



# G-reqs: From gathering requirements to filling the gaps in in-situ data

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## Challenges in in-situ data

In contrast with space-based data, in-situ data is very **heterogeneous** and complex to organize, becoming often **hardly accessible** for users due to multitude of actors involved and **technical barriers** associated with, e.g., poor metadata, missing provenance information, lack of common standards, missing vocabularies for variables and units of measure, diversity of licenses and formats, **gaps** and discontinuities in time series, lack of spatial coverage, etc.

*In-situ: all land, water, and air-based observations, independent of the observing technology and methodology, excluding only space-based observations [1]*

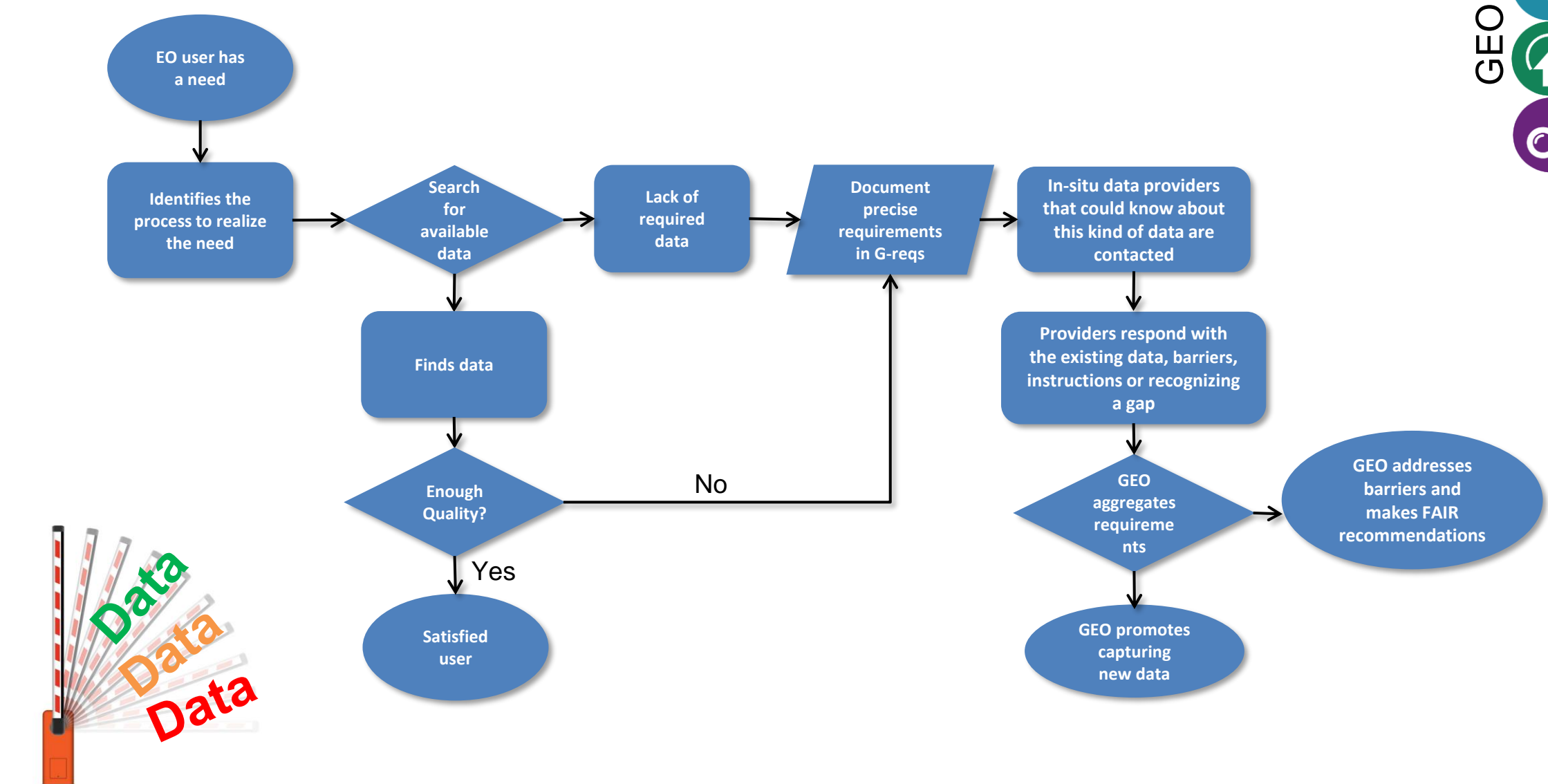
...What is more important and where to start fixing this?  
We can start by collecting the main needs, requirements and barriers from the actual in-situ data users.

## G-reqs: Geospatial in-situ requirements

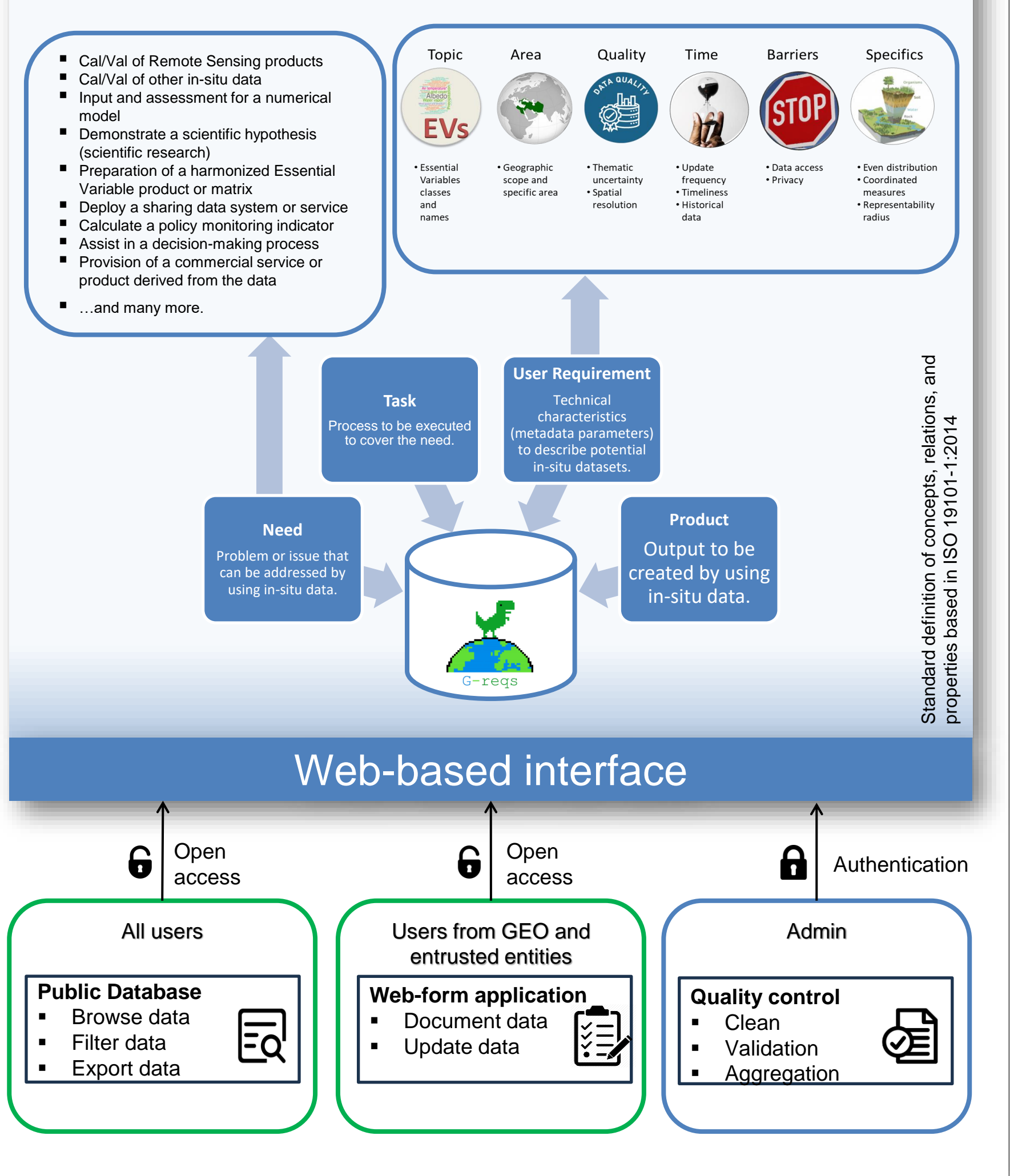
- A database tool and standard methodology to **collect** and help **manage user requirements** for **in-situ** datasets to produce specific products or services to meet GEO objectives.
- Based on the **concept of Needs** that can be fulfilled by executing a set of tasks that require in-situ data to be performed
- G-reqs content helps in **identifying barriers** that might prevent users from discovering and accessing or using the data effectively and provide **gap evidences** for prioritization of the production of new in-situ observations
- Ultimate aim is the matchmaking between user requirements and available data
- This information becomes part of the GEO knowledge, and it is an integral part of the **GEO In-situ Strategy**.

### Examples of selected records collected in G-reqs

Need type	Need description	Area	Subarea	Temporal extent	Requirement name	Requirement variable	Threshold (T) Goal (G)	Thematic uncertainty	Coordinate measure	Update frequency	Timeline	Horizontal Resolution	Vertical Resolution
Remote Sensing CalVal	Production of biomass maps	National	Tropical countries across all continents	2013 – Present	Probabilistic samples of forest biomass measurements	Above ground forest biomass	T	5 %	Biodiversity, soil carbon, tree height	2 years	3 years	25 km	n/a
							G	0 %		1 year	1 year	5 km	n/a
Scientific Research	Exploring elevational dependencies in climate change	Global	Specific mountain regions	2005 – Present	Climate variables	Precipitation at surface level	T	20 %	Air temperature, wind speed, species presence	1 year	n/a	500 m	300 m
							G	0 %		1 hour	n/a	10 m	200 m
Prepare EV product or matrix	EV to study habitat quality	Continental	Iberian Peninsula	1980 – Present	Habitat quality in the Iberian Peninsula	Community composition and ecosystem functioning	T	10 %	Biodiversity indices of different taxa, soil properties, structure indicators	10 years	1 year	30 m	n/a
							G	5 %		5 year	6 month	10 m	n/a

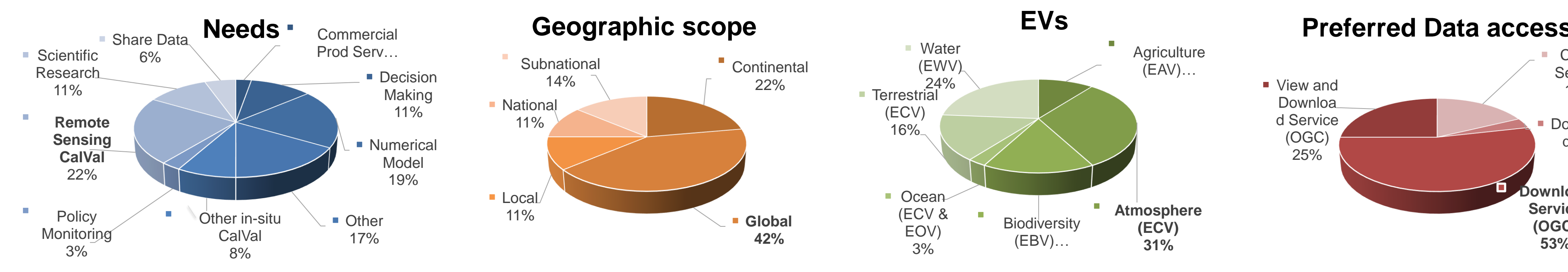


## G-reqs conceptual model



## Preliminary overall analysis of the G-reqs database

Already, we can show some useful evidences that, when confirmed by more user contributions, GEO and interested data providers can take into consideration.

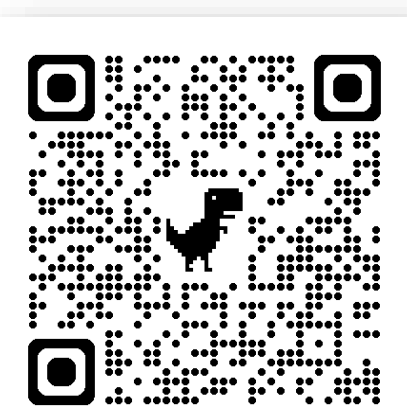


## Open to contributions

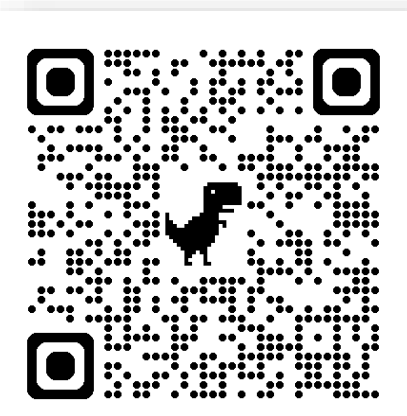


- G-reqs is **open to contributions** and users from agencies, initiatives, networks, research infrastructures, universities, private companies, or from any entity looking for fit-for-purpose in-situ EO datasets, with special attention to those entities that are part of GEO.
- The G-reqs team looks for in-situ **users** and organize **interviews** and **workshops** to **guide** them to formulate requirements.
- Users can also formulate requirements on **their own** using the tool and ask for **help** when necessary.

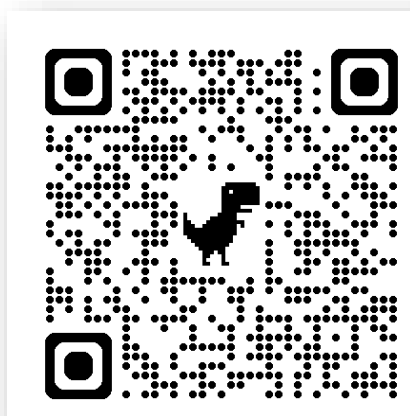
*Sharing your experience may help secure continuity and improve availability of high quality in-situ data for future research and sustainable practices.*



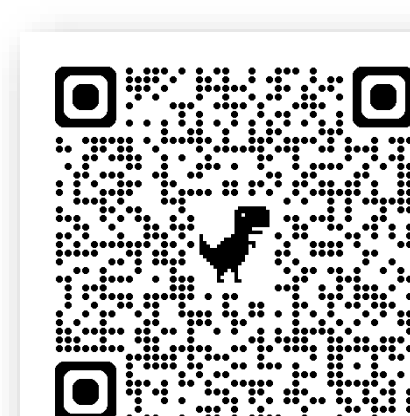
G-reqs  
landing page



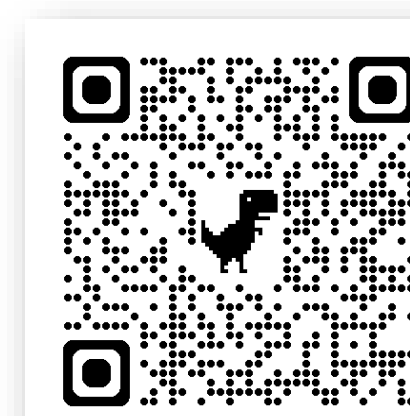
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requirements



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requirements



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## GEO Work Programme activities and EU projects involved in G-reqs so far



[1] GEOSS Non-Space-Based Earth Observation Resources (GD-06) Task Team, "In Situ Observations: Coordination Needs and Benefits" (no page), included in the GEO 2016 Work Programme Progress Report.

[2] Maso, J.; Brobia, A.; Voidrot, M.-F.; Zabala, A.; Serral, I. G-reqs, a New Model Proposal for Capturing and Managing In Situ Data Requirements: First Results in the Context of the Group on Earth Observations. Remote Sens. 2023, 15, 1589. <https://doi.org/10.3390/rs15061589>