



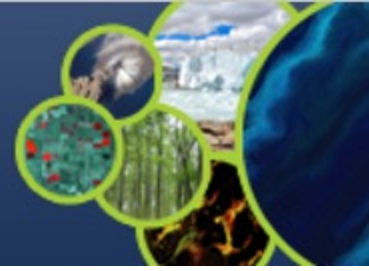
Committee on Earth Observation Satellites

# Working Group Calibration & Validation

## Terminology and online glossary

Peter Strobl, EC-JRC, WGCV  
CEOS WGCV #49, Virtual Meeting Session  
Hosted on Webex  
29 June 2021





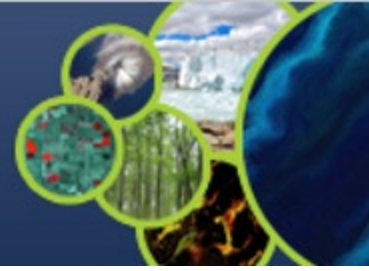
**Definition:** (<https://en.wikipedia.org/wiki/Glossary>)

A **glossary**, also known as a **vocabulary** or **clavis**, is an alphabetical list of terms in a particular domain of knowledge with the definitions for those terms. Traditionally, a glossary appears at the end of a book and includes terms within that book that are either newly introduced, uncommon, or specialized. While glossaries are most commonly associated with non-fiction books, in some cases, fiction novels may come with a glossary for unfamiliar terms.

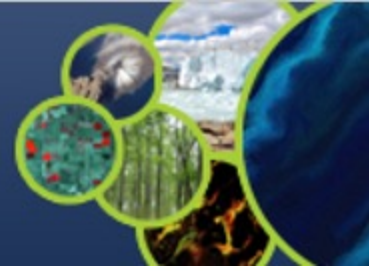
A bilingual glossary is a list of terms in one language defined in a second language or glossed by synonyms (or at least near-synonyms) in another language.

In a general sense, a glossary contains explanations of concepts relevant to a certain field of study or action. In this sense, the term is related to the notion of ontology. Automatic methods have been also provided that transform a glossary into an ontology<sup>[1]</sup> or a computational lexicon

- With the advent of ‘Big Data’, **Earth Observation, Geospatial Sciences and many of their fields of application** become increasingly intertwined, i.e. they become a **single ‘domain of knowledge’**
- Traditions and legacy usage make their vocabularies increasingly **complex and confusing** as soon as previous ‘communities’ are crossed.
- Multidisciplinary working groups need to agree on terminology when starting their work, often struggling with diverging practices and then starting own tailored versions (often as “**least common denominator**”)



- ISO/TC 211 terminology management group: <https://isotc211.geolexica.org/>
  - OGC: <https://www.ogc.org/ogc/glossary/>, <http://www.opengis.net/def/glossary/>
  - INSPIRE glossary: <https://inspire.ec.europa.eu/glossary>
  - CEOS: [http://ceos.org/document\\_management/Working\\_Groups/WGISS/Interest\\_Groups/Data\\_Stewardship/White\\_Papers/EO-DataStewardshipGlossary\\_v1.2.pdf](http://ceos.org/document_management/Working_Groups/WGISS/Interest_Groups/Data_Stewardship/White_Papers/EO-DataStewardshipGlossary_v1.2.pdf)
  - NASA: <https://earthobservatory.nasa.gov/glossary>
- Of these only the 'Geolexica' is interlinked and addressable (per term)!
  - None shows structure or ontology
  - All have gaps and inconsistencies!

**ISO:**

- observed (bio)physical cover on the Earth’s surface (TC211)

how, by whom, from where?

What if there is no  
'cover'?

Which surface (solid, liquid, internal)?

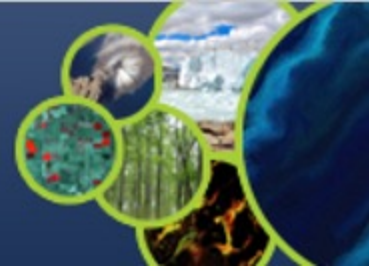
**OGC:** not available

**INSPIRE:**

- Physical and biological cover of the earth's surface including artificial surfaces, agricultural areas, forests, (semi-)natural areas, wetlands, water bodies.

**NASA:**

- The characteristics of a land surface as determined by its spectral signature (the unique way in which a given type of land cover reflects and absorbs light).



## ISO = INSPIRE

- network composed of two or more sets of curves in which the members of each set intersect the members of the other sets in an algorithmic way  
Note to entry: The curves partition a space into grid cells.

## NASA:

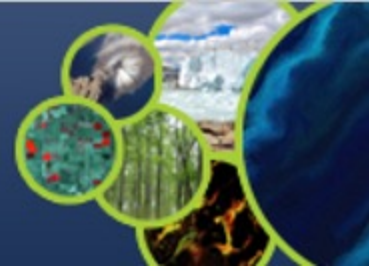
- Not available, neither is ‘raster’

## OGC:

- Not available (!) (available: “georectified gridded data”)

## BELSPO: (<https://eo.belspo.be/en/glossary> )

- A network of regularly spaced straight lines intersecting at right angles. The raster is thus composed of cells of the same size. Each cell is assigned an integer or decimal numeric value. This structure or format is used for representing geographic information in some GIS software packages



## ISO - resolution (a. of a sensor) (b. of imagery)

- a. smallest difference between indications of a sensor that can be meaningfully distinguished

Note to entry: For imagery, resolution refers to radiometric, spectral, spatial and temporal resolutions.

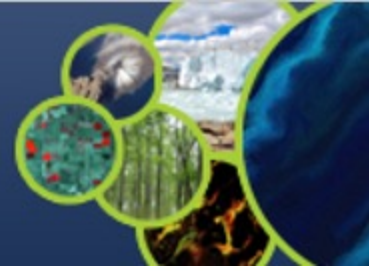
- b. smallest distance between two uniformly illuminated objects that can be separately resolved in an image

## NASA:

- A measure of the ability to separate observable quantities. In the case of imagery, it describes the area represented by each pixel of an image. The smaller the area represented by a pixel, the more accurate and detailed the image.

## INSPIRE:

- Resolution expresses the size of the smallest object in a spatial data set that can be described. It refers to the amount of detail that can be discerned. It is also known as granularity. Resolution is also limited because geo-spatial databases are intent



## ISO

- collection and interpretation of information about an object without being in physical contact with the object

## NASA:

- The technology of acquiring data and information about an object or phenomena by a device that is not in physical contact with it. In other words, remote sensing refers to gathering information about the Earth and its environment from a distance, a critical capability of the Earth Observing System. For example, spacecraft in low-Earth orbit pass through the outer thermosphere, enabling direct sampling of chemical species there. These samples have been used extensively to develop an understanding of thermospheric properties. Explorer-17, launched in 1963, was the first satellite to return quantitative measurements of gaseous stratification in the thermosphere. However, the mesosphere and lower layers cannot be probed directly in this way--global observations from space require remote sensing from a spacecraft at an altitude well above the mesopause. The formidable technological challenges of atmospheric remote sensing, many of which are now being overcome, have delayed detailed study of the stratosphere and mesosphere by comparison with thermospheric research advances.

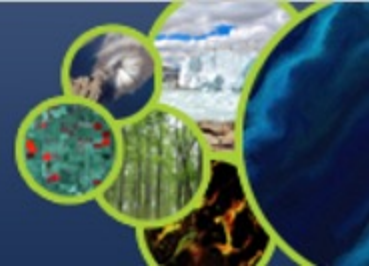
Some remote-sensing systems encountered in everyday life include the human eye and brain, and photographic and video cameras.

## INSPIRE:

- The FeatureOfInterest is a sampling feature which is also the ultimate FeatureOfInterest (i.e. the sampledFeature).

## OGC:

- Acquisition of raster images of the Earth, often involving spectral frequencies other than the visible band, by devices typically carried on airborne or satellite platforms. Sometimes refers also to image analysis of these images



## ISO

- direct measurement of the measurand in its original place

## CEOS

- 1) direct measurement of the measurand in its original place
- 2) any sub-orbital measurement of the measurand

## NASA:

- Latin for 'in original place.' Refers to measurements made at the actual location of the object or material measured. Compare remote sensing.

## INSPIRE:

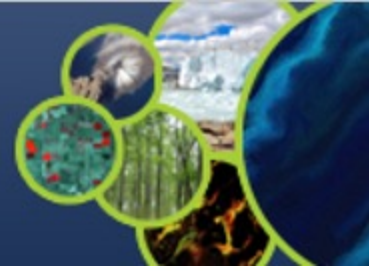
- The FeatureOfInterest is a sampling feature which is co-located with the ultimate FeatureOfInterest (i.e. the sampledFeature).

## OGC:

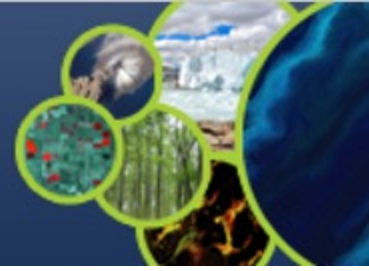
- Not available

➤ No consistent spelling: in\_situ, in-situ, in|situ, in-Situ, insitu, ...





- Each term needs to be individually addressable
- Each term needs to be uniquely defined, incl. unified spelling
- Each definition needs to be complete, i.e. building only on everyday language or other defined terms
- All terms used in a definition which are defined themselves need to be marked and linked (parent-relations)
- All related terms where a term is (re-)used need to be listed and linked (sibling and child relations)
- Circular relations (child becomes parent) shall be avoided
- Categorisations need to be unambiguous (no overlaps) and wherever possible complete (no 'grey zones')



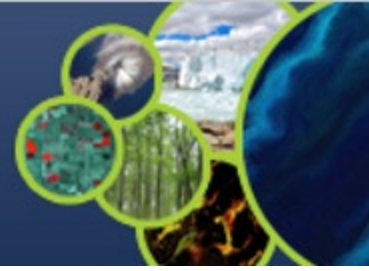
## Observation (Wikipedia slightly altered)

- Observation as a process is the active acquisition of *data* describing a primary source like a feature or a phenomena. Observations can be qualitative, that is, only the absence or presence of a *property* is noted, or quantitative if a numerical value is attached to the observed *property* by counting or measuring.

Observation can be done in close neighbourhood (see '*in-situ*') or at larger distance (see '*remote sensing*') from the observed feature or phenomena.

In the context of Earth Observation (EO), observations can be categorised by location into space-, air-, or sea-borne, ground-based, underwater and underground.

- “Observation” can also be used to denominate the data resulting from an observation process. In this case the observation process generating this particular observation must have been concluded. (Therefore all observations are *samples*, but not all samples are observations.?)



## Remote observation

- ‘Remote describes *observations* of a *feature* or *phenomenon* performed at a significant distance from that feature or phenomena. ‘Significant’ in this context means that the distance has or may have a non-negligible impact on the acquired *data*. The effect of distance is the main distinction criteria between ‘remote’ and ‘*in-situ*’ observations

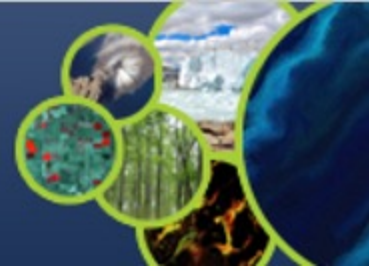
## In-situ observation

- ‘In-situ’ describes *observations* performed in the same place where an object is located or a phenomenon is occurring, without isolating it from other systems or altering its original conditions. In-situ observations require either direct physical contact or a distance which has no or negligible impact on the observation. Observations not fulfilling these conditions are considered ‘Remote’.

## Remote Sensing

- A broad term used for describing the domain that deals primarily with remote observations, their instrumentation, processing and analysis.

- Fully online with fixed URL (DOI), and dedicated URLs for each entry
- Endorsed by all major stakeholders -> 'One Glossary'
- Open to 'public' contributions (registered users -> 'Wikipedia' or 'Git' style)
- Monitoring and moderation by multi-agency group of experts
- Mechanisms for resolving intra- and inter-disciplinary disputes
- Versioning (like in 'Git')
- Compulsory use in all standards (i.e. no in-document conflicting definitions)
- Compulsory listing of all standards using a term



- Discussions/Contacts
    - ✓ OGC Technical Committee (TC) Dec 2020
    - ✓ ISO TC211 on occasion of 19124 meeting May 2021
    - ✓ FAIR dataset quality information (FAIR-DQI) working group June 2021
  - Conclusions
    - a consolidation of geospatial/EO terminology seems largely welcome and considered necessary
    - rules, procedures, and tools/platform could and should be put in place first
- Do we want to move forward and if so who and how?



*Thank you for your attention!*  
*Any questions?*

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