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G-reqs as a framework for defining precise, technology-agnostic, user-driven geospatial in-situ requirements. Towards a FAIR Global Earth Observation System of Systems without data gaps.

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In-situ Earth observation data play a key role in environmental and climate related domains. However, in-situ data is often missing or hardly accessible for users due to technical barriers, for example, unstructured metadata information, missing provenance, lack of links to standard vocabularies or units of measure definitions. This communication presents a well-defined, formalized methodology for identifying and documenting requirements for in-situ data from a user's point of view initially tested within the Group on Earth Observations. This is materialized into a comprehensive Geospatial In-situ Requirements Database and a related tool called G-reqs.

The G-reqs facilitates the requirements gathering process via a web-form that acts as the user interface. It compasses a variety of Needs: Calibration/Validation of remote sensing products, Calibration/Validation of other in-situ data, input assessment for a numerical modeling, creation of an Essential Variable product, etc. Depending on the type of need, there will be requirements for in-situ data that can be formally expressed in the main components of the geospatial information: spatial, thematic, and temporal (e.g. area of scope, variable needed, thematic uncertainty, positional accuracy, temporal coverage and frequency, representative radius, coordinate measurements, etc). The G-reqs is the first in-situ data requirements repository at the service of the evolution of the GEO Work Programme but it is not limited to them. In fact, the entire Earth observation community of users is invited to provide entries to G-reqs. The requirements collected are technology-agnostic and neither takes into account the specific characteristics of any dedicated instrument nor sensors acquiring the data. The web-form based tool and the list of all validated requirements are FAIRly accessible in the G-reqs web site at https://www.g-reqs.grumets.cat/.

After a process of requirements gathering, the presented approach is aiming to discover where similar requirements across different scientific domains are shared, fostering in-situ data reusability, and guiding the priorities for the creation of new datasets by key in-situ data providers. For example, in-situ networks of observation facilities (ENVRI, e.g. ELTER, GEOBON, among others) are invited to direct their users to provide requirements to the G-reqs and participate in the analysis of the requirements, detect gaps in current data collection and formulate recommendations for the creation of new products or refine existing ones. The final aim is to

improve the interoperability and accessibility of actionable in-situ Earth observation data and services, and its reuse.

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