Geophysical Research Abstracts
Vol. 15, EGU2013-7437, 2013
EGU General Assembly 2013

GEOWOW: a drought scenario for multidisciplinary data access and use

Mattia Santoro (1), Alessandro Sorichetta (2), Elena Roglia (2), Massimo Craglia (2), and Stefano Nativi (1)

(1) Institute of Atmospheric Pollution Research (CNR-IIA), Monterotondo (RM), Italy (mattia.santoro@cnr.it, stefano.nativi@cnr.it), (2) European Commission Joint Research Centre, Ispra, Italy (alessandro.sorichetta@jrc.ec.europa.eu, elena.roglia@jrc.ec.europa.eu, massimo.craglia@jrc.ec.europa.eu)

Recent enhancements of the GEOSS Common Infrastructure (GCI; http://www.earthobservations.org/gci_gci.shtml), and in particular the introduction of a middleware in the GCI that brokers across heterogeneous information systems, have increased significantly the number of information resources discoverable worldwide. Now the challenge moves to the next level of ensuring access and use of the resources discovered, which have many different and domain-specific data models, communication protocols, encoding formats, etc.

The GEOWOW Project – GEOSS interoperability for Weather, Ocean and Water, http://www.geowow.eu – developed a set of multidisciplinary use scenarios to advance the present GCI. This work describes the "Easy discovery and use of GEOSS resources for addressing multidisciplinary challenges related to drought scenarios" showcase demonstrated at the last GEO Plenary in Foz de Iguazu (Brazil).

The scientific objectives of this showcase include: prevention and mitigation of water scarcity and drought situations, assessment of the population and geographical area potentially affected, evaluation of the possible distribution of mortality and economic loss risk, and support in building greater capacity to cope with drought. The need to address these challenges calls for producing scientifically robust and consistent information about the extent of land affected by drought and degradation. Similarly, in this context it is important: (i) to address uncertainties about the way in which various biological, physical, social, and economic factors interact each other and influence the occurrence of drought events, and (ii) to develop and test adequate indices and/or combination of them for monitoring and forecasting drought in different geographic locations and at various spatial scales (Brown et al., 2002).

The scientific objectives above can be met with an increased interoperability across the multidisciplinary domains relevant to this drought scenario. In particular, we demonstrate in this instance (i) an improved search capability through semantically related resources, (ii) a harmonized access to the heterogeneous resources discovered, and (iii) a flexible transformation framework to access, download and use the resources discovered, and implement scientifically-sound scenarios that respond to environmental global challenges.

This showcase demonstrates how the middleware services provided by the GEO Discovery and Access Broker – DAB (Nativi et al., 2013) – component can be used to address the multidisciplinary interoperability challenges.

With respect to discovery, the GEO DAB allows to expand the traditional discovery functionalities using a set of semantically connected concepts delivered through vocabulary services. This makes it possible to obtain an extended result set, where the user can find new unexpected datasets of interest for her/his analysis. Moreover, the use of semantics-enabled queries makes it possible to search and retrieve data resources in multiple languages, which is a crucial issue in global research.

With respect to access and use, the GEO DAB makes it possible for users to preview, access, and use the resources discovered according to a common grid environment. Users can define a common grid environment – Coordinate Reference System (CRS), spatial resolution, spatial extent (e.g., a subset of a discovered dataset), and data encoding format – to download all the datasets of interest. This is crucial for advancing an effective integrated exploitation of multidisciplinary data coming from heterogeneous sources. In normal practice, the manipulation of the data discovered (pre-processing) that is necessary ahead of the analysis has to be done by the user. The GEO DAB takes this burden away from the user providing a true added value service.

The showcase presented here goes of course beyond the specifics of drought applications, and is of interest because it demonstrates real advancements in the use of complex system of systems, form simple discovery, to more semantically aware multilingual discovery, and above all access and use of the information resources which is the critical goal.

The research leading to these results has received funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under Grant Agreement n. 282915.

References

Jesslyn F. Brown, Bradley C. Reed, Michael J. Hayes, Donald A. Wilhite, and Kenneth Hubbard. A Prototype Drought Monitoring System Integrating Climate and Satellite Data. Pecora 15/Land Satellite Information IV/ISPRS Commission I/FIEOS 2002 Conference Proceedings

S. Nativi, M. Craglia, J. Pearlman, 2013, "Earth Science Infrastructures Interoperability: the Brokering Approach", in press on IEEE JSTARS