



**eLTER**  
**Long term ecosystem research for  
ecosystem and biodiversity**

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# eLTER in a nutshell

# ... to address global Research Challenges we need a lot of data

EXAMPLE: LTER ZÖBELBODEN AS A DATA INTENSIVE ECOSYSTEM RESEARCH SITE



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**Input**  
energy, matter, water

**Ecosystem Change**  
biota, soil, biodiversity, habitats

**Output**  
energy, matter, water



© S. Smidt



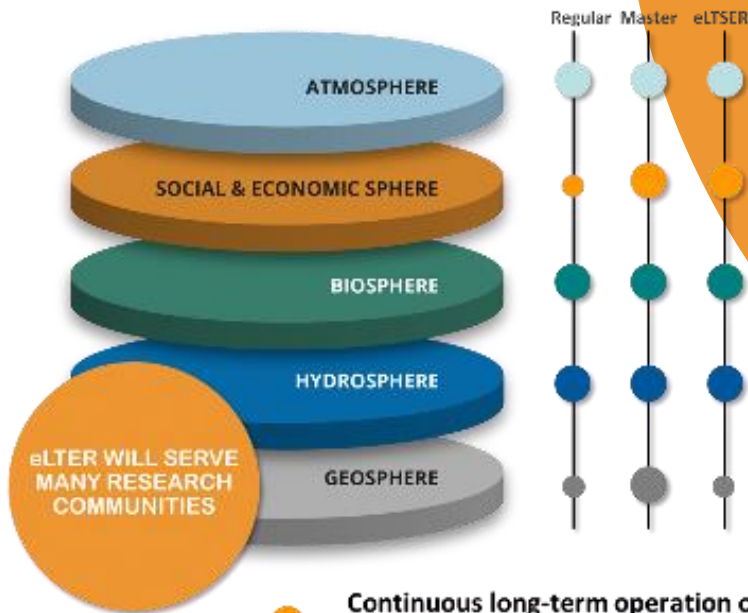
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- System structure & functions
- Main drivers of change
- Interactions of slow/fast disturbance effects

# Integrated European Long-Term Ecosystem, Critical Zone & Socio-ecological Research Infrastructure

... **site based, long term** monitoring and observations, focusing on a **whole system** approach, and covering a **broad biogeographic** 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?**



Site categories differ in their focus on different system layers

- eLTER provides
- Basic site infrastructure
  - Integrated baseline observation
  - User access to
    - in-situ sites
    - data
  - Other services



26 countries, 450 Sites, 35 platforms

Continuous long-term operation of ~200 innovative hubs

# The eLTER Research Challenges and related policies

- Biodiversity loss and land use change

*EU Biodiversity Strategy, EU Habitats and Water Framework Directive*



© Makrowilli

- Climate change

*EU Climate strategies & targets, EU Strategy on adaptation to Climate Change, UNFCCC Paris Agreement*



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- Eutrophication and pollution – Reactive Nitrogen in the environment

*EU National Emission Ceilings and Water Framework Directives, UNECE-CLRTAP*



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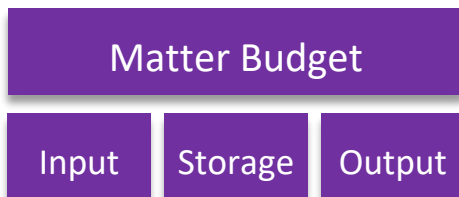
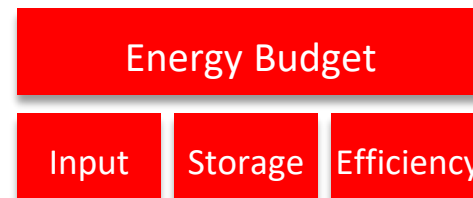
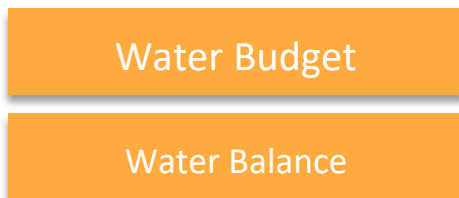
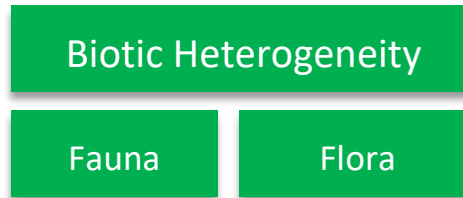
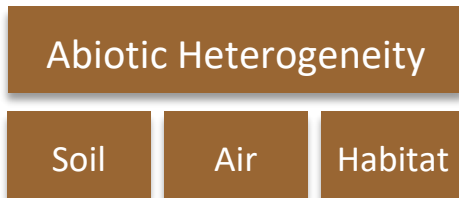
- Sustainable management of ecosystems, water, soils & biodiversity *EU Common Agricultural Policy, Soils thematic strategy, EU Forest Strategy*



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# eLTER Framework of Standard Observations

- **Sensitivity** to environmental change
- Critical **relevance** to environmental monitoring



➔ 173 candidate variables selected



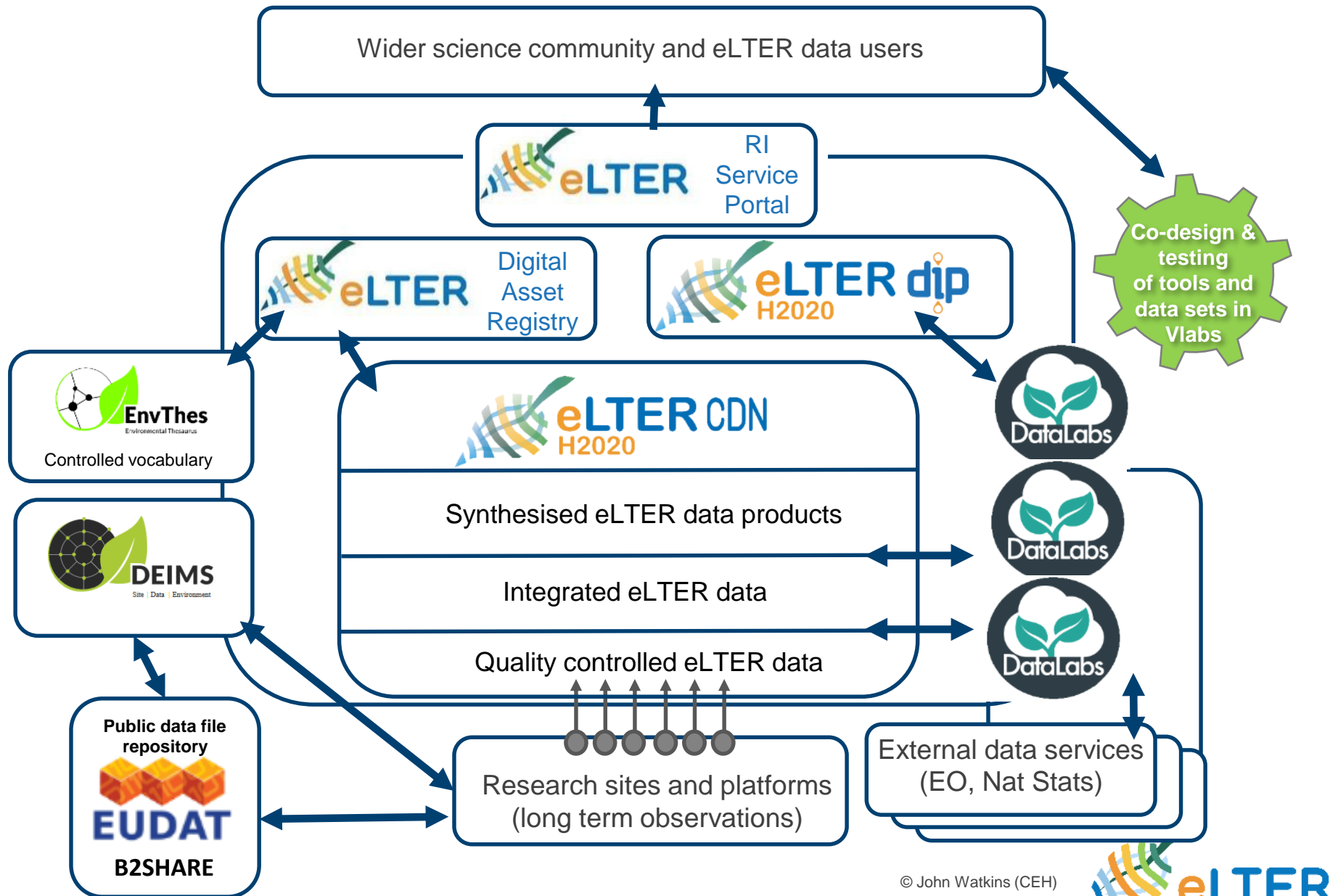
1. Relevance
2. Cost-efficiency
3. Feasibility





# eLTER Information System

# eLTER IT architecture







# Biodiversity Data Challenges

# eLTER (Biodiversity) Data Challenges

- **Broad scientific scope**
- **Heterogeneity of input data**
  - Integration of legacy data
  - Varying spatial design of observations
  - Varying temporal design and intervals of observations
  - Range of methods and observation protocols applied
- **Integration of new methods in biodiversity observation and research (e.g eDNA)**
- **Common terminologies and taxonomies**
  - Different code lists for variable names (e.g. ICP IM, ICP Forest)
  - Different vocabularies for observed media and components
  - Different species taxonomies (national and European)
- ➔ **Integration and harmonisation of data across the different data providers is a time consuming effort**

# eLTER FAIRification of (biodiversity) data streams

## ➤ eLTER PLUS

- Integration of legacy data provided by different communities using a range of local or common protocols and standards
- Prototyping data workflows and related tools to develop **eLTER data products**



## ➤ ENVRI-FAIR

- Using **common services** (e.g. Catalogue of Life, LifeWatch) to harmonise species names to common taxonomies



## ➤ LIFEPLAN

- Implementation of **automatic biodiversity sampling** and recording on a number of eLTER sites (eDNA, acoustic sampling, etc.)



## ➤ NFDI4BIODIV



# eLTER links to NFDI4BIODIV

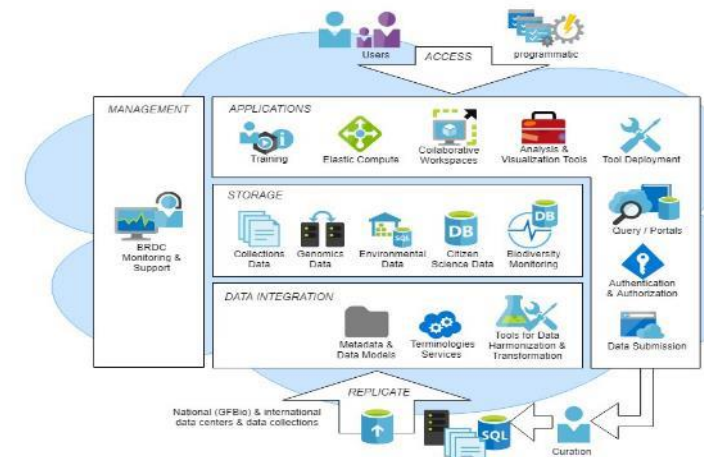


## eLTER Use Case

- key biodiversity data sources and data needs (e.g. eLTER RI, GBIF, Natura2000)
- taxonomic quality control and tracking
- standard vocabularies and taxonomies
- provenance of the data transformations and harmonisation
- data documentation and access

## Contribution by/to NFDI4Biodiversity

- NFDI4Biodiv as national node and handover-point for LTER-D data to eLTER;
- cooperation in specification of **Research Data Commons** IT infrastructure for handover to eLTER



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**If you want to go fast go alone,  
if you want to go far go together.**

An old African proverb

<https://elter-projects.org/>

eLTER PLUS

eLTER PPP



<https://elter-projects.org/>

# Thank you

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