boundedBy>
        <gml:Envelope srsName="EPSG:4258" srsDimension="2">
            <gml:lowerCorner>41.831955426 2.478775815</gml:lowerCorner>
            <gml:upperCorner>41.916895878 2.645765735</gml:upperCorner>
        </gml:Envelope>
    </gml:boundedBy>
    <gml:domainSet>
        <gml:RectifiedGrid dimension="2" srsName="http://www.opengis.net/def/crs/EPSG/0/25831" gml:id="gridmet15v20as0f0333Amlr100-SW-20140701">
            <gml:limits>
                <gml:GridEnvelope>
                    <gml:low>0 0</gml:low>
                    <gml:high>927 624</gml:high>
                </gml:GridEnvelope>
            </gml:limits>
            <gml:axisLabels>x y</gml:axisLabels>
            <gml:origin>
                <gml:Point gml:id="origin_idmet15v20as0f0333Amlr100-SW-20140701">
                    <gml:pos>456720 4640610</gml:pos>
                </gml:Point>
            </gml:origin>
            <gml:offsetVector>15 0</gml:offsetVector>
            <gml:offsetVector>0 -15</gml:offsetVector>
            <!-- Origin coordinates and offset vectors are expressed in the native CRS -->
        </gml:RectifiedGrid>
    </gml:domainSet>
    <gml:rangeSet>
        <gml:File>
            <gml:rangeParameters xlink:href="met15v20as0f0333Amrlr100-SW-20140701.tiff" xlink:role="http://www.opengis.net/spec/WCS_coverageencoding_geotif
            <gml:fileReference>met15v20as0f0333Amrlr100-SW-20140701.tiff</gml:fileReference>
            <gml:fileStructure>inapplicable</gml:fileStructure>
            <gml:mimeType>image/tiff</gml:mimeType>
        </gml:File>
    </gml:rangeSet>
    <gml:coverageFunction>
```

GMLCOV EL Example proposed

- **Proposed to MIG-T MIWP-14 in Rome (1 Dec 15)**, for inclusion in the EL TG.
- **Checked by Alex Dumitru**, but appropriate testing TBD.

Open items – Testing the GMLCOV EL Example

- **General – Correction of the GMLCOV File structure**.
- **Identification of the Vertical CRS** - Proposed to use the 'referenceFrame' attribute of the 'swe:Quantity' element, within the 'rangeType' component (Seems to be consensus in OGC).

```
<gmlcov:rangeType>
    <swe:DataRecord>
        <swe:field name="Height">
            <swe:Quantity definition="http://inspire.ec.europa.eu/enumeration/ElevationPropertyTypeValue/height" referenceFrame="http://www.opengis.net/def/crs/EPSG/0/5730">
                <!-- Future URL pointing to the "height" enumeration value within the INSPIRE Registry / It will be operative by November 2015 -->
                <swe:description>EVRS Height - EVRF2000</swe:description>
                <swe:nilValues>
                    <swe:NilValues>
                        <swe:nilValue reason="http://www.opengis.net/def/nil/OGC/0/Missing">-9999</swe:nilValue>
                    </swe:NilValues>
                </swe:nilValues>
                <swe:uom code="m"/>
                <swe:constraint>
                    <swe:AllowedValues>
                        <swe:interval>-100 3143</swe:interval>
                        <swe:significantFigures>5</swe:significantFigures>
                    </swe:AllowedValues>
                </swe:constraint>
            </swe:Quantity>
        </swe:field>
    </swe:DataRecord>
</gmlcov:rangeType>
```

Open items – Testing the GMLCOV EL Example

- **EX_GeographicBoundingBox coordinates** - Should the coordinates be in WGS84 decimal degrees?

```
<el-cov:domainExtent>
    <gmd:EX_Extent>
        <gmd:geographicElement>
            <gmd:EX_GeographicBoundingBox>
                <!-- Geographic extent expressed in SRS EPSG:4258 (ETRS89-GRS80). Geodetic coordinates should be transformed to WGS84 -->
                <gmd:westBoundLongitude>
                    <gco:Decimal>2.478775815</gco:Decimal>
                </gmd:westBoundLongitude>
                <gmd:eastBoundLongitude>
                    <gco:Decimal>2.645765735</gco:Decimal>
                </gmd:eastBoundLongitude>
                <gmd:southBoundLatitude>
                    <gco:Decimal>41.831955426</gco:Decimal>
                </gmd:southBoundLatitude>
                <gmd:northBoundLatitude>
                    <gco:Decimal>41.916895878</gco:Decimal>
                </gmd:northBoundLatitude>
            </gmd:EX_GeographicBoundingBox>
        </gmd:geographicElement>
    </gmd:EX_Extent>
```

Open items – Discussions from the WS in Barcelona

- **How to use a WCS GetCoverage request for providing the coverage values.**
  - WCS request within rangeParameters using xlink:href? – It seems the method proposed by OGC 09-146r2 GML Application Schema – Coverages.

```
<gml:rangeSet>
    <gml:File>
        <gml:rangeParameters xlink:href="http://www.ign.es/wcs/mdt?service=WCS&amp;request=GetCoverage&amp;version=1.0.0&amp;coverage=mdt:Elevacion25830_25&amp;CRS=EPSG:25830&amp;bbox=
        484387.5,4778987.5,512212.5,4798212.5&amp;WIDTH=1113&amp;HEIGHT=769&amp;FORMAT=geotiff" xlink:role="http://www.opengis.net/spec/WCS_coverageencoding_geotiff/1.0/"
        xlink:arcrole="fileReference"/>
        <gml:fileReference>geoserver-GetCoverage.tiff</gml:fileReference>
        <gml:fileStructure/>
        <gml:mimeType>image/tiff</gml:mimeType>
        <!-- This encoding way is a proposal, required to be shared and validated with other encoding examples for coverages using WCS. Native CRS is used for data providing -->
        <!-- WCS provides the coverage in the native reference systems (EPSG:25830 and national altimetric system) -->
    </gml:File>
</gml:rangeSet>
```

  - WCS request within gml:fileReference? - It seems the method to reference the files in OGC 07-036 GML.
  - Other method.

Open items – Discussions from the WS in Barcelona

- **How to deal with INSPIRE Extensions** (INSPIRE coverages attributes added to the standard components of a GMLCOV).
- Such extensions imply partial conceptual redundances.
- They are not supported by standard services.
- Example - 'domainExtent' vs. 'gml:boundedBy`: https://themes.jrc.ec.europa.eu/discussion/view/12901/domainextent-vs-gmlboundedby-el-oi-coverages-encoding

```
<gml:boundedBy>
    <gml:Envelope srsName="EPSG:4258" srsDimension="2">
        <gml:lowerCorner>41.831955426 2.478775815</gml:lowerCorner>
        <gml:upperCorner>41.916895878 2.645765735</gml:upperCorner>
    </gml:Envelope>
</gml:boundedBy>
```

```
<el-cov:domainExtent>
    <gmd:EX_Extent>
        <gmd:geographicElement>
            <gmd:EX_GeographicBoundingBox>
                <!-- Geographic extent expressed in SRS EPSG:4258 (ETRS89-GRS80).
                Geodetic coordinates should be transformed to WGS84 -->
                <gmd:westBoundLongitude>
                    <gco:Decimal>2.478775815</gco:Decimal>
                </gmd:westBoundLongitude>
                <gmd:eastBoundLongitude>
                    <gco:Decimal>2.645765735</gco:Decimal>
                </gmd:eastBoundLongitude>
                <gmd:southBoundLatitude>
                    <gco:Decimal>41.831955426</gco:Decimal>
                </gmd:southBoundLatitude>
                <gmd:northBoundLatitude>
                    <gco:Decimal>41.916895878</gco:Decimal>
                </gmd:northBoundLatitude>
            </gmd:EX_GeographicBoundingBox>
        </gmd:geographicElement>
    </gmd:EX_Extent>
</el-cov:domainExtent>
```

Open items – Discussions from the WS in Barcelona

- **How to implement tiling / model mosaic elements (OI), coverages and coverage aggregations within the GMLCOV files.**

  https://themes.jrc.ec.europa.eu/discussion/view/50412/how-to-implement-tiling-model-mosaic-elements-coverages-and-coverage-aggregations-in-gmlcov-files

  See File proposed by Julián Delgado (IGN – Spain) in the Workshop in Barcelona.

Open items – Discussions from the WS in Barcelona

- **Harmonize the CRS used in the "srsName" parameter for different GMLCOV file components**.

  https://themes.jrc.ec.europa.eu/discussion/view/50299/harmonize-the-crs-used-in-the-%E2%80%9Csrsname%E2%80%9D-parameter-for-different-gmlcov-file-components

  Repeated use of the same attribute and value in the previous File.

- **Validation**.
  - List of aspects to be validated.
  - Tools available for validating the GMLCOV Files.

Open items – Discussions from the WS in Barcelona

- **Redundancy of Metadata**:
  - At coverage level - **Optional MD Hook** (proposed in GMLCOV).
    - Is it intended for a specific purpose? (e.g. get specific coverage MD information faster than reading it from the regular metadata file of the coverage data set or external file header).
    - There should be more guidelines on for what to use this MD Hook and which items should be informed in it.
    - Duplication of metadata should be avoided in order to maintain consistency and make it simple.
  - In the **Image File Header**.
  - At data set level - **XML External MD File** of the data set.