THE eLTER INFORMATION SYSTEM

The eLTER Information System enables provision and access to long term ecosystem observation data in order to support data analysis and forecasting. The first eLTER H2020 project 2015-2019 developed the basic architecture and tools to support data providers as well as data users and, thereby, fostered the availability to FAIR[a] and open data is a key element for Open Science.

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The eLTER Research Infrastructure[16] aims to support advanced ecosystem studies while addressing grand societal and research challenges and promoting innovation in ecosystem research. One of the major aims of long term ecosystem monitoring and research is to provide quality controlled and reliable data to support scientific analyses and enable input for designing environmental policies and assessing their impacts. In order to foster information exchange and sharing, at the very minimum, data must be described using discovery metadata and controlled vocabularies. This requires proper documentation of data, services and observation facilities, as well as the implementation of underlying IT infrastructure enabling the discovery and access of data in a web-based environment.

The eLTER Information System (eLTER IS) integrates, in a unique and innovative manner, a number of tools supporting the requirements for network level data management (see box). This enables the linking of local and regional data nodes by means of a common standards and services supporting metadata, spatial and time series data.

Site and Dataset Registry, DEIMS-SDR (Dynamic Ecological Information System - Site and Dataset Registry; https://deims.org) provides harmonised and standardised documentation of long-term observation facilities and linked datasets using common metadata standards. The wide range of information about the facilities and their characteristics includes information on the basic instrumentation as well as an overview of the main research topics addressed within the site. DEIMS-SDR provides a valuable global service which can also be used by other observation networks because the exchange is based on the INSPIRE[b] EF data specification and OGC[c] specifications.

Requirements for an integrated eLTER Information System

✽ Enable and support access to distributed data sources and providers

✽ Provide central core facilities for data documentation and provision

✽ Provide a common interface for data discovery, visualisation and access

✽ Foster the use of metadata, data and service standards

✽ Implement common metadata standards in order to support community needs

✽ Enable and foster the use of common semantics

Data Nodes (DN; https://cdn.lter-europe.net/), enable the provision of metadata and data (including the link to data repositories if data are stored in external trusted repositories). These data can either be uploaded to a *Central Data Node* (CDN), being a central network level facility or a *Partner Data Node* (PDN) following specific standards. The Central Data Node provides services to register sensors as well as the ability to upload data streams for these sensors using a web interface. The CDN uses the recent version of the OGC SOS[d] reference implementation provided by 52°North and supports SensorML 2.0. SOS data services, which are documented using DEIMS-SDR, providing an online distribution link to the service endpoint.

Data Integration Portal (DIP; http://dip.lter-europe.net), is the central catalogue to discover, access and visualise data sources provided through the data nodes registered in the eLTER DIP. Data provided as an OGC SOS service can be dynamically visualised and downloaded using the 52°North Helgoland client. So, time series from different sensors can be overlaid and visualised, providing a first inspection of the provided data in near real time.

Common controlled vocabulary (EnvThes; http://vocabs.ceh.ac.uk/edg/tbl/EnvThes.editor), provides a semantic backbone for keyword tagging and discovery.

The components of the eLTER Information System can be accessed through the eLTER IS landing page https://data.lter-europe.net/.

References

D3.1 eLTER State of the art and requirements (Oggioni et al.)*

D3.2 Governance and long term policy (Kunkel et al.)*

D3.3 Data models (Peterseil et al.)*

D8.1 eLTER Information Architecture Report (Watkins et al.)*

D8.2 Software Service Prototype (Oggioni et al.)*

D8.3 eLTER Data Integration Platform (Minic et al.)*

D8.4 User feedback (Minic et al.)*

Integrated European Long-Term Ecosystem, critical zone and socio-economical systems Research

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Components of the eLTER Information System

✺ Site registration (DEIMS-SDR), standardised documentation of long-term observation facilities

✺ Central Data nodes (CDN), hosting of time series data (including the link to data repositories)

✺ Data Integration Portal (DIP), discovery and access to data sources provided through the data nodes

✺ Common controlled vocabulary (EnvThes), providing a semantic backbone for keyword tagging and discovery.

Wohner, C., Peterseil, J., Poursanidis, D., Kliment, T., Wilson, M., Mirtl, M., Chrysoulakis, N. (2018) DEIMS-SDR – A web portal to document research sites and their associated data, Ecological Informatics, 51:15-24, ISSN 1574-9541, [https://doi.org/10.1016/j.ecoinf.2019.01.005]

[a]Data management principles: Findable, Accessible, Interoperable, Reusable
[b]Infrastructure for spatial information in Europe
[c]Open Geospatial Consortium
[d]Sensor Observation Service

*Available from www.lter-europe.net/elter/outputs

eLTER encompasses LTER-Europe, a community of national long-term ecosystem research site networks, as well as major projects to develop eLTER RI, a whole ecosystem European Research Infrastructure under the ESFRI framework