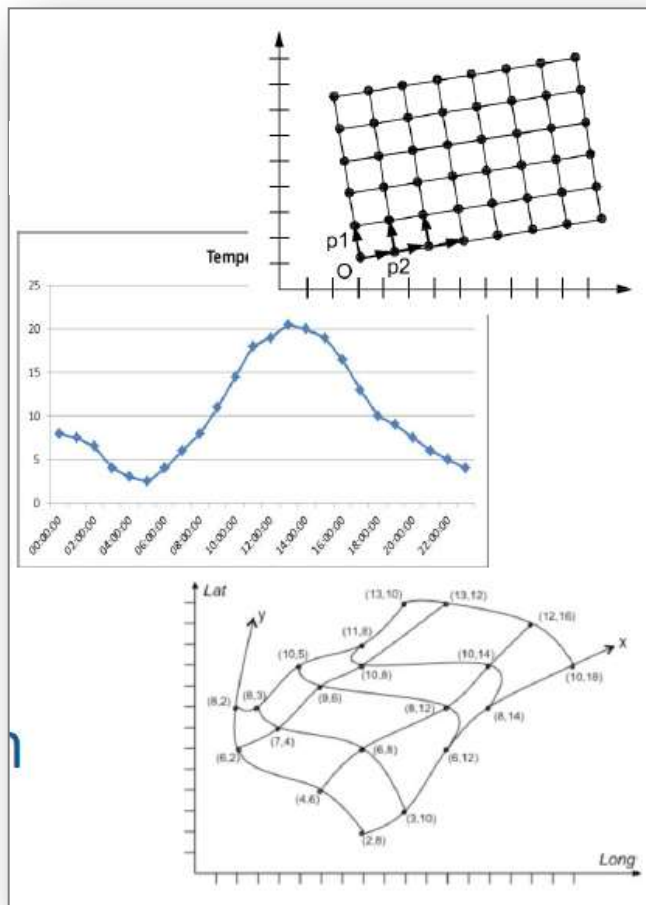


# WCS and MIWP-7b



## Thematic Cluster #3

Jordi Escriu  
*Facilitator Thematic Cluster #3*

# Coverages in INSPIRE

- **Coverage:**

Describe characteristics of real-world phenomena that vary over space and/or time (temperature, elevation, land cover, imagery...)

- **Contains** sets of values, associated to a spatial and/or temporal domain

- **Used in several INSPIRE themes:**

AC-MF, OF, ER, EL, NZ, OI, LU, LC

# Coverages in INSPIRE

- **INSPIRE** reuses the concept of coverage from ISO 19123

*spatial object that acts as a function to return values from its range for any direct position within its spatial, temporal or spatiotemporal domain  
[Adapted from ISO 19123]*

- **Main components**

- **Domain Set:** Spatial domain of the coverage – Locations (points / grids)
- **Range Set:** The values of the phenomenon
- **Coverage Function:** Defines the correspondence between the domain and the range of the coverage, e.g. the rules assigning the phenomenon values to the grid
- **Range Type:** Describes the characteristics of the range values (type of phenomenon)

# Encoding of INSPIRE Coverages (EL)

- **Coverage, except Range Set**
  - OGC GML Application Schema for Coverages [OGC 09-146r2]
- **Coverage Range Set**
  - **OPTION 1: Multipart representation**
    - 1<sup>st</sup> Part: GML Part (gmlcov:RectifiedGridCoverage)
    - 2<sup>nd</sup> Part: Range Set encoded using a well-known binary format (embedded in 1<sup>st</sup> Part) – TIFF / GeoTIFF (\*)
  - **OPTION 2: External file encoding**
    - 1<sup>st</sup> Part: GML Part (gmlcov:RectifiedGridCoverage)
    - 2<sup>nd</sup> Part: Range Set, encoded using an external well-known binary format (gml:File) – TIFF / GeoTIFF (\*)
  - **OPTION 3: Inline encoding**
    - Range Set is encoded within the XML inline (DataBlock)

(\*) Alternatively, the BAG format for Hydrographic bathymetry data

# Web Coverage Service (WCS)

- **A network service providing coverage data**
- **Objective:** Get the original data (or a subset), suitable for further processing
- **OGC WCS 2.0** (Modular, Testable, Scalable)
- **Not currently considered in the TG for download services, just:**
  - **Atom feeds** - For pre-defined dataset download services
  - **WFS 2.0** - For pre-defined dataset and direct access download services

# WCS Workshop – JRC/Ispra, 14-15.10.2014

## "WCS as a candidate INSPIRE Download Service"

- **Presentations & Minutes**

[https://ies-svn.jrc.ec.europa.eu/projects/download-services-tg/wiki/MIG\\_workshop\\_on\\_WCS-based\\_INSPIRE\\_download\\_services](https://ies-svn.jrc.ec.europa.eu/projects/download-services-tg/wiki/MIG_workshop_on_WCS-based_INSPIRE_download_services)

- **Findings / Pending aspects**

- All operations required by the Download Service IRs can be mapped to the WCS 2.0 standard
- Using a WCS for providing coverage data provides a number of benefits and opportunities (depending of the extensions supported).
- Further guidelines or best practices are needed for how to provide harmonized INSPIRE coverage data through the WCS.
- Such guidelines should revisit and, if required, propose updates to the encoding guidelines currently included in the data specifications.

# WCS Workshop – JRC/Ispra, 14-15.10.2014

## • Benefits and Opportunities

- **Provision of raster data** (e.g. surfaces and grids) **directly accessing to the source / original values**
- **Multi-dimensional or multi-variable grids**
- **Advanced download**
  - Queries based on filters that are not trimming and slicing  
e.g. corridor selection (air temperature along flight corridor)
  - Advanced analyses (server-side)  
e.g. statistical analyses, interpolation between point values, aggregations, time series analyses
- **Visualization** (for mapping purposes)
  - An image coverage as-is
  - Using interpolation of point clouds
  - Using reclassification of range values
  - Using styling as defined by the user
  - Selecting a style provided by the server

# MIWP-7b

## WCS-based INSPIRE Download Services

- **MIG has set up a new temporary sub-group**

<https://ies-svn.jrc.ec.europa.eu/projects/wcs-download-services>

- **Terms of Reference (ToR):**

<https://ies-svn.jrc.ec.europa.eu/issues/2441>

- **Other background material:**

- WCS / WCPS standards
- Extensions
- Case studies
- Known implementations
- ...



# MIWP-7b - Tasks

## WCS-based INSPIRE Download Services

- **Main tasks / deliverables:**

- T1. Updates to TGs for Download Services to include WCS
- T2. New Technical Guidelines for providing conformant INSPIRE coverage data by using WCS
- T3 Document the current state-of-play of WCS 2.0 and older versions
- T4. Demonstrate the feasibility of the proposed guidelines
  - T4-i Implement the INSPIRE extensions in Open Source WCS 2.0 solution
  - T4-ii Deploy sample coverage data sets from several INSPIRE themes
  - T4-iii Demonstrate interoperability of the deployed data and services
- T5. Establish a web space and maintain an issue tracker for WCS based download services

# MIWP-7b – Group / Progress

- **Group (established by 31.05.2015)**

Experts, especially on download services & coverages and related needs / use-cases:

*Jukka Rahkonen, Jari Reini, Michael Lutz, Jachym Cepicky, Peter Baumann, James Passmore, Diomede Illuzzi, Bart Cosyn, Oyns Kissiyar, Andreas Krimbacher, Roope Tervo, Dimitri Sarafinof, Simon Jirka, Jeroen Hogeboom, Jordi Escriu*

- **Leader:** Jukka Rahkonen (National Land Survey Finland)

- **Meetings**

- Virtual kick-off meeting (23.06.2015)
- 2 additional teleconferences (12.08.2015 / 09.09.2015)

# MIWP-7b - Progress

- **Main actions done**

- **Assigning of tasks leaders**
- **Split the Download Service TGs into several documents:**
  - One on the IR-TG mapping and generic aspects (e.g. quality of service)
  - One on each proposed standard (Atom, WFS, SOS, WCS)

**[20150812\\_Download\\_service\\_TG\\_structure.pptx](#)**

- **Contraction of technical editor for the group**
- **Detailed roadmap** (discussed / not available yet)
- **Decision to participate in on-going related discussions in the Thematic Clusters**
- **Presentation of the activity in the OGC Meeting in Nottingham**

## WCS Discussion topic in TC #3

- **Discussion topic on WCS open in TC #3:**

<https://themes.jrc.ec.europa.eu/discussion/view/22150/web-coverage-service-wcs-a-missing-piece-in-inspire>

- *Do you think that WCS is a missing piece in INSPIRE?*
- *Which benefits / drawbacks do you foresee if WCS is used in the INSPIRE context?*
- *Explain you own experience and best practice with the use of WCS (evaluation, use-cases, software utilized, etc.)*
- *Any additional items to be discussed or treated by this group?*