



e-shape solutions: Earth Observation for biodiversity and water management

14 - 15 February 2023

9.30 – 17.00 CET

The Hague - NSO Headquarter

Centre Court

e-shape mySITE – Mobilizing data from long-term in-situ observation facilities

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e-shape

An event co-organised by

eurisy
ACTING COLLECTIVELY TO
BRIDGE SPACE AND SOCIETY

**Netherlands
Space
Office**

Outline

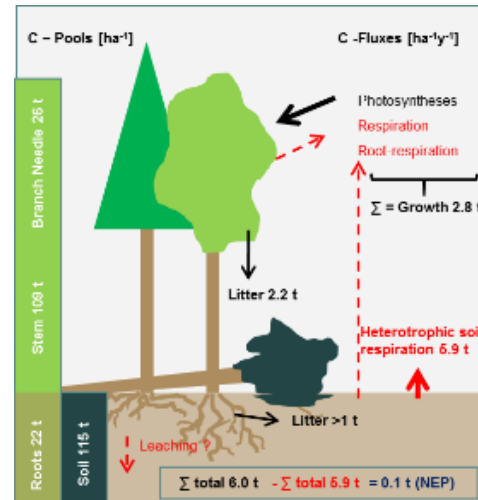
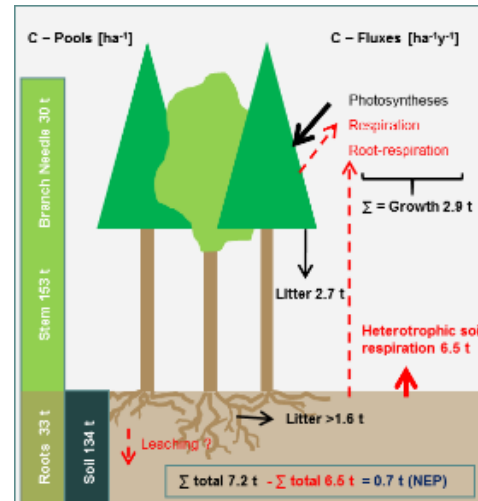
- Background
- Scope of e-shape pilot mySITE
- Implementation
- Sustainability and Outlook

Background



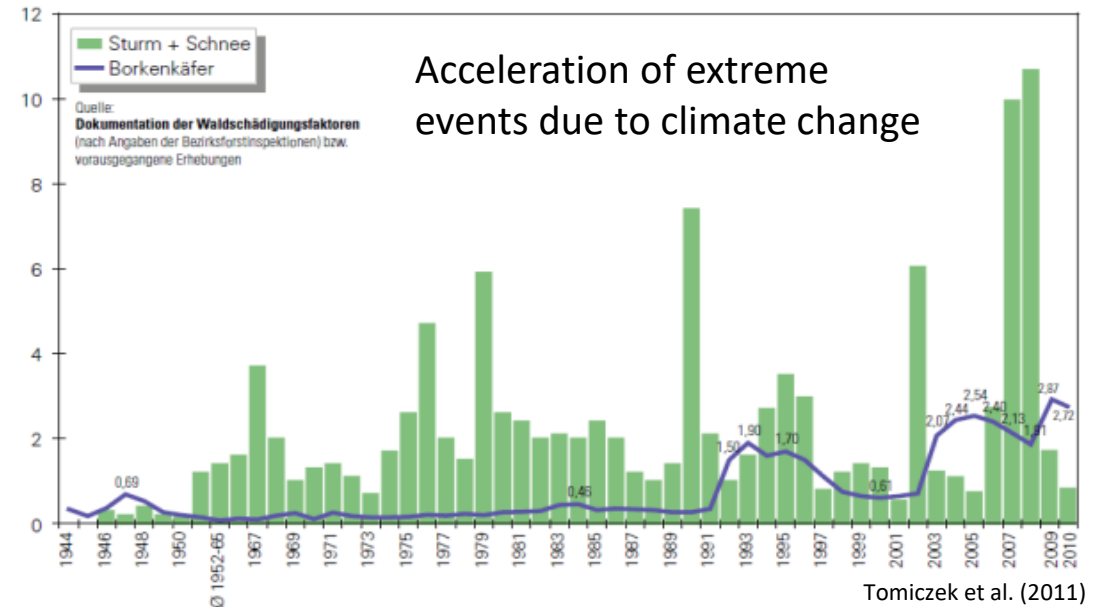
Climate and global change affects biodiversity, ecosystems, and their processes

Wind throw Zöbelboden ©Zöbelboden/Dirnböck



Kobler et al. (2015, European Journal of Forest Research)

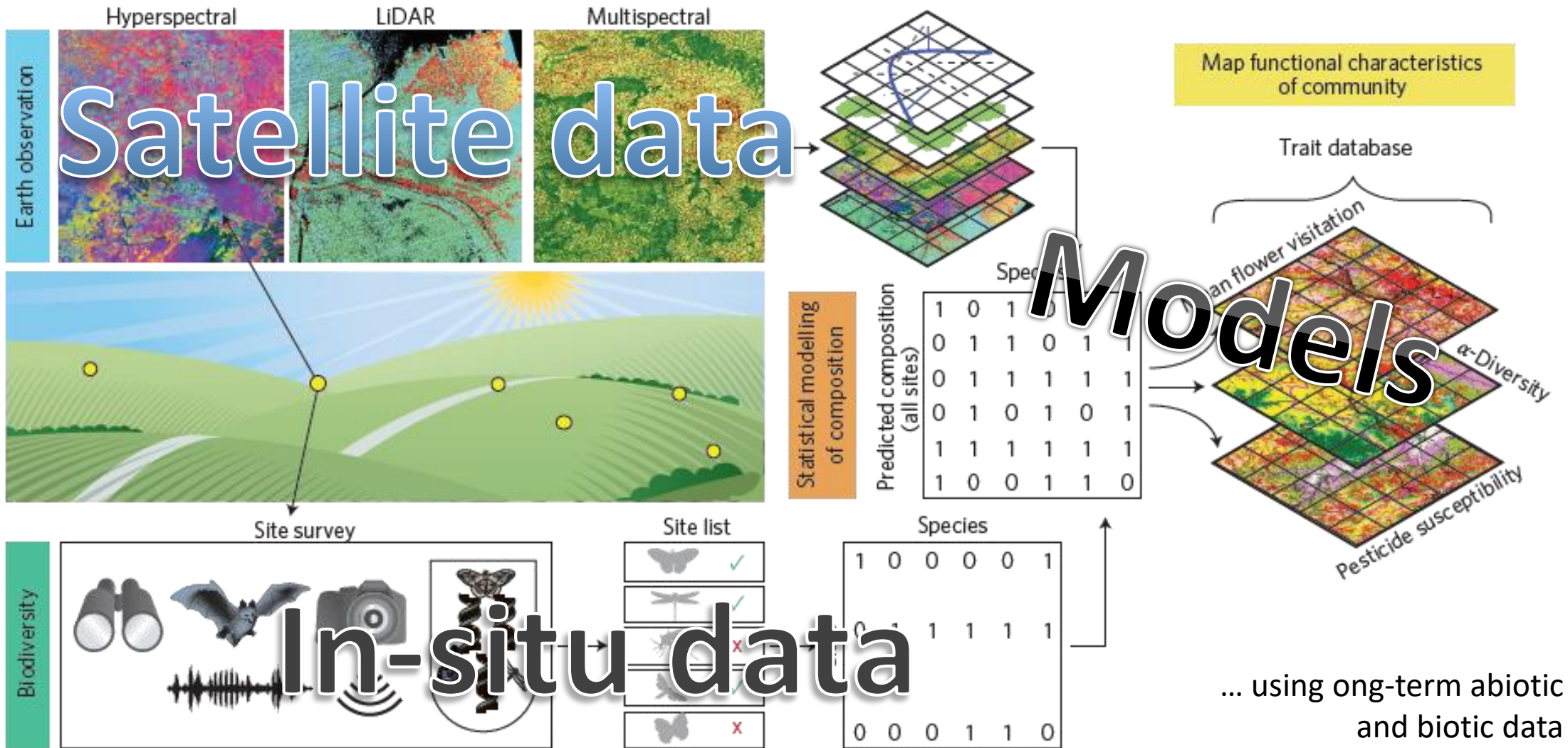
Carbon sink
 ↓
 Carbon source



Long-term studies and high-quality in-situ data are necessary to understand the dynamics and magnitude of the changes and the possible effects and must be available in a timely manner

Background

... connecting Earth observation to biodiversity and ecosystems



Starting point

In-situ data is available (varying amount of variables and with time series data 10y+)

Occasionally even **spatially continuous data** (phenology, LAI,...)

Gap:

- Site managers have no access/possibility to use EO data or EO enabled biodiversity data (spatially overview / early warning / gap filling)
- In-situ data have different interval, units, monitoring strategy, processing, quality
- Sometimes stored locally and not directly available

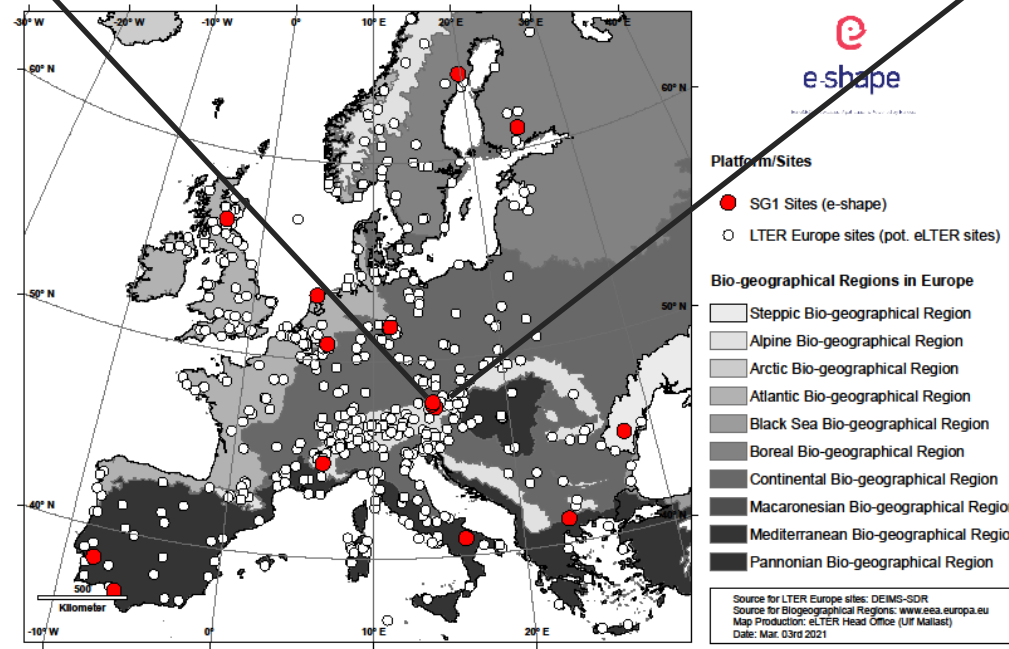


DEIMS.org (© TERENO Harz - central german lowland - Hohes Holz)

Objectives - mySite

Providing information on targeted areas (e.g. eLTER sites) in order to enable large scale research and assessment

- build and extend **common registry of observations and experimentation** facilities as the basis for the integration of available information and as contribution to the GEO Data Infrastructure
- **visualise in-situ and EO data** providing end user services linking to data provided from in-situ and remotely sensed observations
- **provide information on linked ecosystem indicators** aligned with the EBV framework and streamline targeted observations linking these indicators to the conceptual framework defined and implemented in the myVARIABLE pilot



mySITE Pilot

Building on a software stack enabling to document, publish and visualize in-situ data from long term observations

- Documentation
 - DEIMS-SDR <https://deims.org>
- Data storage
 - EUDAT B2SHARE (<https://b2share.eudat.eu>)
 - Geoserver
 - eLTER Central Data Node (OGC SOS)
- Visualization and access
 - EcoSense <https://ecosense.biosense.rs>
 - crocoTile <https://elter-crocotile.data labs.ceh.ac.uk/>



Environmental Assessment Agencies/ European and national conservation agencies



Research Community



Protected Area / Site and Platform Coordinators

DEIMS-SDR (deims.org)

- A site and dataset registry
- Allows to document environmental monitoring and research sites
- Ca. 1200 sites* registered as of November 2022
- Used in the research networks eLTER, ILTER, national LTER networks and a number of EU projects such as e-shape



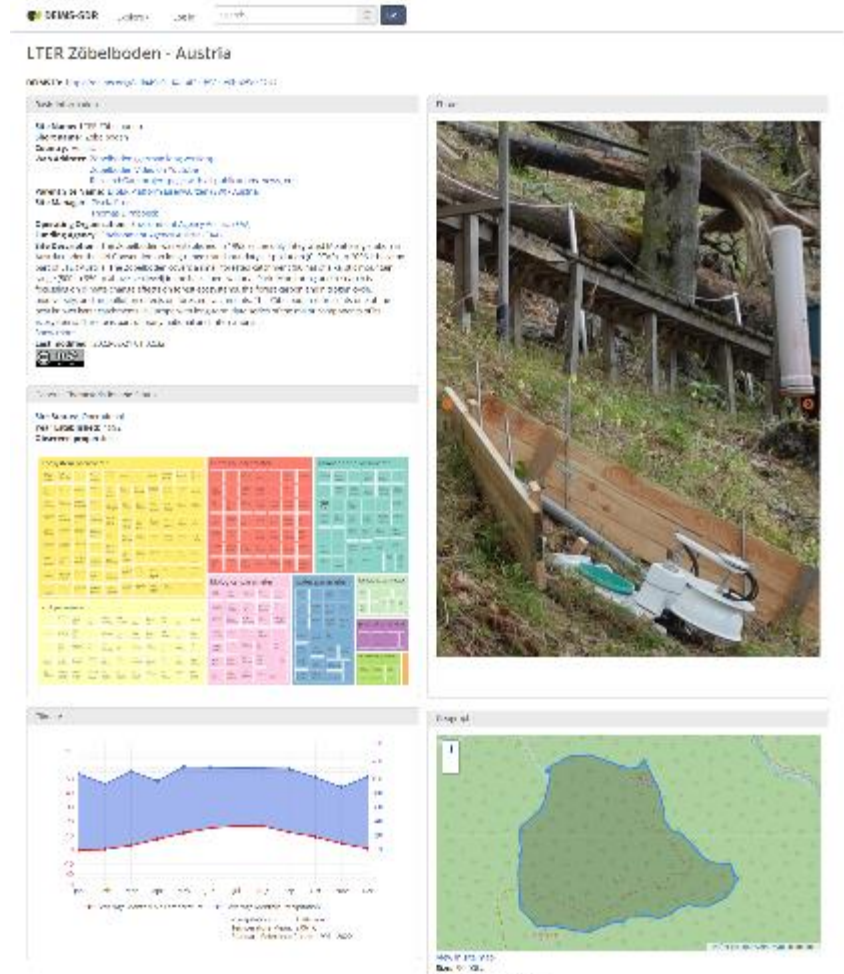
LTER Zöbelboden, Austria

<https://deims.org/8eda49e9-1f4e-4f3e-b58e-e0bb25dc32a6>

* A site is defined as an in-situ observation or experimentation facility, delimited in space, but varying in size and complexity of the internal organisational and observational design, for the collection of data covering e.g. biogeophysical, biotic or socio-ecological characteristics and processes (Wohner et al., 2019)

DEIMS-SDR (deims.org)

- Provides **information** about observed properties, geographic information, contact details and environmental characteristics
- Issues **persistent identifiers** for sites (DEIMS.ID)
 - Suitable for references in reports, papers, datasets, etc.
 - DEIMS.ID stays active even after a site is closed
- All of that information is available through machine-readable endpoints
- **APIs (WMS/WFS/REST-API)** in different formats (**GeoJSON, Shapefile, KML, ...**) and used for cookie-cutting of remote sensing data



The screenshot displays the DEIMS-SDR interface for the LTER Zöbelboden site in Austria. It features a detailed metadata table with columns for various parameters and their values. To the right, there is a photograph of a field plot with a wooden border and a white sensor. Below the table, a line graph shows data trends over time, and a map shows the site's location within a larger geographic context.

LTER Zöbelboden (<https://deims.org/8eda49e9-1f4e-4f3e-b58e-e0bb25dc32a6>)

DEIMS-SDR (deims.org) - locations

- Adding “locations” to DEIMS-SDR and linking them to sites – reference areas for observation and analysis
- Link is displayed both in human-readable form and in the REST-API
- (Current) Types of Locations:
 - Equipment Location
 - Hydrological Catchment
 - Sampling Area
 - Socio-ecological reference area
 - Air Shed
 - Model Area
 - **Remote Sensing Analysis Area (e-shape)**
- Building extraction workflows, e.g. crocoTile (<https://elter-crocotile.datalabs.ceh.ac.uk/>)

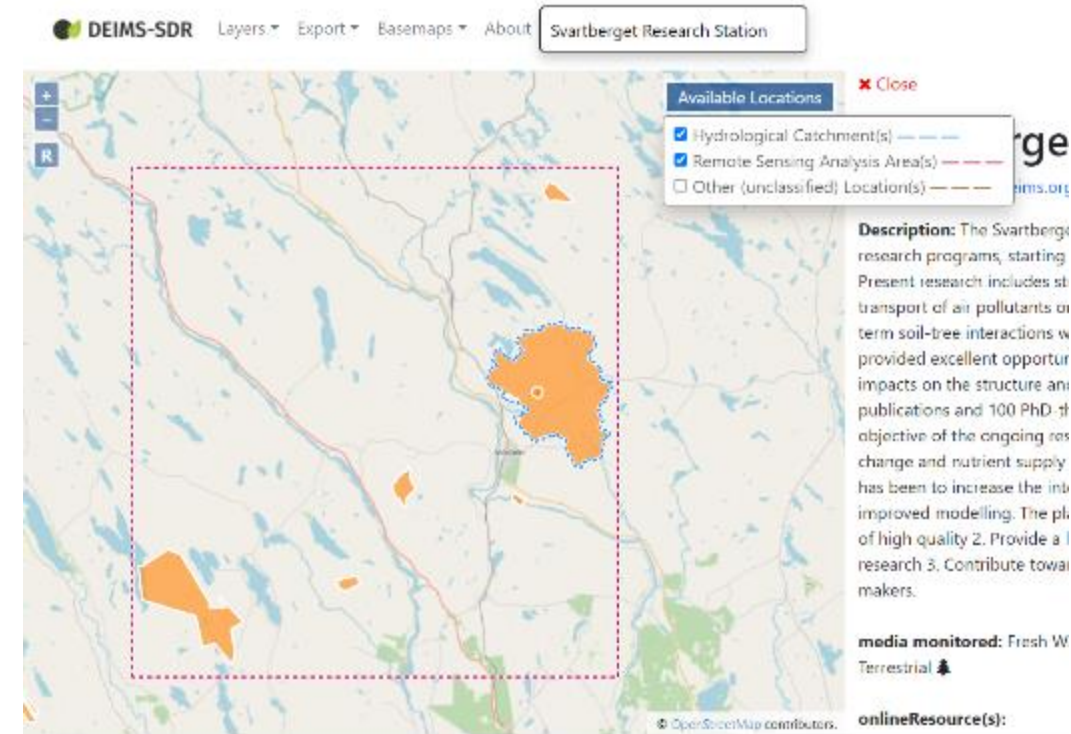


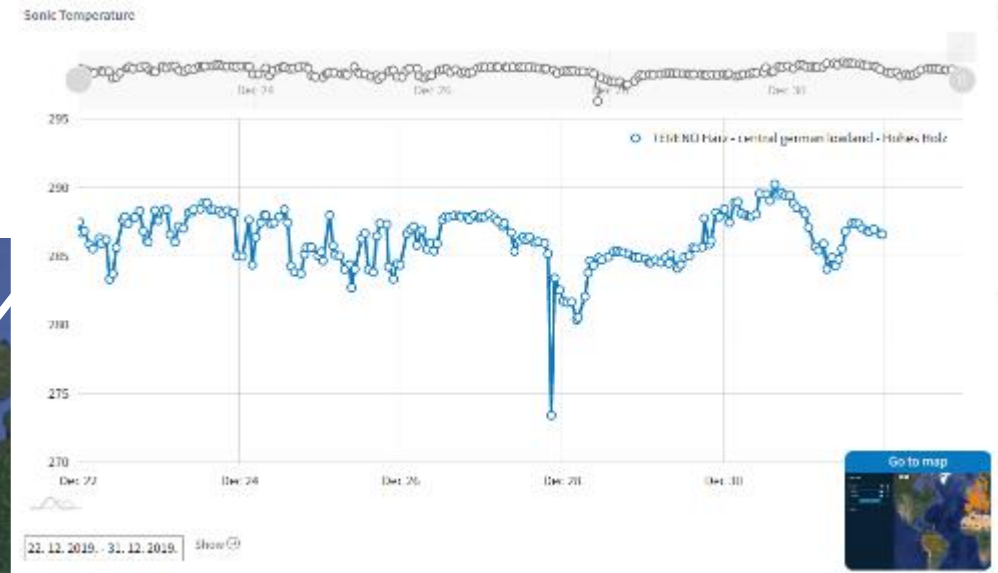
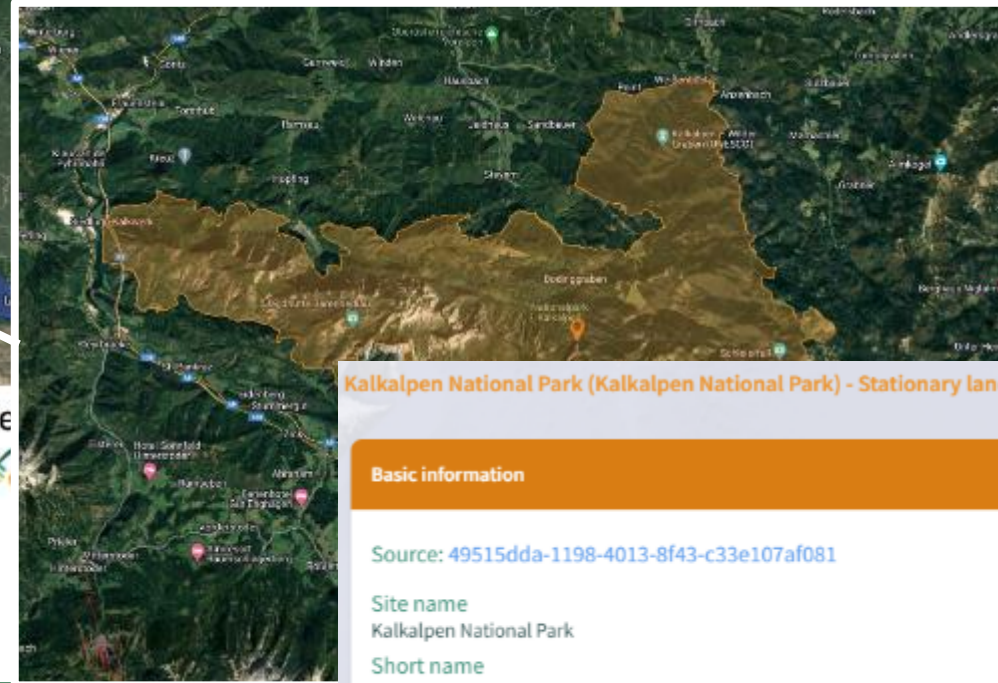
Fig. Boundaries and locations of Svartberget as displayed on the DEIMS-SDR site map (deims.org/map)

EcoSense - visualisation



The e-SHAP project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant agreement 1010151.

The eITER PLUS project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant agreement 871128.

Kalkalpen National Park (Kalkalpen National Park) - Stationary land-b...

Basic information

Source: 49515dda-1198-4013-8f43-c33e107af081

Site name
Kalkalpen National Park

Short name
Kalkalpen National Park

Country
Austria

Web Address

Combine **key components** to provide value to stakeholders and users through a services workflow

EcoSense - access

In-situ

The screenshot shows the EcoSense web application interface. On the left is a dark sidebar with filter options for 'BASE MAP', 'Layers' (including 'Sites' and 'Activities'), 'EBVs' (with fields for 'EBVs Class', 'FRNs Name', and 'Entity Type'), and 'Spatial Scopes'. The main area features a map of a mountainous region. Overlaid on the map is a table of datasets with columns for title, location, and time period. A legend in the top right of the map area identifies snow cover states: 'no snow, clear sky' (light blue), 'Snow, clear sky' (medium blue), 'Clouds' (grey), and 'no data' (white). The 'EcoSense' logo is visible at the bottom of the map area.

Hydroperiod		
Snowcover		
Select All / Deselect All		
Bralla Snowcover 2019-2020	Burmsmullr: Calmgorms Snowcover 2019-2020	Donana Snowcover 2019-2020
Gesaus Snowcover 2019-2020	Kalkalpen Snowcover 2019-2020	Kerkinli Lake Snowcover 2019-2020
Lammi LTER Snowcover 2019-2020	LTSER Dutch Wadden Sea Snowcover 2019-2020	LTSER Zone A Snowcover 2019-2020
Montado Snowcover 2019-2020	Murgia Alta Snowcover 2019-2020	Svartberget Snowcover 2019-2020
TERENO Eifel Lower Rhine Valley Snowcover 2019-2020	TERENO Harz Central German Lowland Snowcover 2019-2020	Gran Paradiso Snowcover 2019-2020
Gran Paradiso-Snowcover Duration 2015-2016	Gran Paradiso-Snowcover Duration 2016-2017	Gran Paradiso-Snowcover Duration 2017-2018
Gran Paradiso-Snowcover Duration 2018-2019	Gran Paradiso-Snowcover Duration 2019-2020	Gran Paradiso-Snowcover Duration 2020-2021

This screenshot shows the EUDAT data portal interface. At the top, there is a 'Related resources' section with a list of links to various datasets related to Kalkalpen National Park. Below this is a map visualization of the snow cover data, with a legend and a 'download' button. The dataset entry includes the DOI: 10.23728/b2share.bd747e84066c43b1, the title 'KalkalpenNationalPark - Snow Cover Duration', and the author 'Richard, Chama [ENRITA], Adams, Mike [ENRITA]'. The abstract describes the metrics: Snow Cover Duration (SCD), First Snow Day (FSD), Last Snow Day (LSD), and Snow Cover Duration (SCD).

Related resources:

- Kalkalpen National Park (Austria) - Land cover
- Kalkalpen National Park (Austria) - Soil
- Kalkalpen National Park (Austria) - Water
- Kalkalpen National Park (Austria) - Human infrastructure
- Kalkalpen National Park (Austria) - Forest
- Kalkalpen National Park (Austria) - Topographie
- Kalkalpen National Park (Austria) - Geology and geomorphology
- Kalkalpen National Park - Corine Land Cover 2006
- Kalkalpen National Park - Corine Land Cover 2012
- Kalkalpen National Park - Corine Land Cover Changes 2006-2012
- Kalkalpen National Park - EUNIS Habitat map
- Kalkalpen National Park - Habitat and biotop map
- Kalkalpen National Park - Combined soil type-depth map
- Kalkalpen National Park - Forest structure (Aerial photo interpretation)
- Kalkalpen National Park (Austria) - Aerophoto 2009/2010/2013
- Kalkalpen National Park (Austria) - Dynamic

EO WMS

EUDAT download

DOI: 10.23728/b2share.bd747e84066c43b1

KalkalpenNationalPark - Snow Cover Duration

by Richard, Chama [ENRITA], Adams, Mike [ENRITA]
Nov 23, 2022

Abstract: Snow Cover Duration (SCD), First Snow Day (FSD), Last Snow Day (LSD) and Snow Cover Duration (SCD) are derived from the snow cover maps. The snow year is considered from the 1st September to 31st August of the following year. The snow season is considered continuous if at least 14 consecutive days of snow are detected. FSD = first day of a continuous snow season. LSD = last day of a continuous snow season. SCD = number of days of continuous snow cover.

Methods: detection methodology used will be soon accessible

TechnicalInfo: The final output consists of 20 m resolution raster layers in GeoTIFF format. FSD = first day of a continuous snow season, expressed as Day Of the Snow Year [DOSY]. LSD = last day of a continuous snow season, expressed as Day Of the Snow Year [DOSY]. SCD = number of days of continuous snow cover.

... mobilise actual and legacy (biotic and abiotic) data and derived datasets (e.g. snow cov, hydroper)

Sustainability

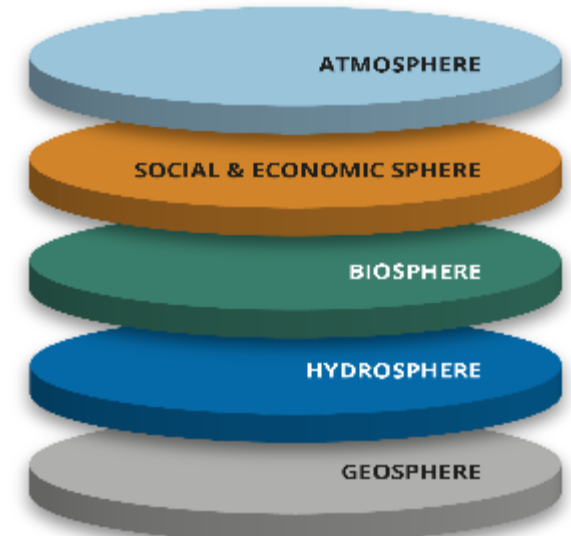


To enable cross-disciplinary whole system research

eLTER RI provides

- **eLTER RI** is a **site based, long term observation and research**, focusing on a **whole system approach**, and covering a broad bio-geographic range
- ... addressing the **key drivers of change** for the major European ecosystems and socio-ecological systems and how does these changes affect **ecosystem functions, biodiversity and ecosystem services**
- ... adopted
 - **DEIMS-SDR** as main catalogue of eLTER facilities
 - **EcoSense** as component for visualisation
- ... fostering
 - further **mobilisation** of biotic and abiotic data and enhancing the **FAIRness**

- Basic site infrastructure
- Data nodes integrating
 - Baseline Standard Observations (“EEVs”)
 - Multiple other data sources (RS, modelling)
- Access to data & sites
- Central service portfolio



eLTER Site categories differ in their focus, but cover all system layers

Continuous long-term operation of ~200 innovative hubs



Summary and lessons learned



Data mobilisation from long-term observation sites is tedious, including legacy data



Foster the communication between EO sector and ground observational networks (eLTER, ICOS, GEO-BON, etc.)



Harmonisation and standardisation, as well as **rich documentation** of data needs to be further addressed – needs a tight communication with data providers



Actively **engage the ground observational networks sector** in larger activities (e.g. Copernicus Land Monitoring, ESA Carbon Science Cluster, ESA FutureEO programme etc.)



Capacity building is needed – i.e. help/support to those who want to open their data but don't have the resources, knowledge, time



Actively support the communication with **dedicated calls that target the co-design, boost the sustainability, and data mobilisation**



e-shape

Thank you!



www.e-shape.eu