

# DEIMS-SDR as a tool to foster environmental research by providing standardised site information

## Introduction to DEIMS-SDR



Protected areas not only play an important role in maintaining natural ecosystems and their biodiversity but also provide a major input into the understanding of ecosystems and their processes. Long-term monitoring for management as well as for scientific purposes is an important element in many of the protected areas. An integrated framework for documenting observation locations as well as the resulting data is often missing. With DEIMS-SDR (Dynamic Ecological Information Management System - Site and Dataset Registry; <https://deims.org>) this challenge is addressed. DEIMS-SDR is a web service that allows registering and discovering long-term ecosystem research sites and protected areas around the globe, along with the data gathered at those sites and the people and networks associated with them. DEIMS-SDR describes a wide range of sites, providing a wealth of information, including each site's location, ecosystems, facilities, parameters measured and research themes. It aims to be a globally comprehensive site catalogue of in-situ observation or experimentation facilities covering all (terrestrial) biomes and enabling that standardised information to be openly available to science, politics and the public in general.

## System Architecture

DEIMS-SDR currently consists of four main components fulfilling different needs and offering linked services (Fig. 1):

- 1. DEIMS Core:** Provides a basic user interface for storing information about datasets and people and for generating respective metadata records
- 2. DEIMS-SDR:** An extension of DEIMS Core featuring additional custom-built modules that allow the storing of information about research sites, data products and sensors and the generation of ISO19139, SensorML and INSPIRE EF metadata records.
- 3. WebGIS Service:** An instance of GeoServer, an OGC compliant implementation of a number of open standards that exposes geographic information of sites as view and download services with additional rudimentary information about research sites, e.g. name, DEIMS.ID and the URL to the respective metadata record.
- 4. Catalogue Service:** DEIMS-SDR periodically loads all available metadata records into a pyCSW instance. pyCSW is a python implementation for the OGC Catalogue Service for the Web (CSW) server implementation that makes records harvestable by other systems.

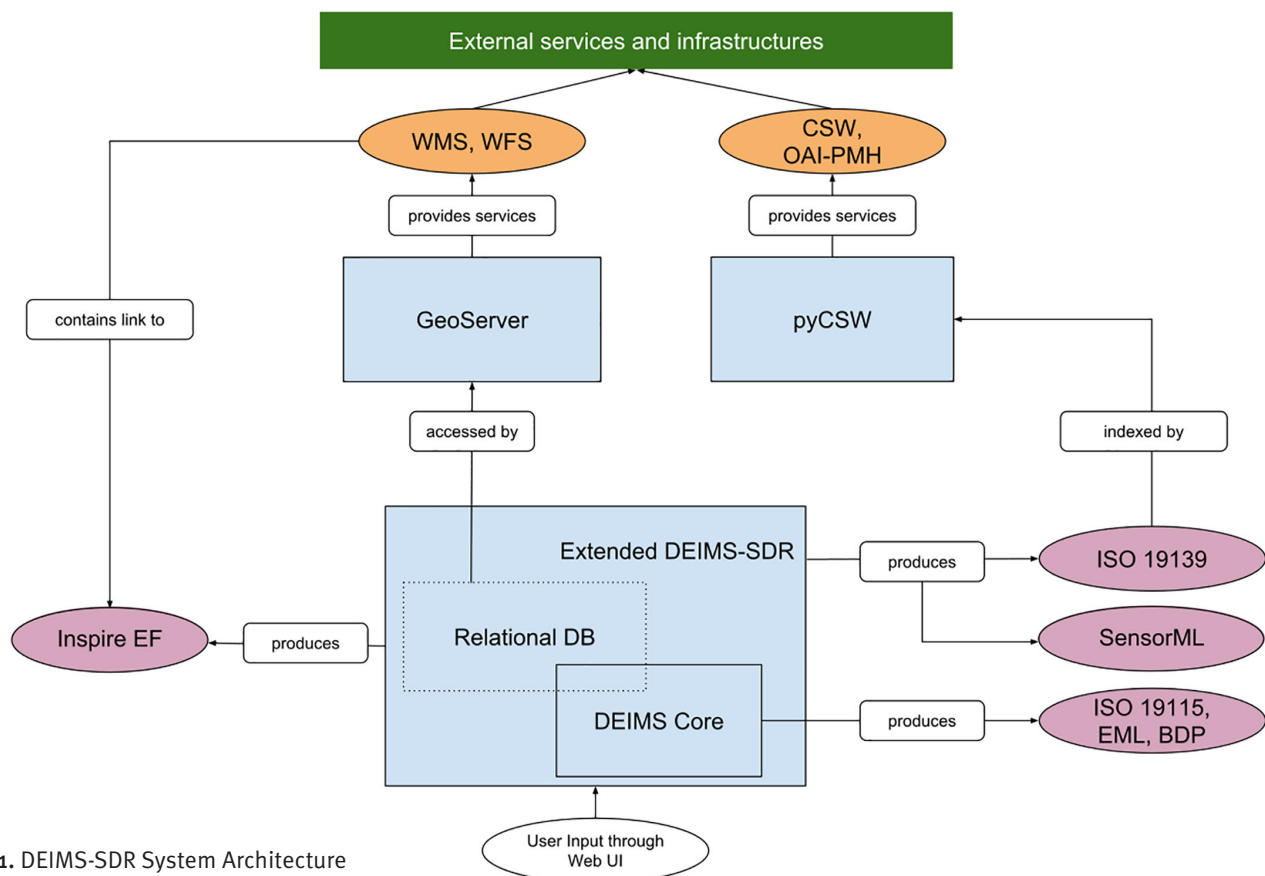


Fig 1. DEIMS-SDR System Architecture

## Core Features

For each site record, a DEIMS.ID is generated upon its creation. This identifier is built combining the deims.org url and an alphanumeric code and is:

- Unique
- Resolvable
- Persistent

The neutral nature of this identifier, called 'DEIMS.ID', allows cross-RI identification of research sites, thus creating more sustainable and usable site metadata records.

## Interoperability

DEIMS-SDR supports a number of standardised services (WMS, WFS, OAI-PMH, CSW) for the provision of data and metadata as well as a number of metadata formats (ISO 19115/19139 and EML for dataset records, Inspire EF for site records, SensorML for sensor records). This allows DEIMS-SDR to be interoperable not only with the data infrastructure of LTER Europe, but also with DataONE and the Group on Earth Observations (GEO), as well as any other infrastructure that supports these services.

## Data Products

DEIMS-SDR also allows storing information about data products. A data product is a product of a workflow (e.g. observations) that facilitates a series of datasets. In the specific case of ECOPotential the 'data product' represents a summarised description of a series of data aimed at presenting the available data sources in a protected area without a full description of each single dataset. It should be seen as something between a broad class (e.g. biodiversity) and a detailed dataset (e.g. abundance of a species within 0.1 hectare plot). For instance, 'deposition data' can be a 'data product' that contains several parameters measured with different temporal frequencies and spatial scales. The advantage of using this approach is that instead of describing each single dataset or parameter the 'data product' can be described as a whole. The related datasets can be linked to the data product through its metadata. In this way, the protected areas as data holders do not have to document every dataset they are collecting with detailed metadata. In addition, the modellers or remote sensing experts can easily identify different types of data they can use. Once a specific datasets was identified as needed for modelling, for example, the associated metadata have to be documented by its owner.

- 1 Abisko National Park
- 2 Camargue Biosphere Reserve
- 3 Cap Corse MPA
- 4 Caribbean LME
- 5 Curonian lagoon biosphere polygon
- 6 Curonian Spit National Park
- 7 Danube Delta Biosphere Reserve
- 8 Doñana Long-Term Socio-ecological Research Platform
- 9 Gran Paradiso National Park
- 10 Hardangervidda National Park
- 11 Kalkalpen National Park
- 12 Kruger National Park
- 13 La Palma Island
- 14 Lithuanian Coastal Site (LT-04 Nagliai, Curonian Spit NP)
- 15 LTER Zöbelboden
- 16 LTER Dutch Wadden Sea Area
- 17 LTER Northern Negev
- 18 LTER Platform Eisenwurz (EW)
- 19 LTER-Montado
- 20 Mediterranean LME
- 21 Montado in Alentejo Natura 2000 sites
- 22 Murgia Alta
- 23 National Park Pavsarian Forest
- 24 Nemunas Delta Regional Park
- 25 Ohrid and Prespa
- 26 Pelagos Sanctuary
- 27 Peneda-Gerês
- 28 Réunion National Park
- 29 Samaria National Park
- 30 Sierra Nevada / Granada (ES- SNE)
- 31 Tatra Mountains Biosphere Reserve PL-SK
- 32 Tatra National Park



Fig 2. Map of listed protected areas on DEIMS-SDR

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Administrative Boundaries: gadm.org; Site locations: deims.org

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## References

Poursanidis, D., Peterseil, J., Wohner, C., Chrysoulakis Nektarios, Wetzel, F., Alonso, J., ... Bosch, S. (2017). Metadata for pre-existing datasets. H2020 ECOPotential. <https://doi.org/10.13140/rg.2.2.17484.72328>  
Wohner, C., Peterseil, J., Poursanidis, D., Kliment, T., Wilson, M., Mirtl, M., & Chrysoulakis, N. (2019). DEIMS-SDR – A web portal to document research sites and their associated data. *Ecological Informatics*, 51, 15–24. <https://doi.org/10.1016/j.ecoinf.2019.01.005>