ConnectinGEO observations inventory

Daniel Nüst
52°North Initiative for Geospatial Open Source Software GmbH
Münster, Germany
d.nuest@52north.org

Joan Masó
Centre for ecological research and forestry applications (CREAF)
Barcelona, Spain
joan.maso@uab.cat

Stefano Nativi
Institute of atmospheric pollution research of the National Research Council of Italy
Florence, Italy
stefano.nativi@cnr.it

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1 Poster Abstract

ConnectinGEO (http://www.connectingeo.net/) is a Coordinate and Support Action project in the Horizon 2020 programme aiming to link existing Earth observation networks with science, the private sector and stakeholders from global initiatives such as Global Earth Observation System Of Systems (GEOSS, http://www.earthobservations.org/geoss.php) or Copernicus (http://www.copernicus.eu/) with the goal to increase coherence of European observation networks and increase the use of existing Earth observation data, for example for assessments, forecasts or planning.

The project will implement a novel methodology combining different approaches to build a coherent picture of observation requirements, analyse the current state of observations, and eventually identify gaps of European EO networks. We present part of the first phase of the project: a systematic analysis of observations and measurements, which include space-based, airborne and in-situ platforms. The analysis can be divided into four steps: gathering requirements, design for a new observation inventory, feeding of the inventory, and analysis of the inventory data. Complementary to this bottom-up analysis a top-down consultation process is conducted.

This inventory focuses on collecting information about observed properties, e.g. air quality, radiation, hydrology, or oceanography, as well as their types, e.g. low level observations, high level observations, essential variables or categorical indicators. It integrates specific metadata from different sources and faces challenges such as metadata fusion and scalability. At the centre is the information from the GEOSS Discovery and Access Broker (DAB) infrastructure, the core component of the GEOSS Common Infrastructure (GCI). This information is complemented by scientific literature, user-generated information, and potentially further domain specific supplemental catalogues.

The observation inventory utilizes a service-oriented architecture to retrieve relevant metadata excerpts from these, and potentially more, data sources and populates them into a newly created analysis data store. The implementation of this data store will utilize existing document index or database technologies, but still require a sophisticated data model to handle challenges such as multiple versions of documents, multiple appearances of the same original dataset, or metadata in multiple languages. This data model and the process to derive it are be presented in this work along with information that is queryable from the observation inventory. Based on this database the project will introduce new methods to extend the observation metadata collaboratively as well as systematically: data providers as well as researchers shall be able to comment and contribute information on both existing and non-existing, i.e. datasets not yet covered in the observation inventory, datasets.

The work concludes with an outlook of an architecture for a scalable observation inventory implementation and the statistics that can be derived from it, such as density or spatial coverage of in-situ observation stations, temporal availability of satellite imagery including latest and iterative coverage, or the used standards to encode as well as retrieve data (APIs, formats). The statistical values feed the assessment of observed phenomena in Europe and encompass aspects such as spatial, temporal and thematic coverage, quality information for both metadata and data, as well as accessibility factors such as license, costs, standards or formats. These data will be analysed with methods of descriptive statistics. Within the larger picture of the ConnectinGEO project, the presented bottom-up assessment is brought together with (i) findings from other bottom-up activities, namely a consultation process with current EO networks and industry-driven challenges, (ii) top-down activities, namely an identification of requirements from generic sustainability goals, and (iii) incorporation of material form international programmes and forums, e.g. Future Earth (http://www.futureearth.org/) or the Belmont Forum (https://igfagcr.org/). The inventory will for the first time provide a complete picture of actually available data and metadata - a census of key observables.

ConnectinGEO also engages in enabling ENEON, a European Network of Earth Observation Networks (http://eneon.net/), and in contributing to the monitoring of the United Nations (UN) Sustainable Development Goals (SDG), for which a clear understanding of the current state of observation data across agencies, organisations, and companies is a crucial contribution.