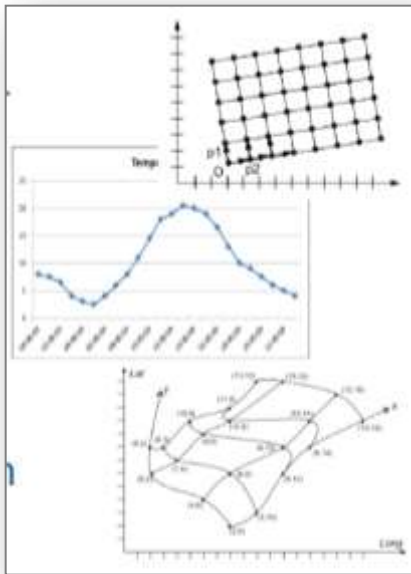


Follow-up Webinar on Coverages & WCS: Open items from the WS in Barcelona



```

<?xml:version="1.0" encoding="UTF-8" ?>
<wmts xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://www.opengis.net/wmts/1.0" xmlns:ows="http://www.opengis.net/ows/1.1" xmlns:gml="http://www.opengis.net/gml/3.2" xmlns:qgis="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis2="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis3="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis4="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis5="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis6="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis7="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis8="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis9="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis10="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis11="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis12="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis13="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis14="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis15="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis16="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis17="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis18="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis19="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis20="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis21="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis22="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis23="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis24="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis25="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis26="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis27="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis28="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis29="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis30="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis31="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis32="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis33="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis34="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis35="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis36="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis37="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis38="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis39="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis40="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis41="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis42="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis43="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis44="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis45="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis46="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis47="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis48="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis49="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis50="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis51="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis52="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis53="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis54="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis55="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis56="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis57="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis58="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis59="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis60="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis61="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis62="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis63="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis64="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis65="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis66="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis67="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis68="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis69="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis70="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis71="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis72="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis73="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis74="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis75="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis76="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis77="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis78="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis79="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis80="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis81="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis82="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis83="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis84="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis85="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis86="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis87="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis88="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis89="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis90="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis91="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis92="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis93="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis94="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis95="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis96="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis97="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis98="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis99="http://www.qgis.org/ows/schemas/1.0" xmlns:qgis100="http://www.qgis.org/ows/schemas/1.0" />
  
```

```

SPSG:4258* srsDimension="2">
  .831955426 2.478775815</gml:lowerCorner>
  .916895878 2.645765735</gml:upperCorner>
  </gml:RectifiedGrid>
  </gml:domainSet>
  <gml:rangeSet>
    <gml:File>
      <gml:rangeParameter xlink:href="#met15v20as0f0333Amr1r100-SW-20140701.tiff" xlink:role="http://www.opengis.net/def/crs/EPSSG/0/25831" gml:id="met15v20as0f0333Amr1r100-SW-20140701" />
      <gml:fileReference>#met15v20as0f0333Amr1r100-SW-20140701.tiff</gml:fileReference>
      <gml:fileStructure>inapplicable</gml:fileStructure>
      <gml:mimeType>image/tiff</gml:mimeType>
    </gml:File>
  </gml:rangeSet>
  </gml:coverageFunction>
  
```



Thematic Cluster #3

Jordi Escriu

Facilitator Thematic Cluster #3





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>

```
1 <?xml version="1.0" encoding="UTF-8"?>
2 <el-cov:ElevationGridCoverage xmlns:svs="http://www.opengis.net/svs/2.0" xmlns:sl="http://inspire.ec.europa.eu/schemas/cvbase/1.0"
3 xmlns:gmlcov="http://www.opengis.net/gmlcov/1.0" xmlns:gs="http://www.isotc211.org/2005/gts" xmlns:geo="http://www.isotc211.org/2005/geo"
4 xmlns:gsr="http://www.isotc211.org/2005/gsr" xmlns:el-bas="http://inspire.ec.europa.eu/schemas/el-bas/3.0"
5 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:el-cov="http://inspire.ec.europa.eu/schemas/el-cov/4.0"
6 xmlns:gmd="http://www.isotc211.org/2005/gmd" xmlns:gss="http://www.isotc211.org/2005/gss" xmlns:xlink="http://www.w3.org/1999/xlink"
7 xmlns:base="http://inspire.ec.europa.eu/schemas/base/3.3" xmlns:gml="http://www.opengis.net/gml/3.2" gml:id="idset15v20as0f0333Amir100-SW-20140701"
8 xsi:schemaLocation="http://inspire.ec.europa.eu/schemas/el-cov/4.0 http://inspire.ec.europa.eu/schemas/el-cov/4.0/ElevationGridCoverage.xsd">
9   <gml:boundedBy>
10     <gml:Envelope srsName="EPSG:4208" srsDimension="2">
11       <gml:lowerCorner>41.831955426 2.478775815</gml:lowerCorner>
12       <gml:upperCorner>41.916895878 2.645765735</gml:upperCorner>
13     </gml:Envelope>
14   </gml:boundedBy>
15   <gml:domainSet>
16     <gml:RectifiedGrid dimension="2" srsName="http://www.opengis.net/def/crs/EPSG/0/20831" gml:id="gridset15v20as0f0333Amir100-SW-20140701">
17       <gml:limits>
18         <gml:GridEnvelope>
19           <gml:low>0 0</gml:low>
20           <gml:high>927 624</gml:high>
21         </gml:GridEnvelope>
22       </gml:limits>
23       <gml:axisLabels>x y</gml:axisLabels>
24       <gml:origin>
25         <gml:Point gml:id="origin idset15v20as0f0333Amir100-SW-20140701">
26           <gml:pos>456720 4640610</gml:pos>
27         </gml:Point>
28       </gml:origin>
29       <gml:offsetVector>15 0</gml:offsetVector>
30       <gml:offsetVector>0 -15</gml:offsetVector>
31       <!-- Origin coordinates and offset vectors are expressed in the native CRS -->
32     </gml:RectifiedGrid>
33   </gml:domainSet>
34   <gml:rangeSet>
35     <gml:File>
36       <gml:rangeParameters xlink:href="#set15v20as0f0333Amir100-SW-20140701.tiff" xlink:role="http://www.opengis.net/spec/WCS_coverageencoding_geotiff
37       <gml:fileReference>set15v20as0f0333Amir100-SW-20140701.tiff</gml:fileReference>
38       <gml:fileStructure>inapplicable</gml:fileStructure>
39       <gml:mimeType>image/tiff</gml:mimeType>
40     </gml:File>
41   </gml:rangeSet>
42   <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.

```
1 <?xml version="1.0" encoding="UTF-8"?>
2 <el-cov:ElevationGridCoverage xmlns:svs="http://www.opengis.net/svs/2.0" xmlns:sl="http://inspire.ec.europa.eu/schemas/cvbase/1.0"
3 xmlns:gmlcov="http://www.opengis.net/gmlcov/1.0" xmlns:gts="http://www.isotc211.org/2005/gts" xmlns:gpc="http://www.isotc211.org/2005/gpc"
4 xmlns:gsr="http://www.isotc211.org/2005/gsr" xmlns:el-bas="http://inspire.ec.europa.eu/schemas/el-bas/3.0"
5 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:el-cov="http://inspire.ec.europa.eu/schemas/el-cov/4.0"
6 xmlns:gmd="http://www.isotc211.org/2005/gmd" xmlns:gss="http://www.isotc211.org/2005/gss" xmlns:xlink="http://www.w3.org/1999/xlink"
7 xmlns:base="http://inspire.ec.europa.eu/schemas/base/3.3" xmlns:gml="http://www.opengis.net/gml/3.2" gml:id="idset15v20as0f0333Amr100-SW-20140701"
8 xsi:schemaLocation="http://inspire.ec.europa.eu/schemas/el-cov/4.0 http://inspire.ec.europa.eu/schemas/el-cov/4.0/ElevationGridCoverage.xsd">
9   <gml:boundedBy>
10     <gml:Envelope srsName="EPSG:4208" srsDimension="2">
11       <gml:lowerCorner>41.831955426 2.478775815</gml:lowerCorner>
12       <gml:upperCorner>41.916895878 2.645765735</gml:upperCorner>
13     </gml:Envelope>
14   </gml:boundedBy>
15   <gml:domainSet>
16     <gml:RectifiedGrid dimension="2" srsName="http://www.opengis.net/def/crs/EPSG/0/20831" gml:id="gridset15v20as0f0333Amr100-SW-20140701">
17       <gml:limits>
18         <gml:GridEnvelope>
19           <gml:low>0 0</gml:low>
20           <gml:high>927 624</gml:high>
21         </gml:GridEnvelope>
22       </gml:limits>
23       <gml:axisLabels>x y</gml:axisLabels>
24       <gml:origin>
25         <gml:Point gml:id="origin idset15v20as0f0333Amr100-SW-20140701">
26           <gml:pos>456720 4640610</gml:pos>
27         </gml:Point>
28       </gml:origin>
29       <gml:offsetVector>15 0</gml:offsetVector>
30       <gml:offsetVector>0 -15</gml:offsetVector>
31       <!-- Origin coordinates and offset vectors are expressed in the native CRS -->
32     </gml:RectifiedGrid>
33   </gml:domainSet>
34   <gml:rangeSet>
35     <gml:File>
36       <gml:rangeParameters xlink:href="#set15v20as0f0333Amr100-SW-20140701.tiff" xlink:role="http://www.opengis.net/spec/WCS_coverageencoding_geotiff"
37       <gml:fileReference>set15v20as0f0333Amr100-SW-20140701.tiff</gml:fileReference>
38       <gml:fileStructure>inapplicable</gml:fileStructure>
39       <gml:mimeType>image/tiff</gml:mimeType>
40     </gml:File>
41   </gml:rangeSet>
42   <gml:coverageFunction>
```

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>
</el-cov:domainExtent>
```


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&request=GetCoverage&version=1.0.0&coverage=mdt:Elevacion25830_25&CRS=EPSG:25830&bbox=484387.5,4778987.5,512212.5,4798212.5&WIDTH=1113&HEIGHT=769&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%9Csrname%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.