

Die europäische Infrastruktur eLTER: Status, Standard Beobachtungen, Ausblick :-)

<https://elter-ri.eu>

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Filling a
critical gap
for top-class
science at the
continental
scale



Um was geht es?

- Charakteristika eLTER
- Akteure und Rollen
- Aktueller Status eLTER
- Aktueller Stand eLTER Prozess in Deutschland
- Kostenabschätzung
- Nächste Schritte

Charakteristika eLTER

= *Integrated European Long-Term Ecosystem, critical zone and socio-ecological Research*

... is a **European research infrastructure** under construction (Germany: lead country, Head Office at UFZ)

... is a pan-European **network** with >250 observation sites

... integrates **different research disciplines** from the fields of long-term ecosystem research, critical zone research and socio-ecological research

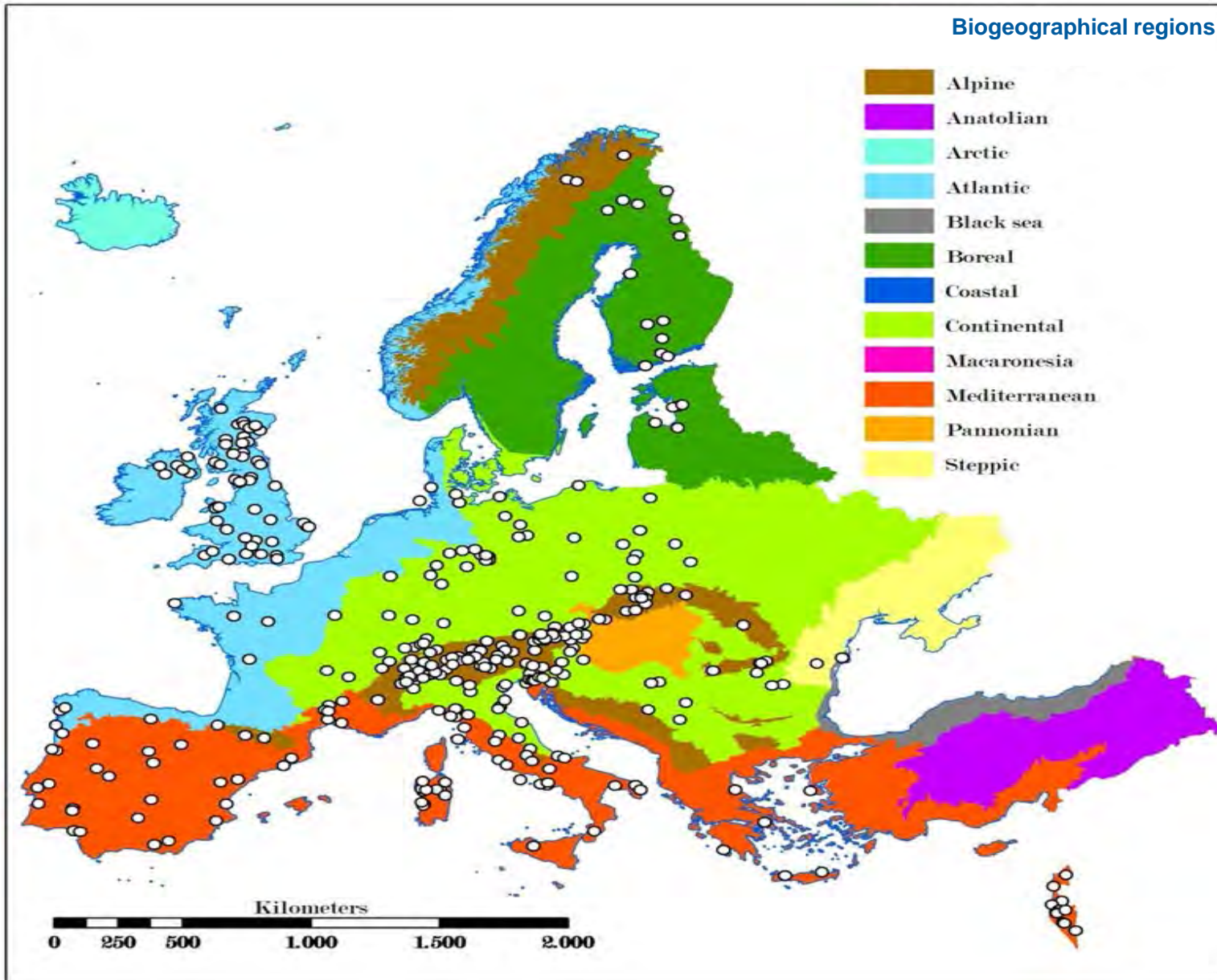
... is taking the "pulse of nature" to detect **trends in ecosystems** important for policy and society

... aims to bring **environmental research and monitoring** in Europe to a **new level** through integration, harmonization and cost-effective funding

... provides **long term data**

... builds on nearly two **decades of networking** (legacy data)!

eLTER RI: geographical coverage & stakeholder support



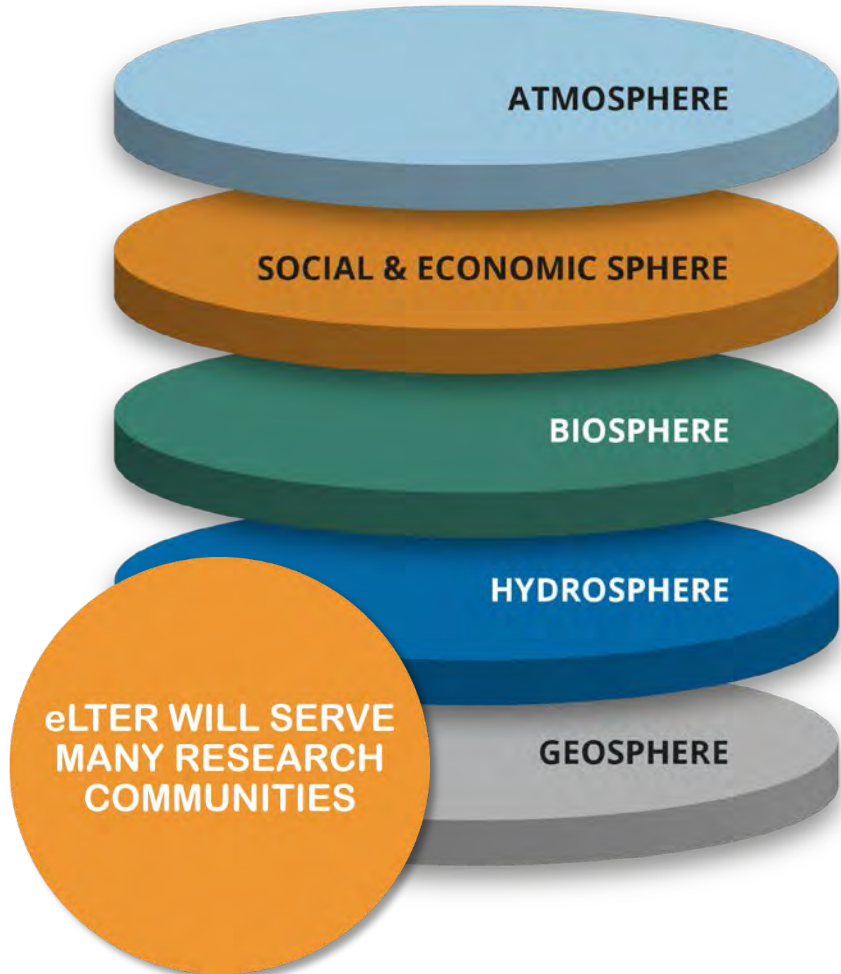
Political support (ministries):
20 countries

Scientific institutions:
165 [from 28 countries]

CAPITALIZING ON...

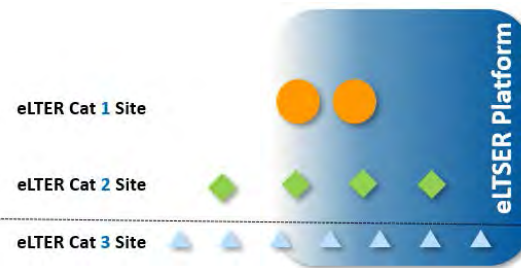
- 26 country networks
- >250 Sites
- >20 LTSER Platforms

„Whole System“-Approach: Cross-disciplinarity addressing the Life Supporting System



DESIGN

- Hierarchy of site categories
- Various levels of
 - spatial complexity
 - instrumentation



SERVICES

- Basic **site infrastructure**
- Information Clusters
 - **Standard Observations** on site (“EEVs”)
 - Multiple **other data sources** (RS, modelling)
- **Data access** (FAIR data)
- **Analytical tools, virtual labs**
- **Training**

Continuous long-term operation of ~250 innovative hubs

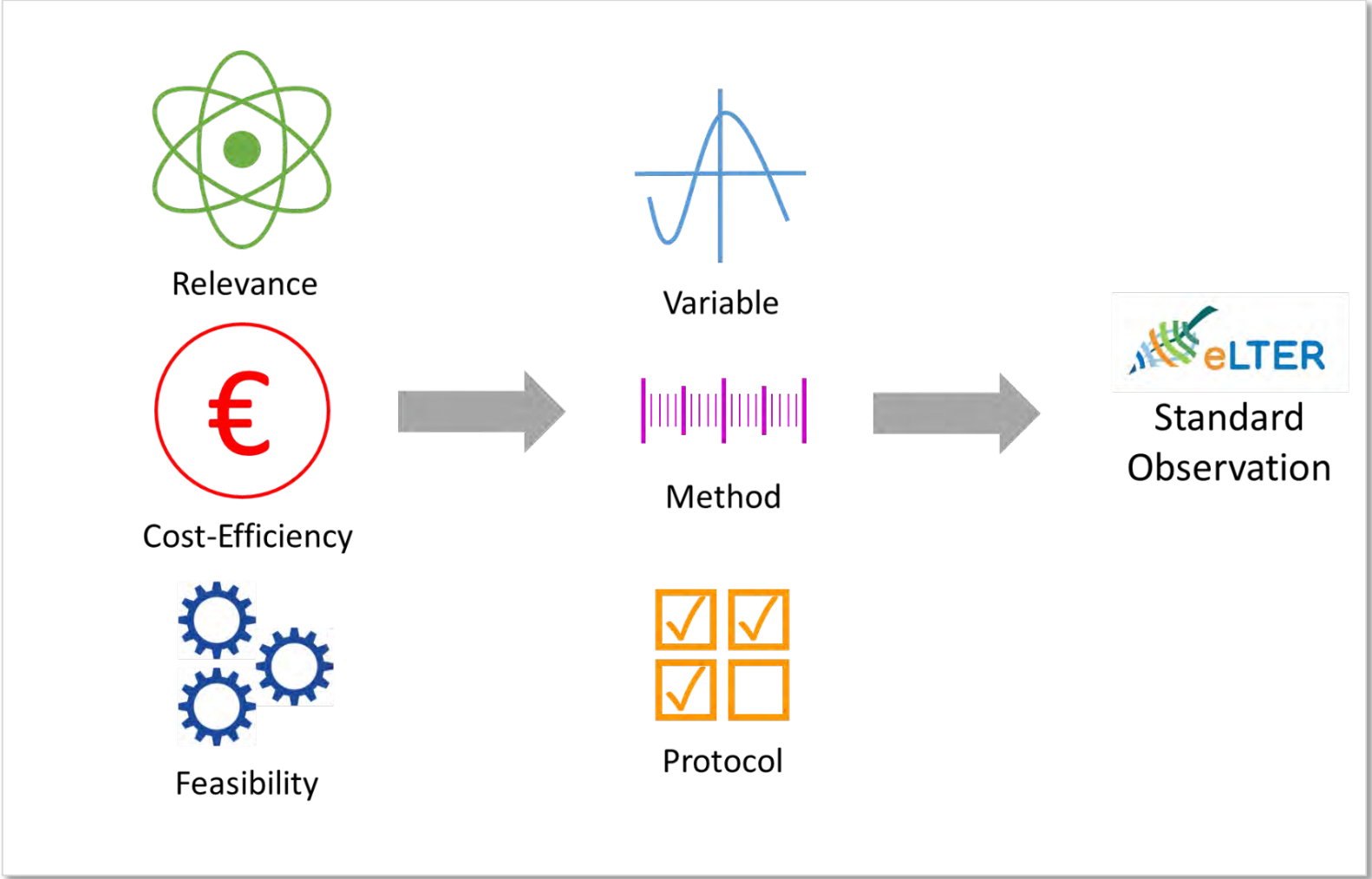
Akteure und Rollen

- **BMBF:** Deutschland als Lead Country; Finanzierung 1 Koordinationsstelle am UFZ bis eLTER RI “fliegt”
- **UFZ:** Head Office (inhaltliche Koordination der Forschungsinfrastruktur); aktuell: vorhandene Stellen werden aus Projektmitteln finanziert
- **LTER-D** (seit 2006)
 - deutsches LTER Netzwerk (<https://www.ufz.de/lter-d>), Verein seit 2013 (30+ institutionelle Mitglieder)
 - Deutsche eLTER Gebiete sind LTER-D Mitglieder
 - Vorstand: eLTER Anbindung durch Peter Haase (Senckenberg => eLTER PLUS Task Lead), Mark Frenzel (UFZ => Head Office)
- ...
- **Interim Council:** Begleitung und Akzeptanz der Entwicklungsschritte durch Ministerien der eLTER-Mitgliedsländer (Perspektive auf Kosten => *value for money*)

Aktueller Status eLTER

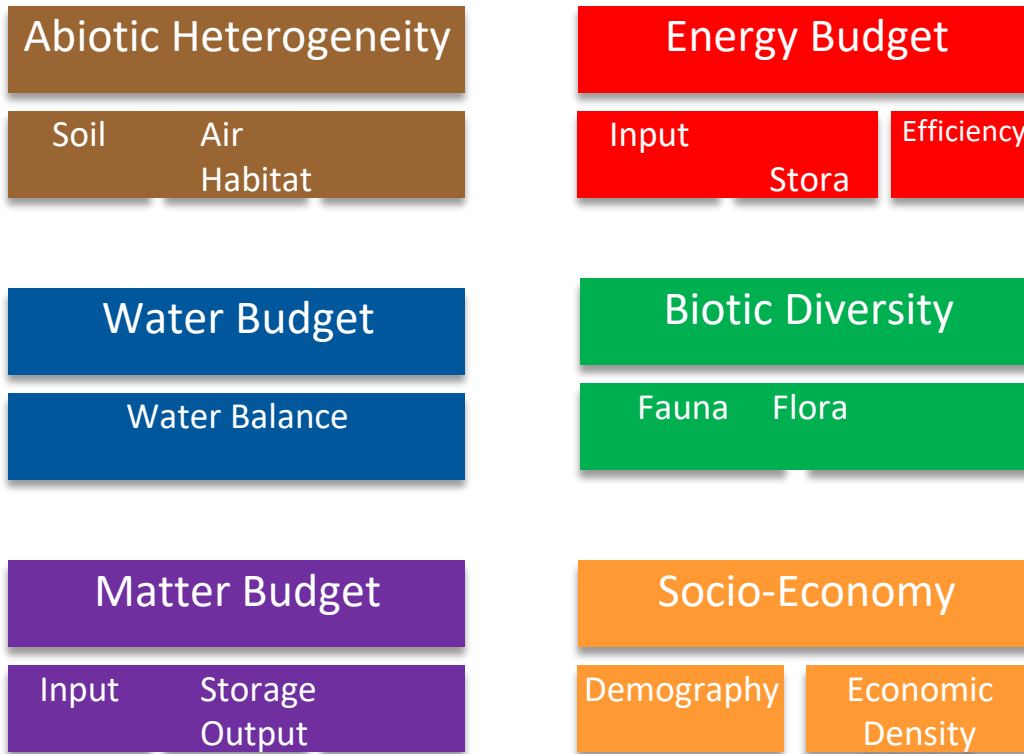
- **Standard-Beobachtungen:** Standardisierte und harmonisierte Messungen, die in den verschiedenen Umweltsphären gemacht werden sollen (Kriterien: Relevanz und Effizienz), um die jeweiligen Systeme abbilden zu können
- **Gebietskategorien:** legen den Umfang der Messungen in Abhängigkeit von den Kapazitäten und den Ambitionen der Institutionen fest.
 - Kategorie 1: höchster Standard (“Master Site”)
 - Kategorie 2: Mindeststandard (“Regular Site“)
 - Kategorie 3: Satelliten Gebiete (Kandidaten für Kat1 oder Kat2), kein offizielles eLTER-Mitglied
- **Kostenabschätzungen**
 - Standard-Beobachtungen
 - Übergreifende Infrastruktur (Services, diverse Topic Center)

eLTER Standard Observations



eLTER Standard Observations framework

(following the Ecosystem Integrity Approach)



Guiding principles

1. High **sensitivity** to system changes
2. Supporting **site comparisons** and clustering
3. Critical **relevance for modelling**
4. **Simplicity (Parsimony) => FEASIBILITY!!!**
Focus on potential for automatism and AI technology based recognition of e.g. species

“A design too complex increases the risk of premature demise.”

(Henry Janzen, 2014)

Grundstruktur für Bestimmung eLTER Standard Observations (SO)

Whole System Approach (WAILS)

Sphären

1. Geosphäre
2. Hydrosphäre
3. Biosphäre
4. Atmosphäre
5. Soziosphäre

Parameter (Messgrößen)

Meist <10 Parameter / Sphäre

Methoden- Kategorien

Basic (einfacher)
Prime (aufwändiger)

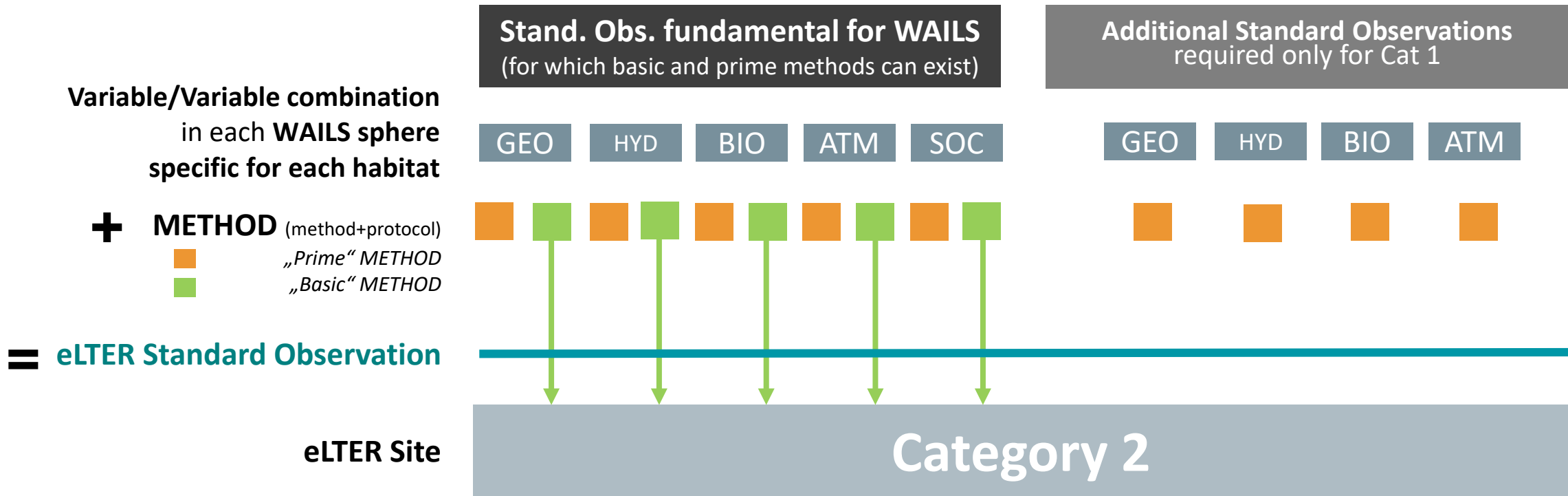
Site-Kategorien

2 (einfacher)
1 (aufwändiger, also mehr
Parameter & mehr Prime)

Habitatspezifität

Was ist in welchem Habitat
relevant?

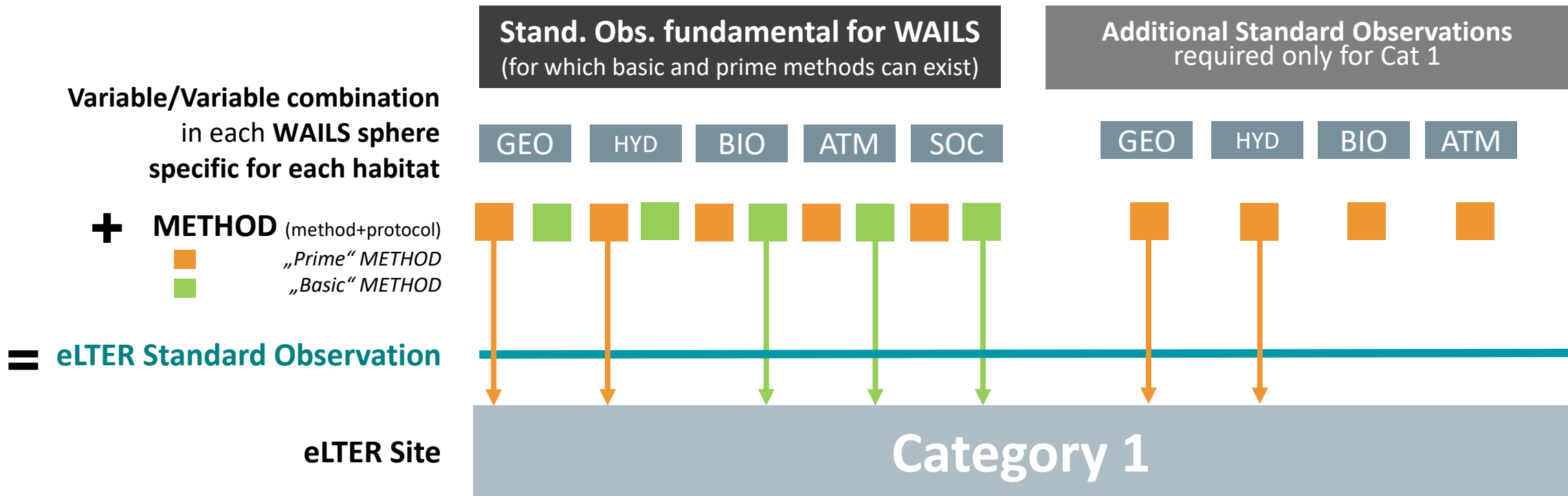
Linkage between eLTER Standard Observation Method Levels and Site Categories: *Category 2 Site*



GEO – Geosphere, **HYD** – Hydrosphere, **BIO** – Biosphere, **ATM** – Atmosphere, **SOC** – Sociosphere (remark: for SOC there are higher requirements only in LTSE Platforms)



Linkage between eLTER Standard Observation Method Levels and Site Categories: *Example for Category 1 Site*



GEO – Geosphere, **HYD** – Hydrosphere, **BIO** – Biosphere, **ATM** – Atmosphere, **SOC** – Sociosphere (remark: for SOC there are higher requirements only in LTSEER Platforms)

What is labelling and what is the relevance of labelling in eLTER RI

Labeling is a procedure intended to **characterize and certify** the **services, capabilities and value** of the **candidate LTER sites** and platforms that may become part of the eLTER RI.

Labeling guarantees **data reliability and quality and service availability** across the eLTER RI.



What is the relevance of labelling for Sites and Platforms

Labeling is an opportunity for being part of an European RI, which in turn is a point of leverage for consolidation and stability in the national context

eLTER Labeling is also intended to be a mark of quality (branding)



Habitat classification of eLTER sites

(adapted from EUNIS Habitat Classification)

1. Wetlands (mires, bogs, fens)
2. Grasslands and lands dominated by forbs, mosses or lichens
3. Heathlands, shrub and tundra
4. Forests and other wooded land
5. Vegetated man-made habitats (regularly or recently cultivated agricultural, horticultural and domestic habitats)
6. Inland surface standing waters
7. Inland surface running waters
8. Coastal (transitional) waters including coastal littoral zones
9. Sparsely vegetated steppes and deserts

Example for Biodiversity SO

Standard Observation	Method
Flying insects	Malaisetraps + Metabarcoding
Vegetation composition (mainly species level+abundance)	Not decided yet
Birds, bats, frogs, insects using acoustic recording	Akustic record devices
Pollen and spores	Automated pollen sampling
Arthropods (ground-dwelling)	Not decided yet
eDNA Water	Metabarcoding
eDNA soil	Metabarcoding

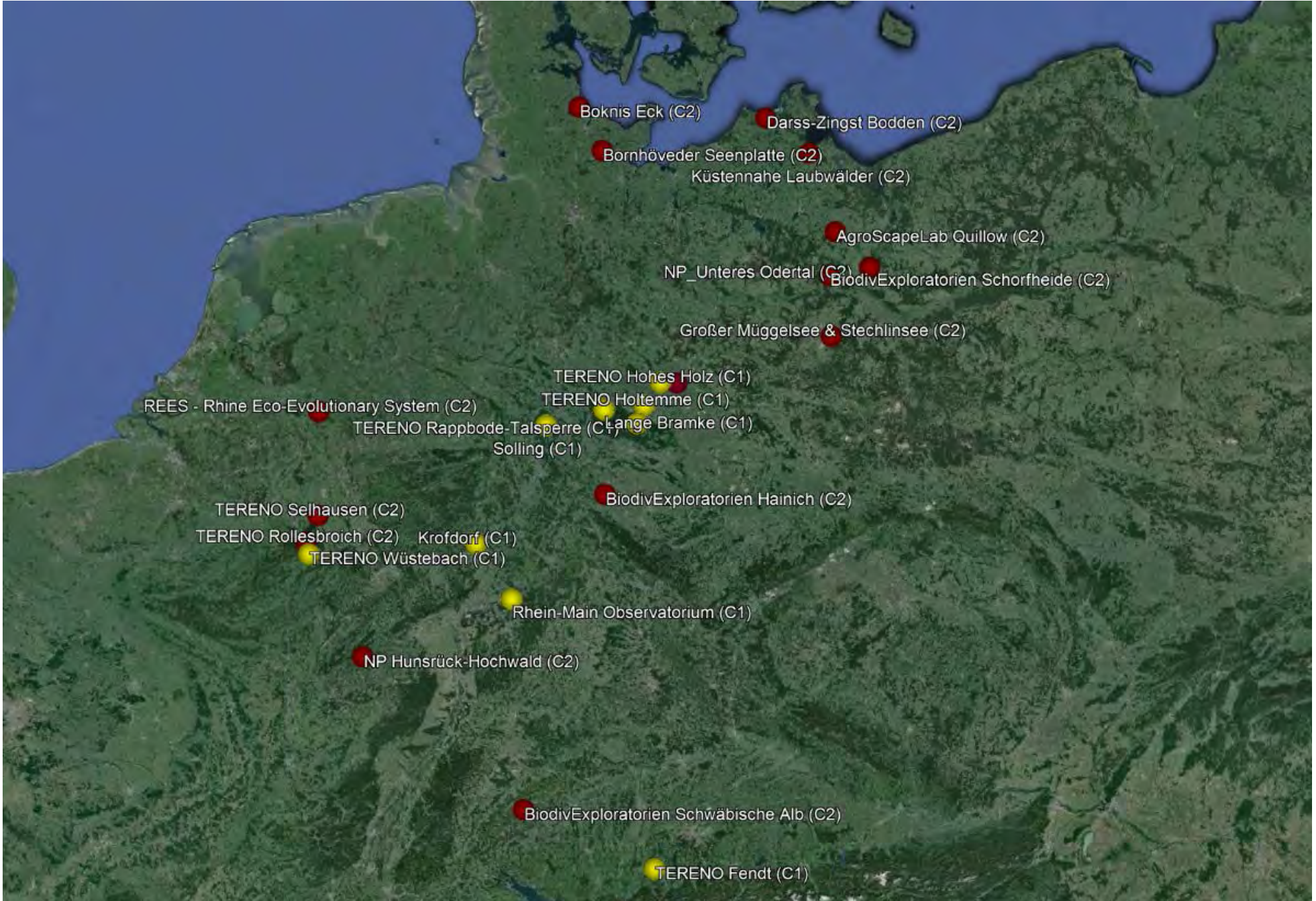
Note: this is just one of several spheres (=> whole system approach)
The overall goal is “parsimony”, thus **not exceeding e.g. 10(-20) variables for each sphere!**

Aktueller Stand eLTER Prozess in Deutschland

- **Abfrage potentielle eLTER Gebiete**

- Juli 2023: Interessensbekundung + institutioneller Rückhalt + Kategorizuordnung
- 26 Rückmeldungen
 - Kategorie 1 \Rightarrow 0 (kann momentan kein Gebiet erfüllen)
 - Kategorie 2 \Rightarrow 10 (4x Kat 1 in Zukunft angestrebt)
 - Kategorie 3 \Rightarrow 16 (5x Kat 1 in Zukunft angestrebt)

Geographische Verteilung => s. Karte



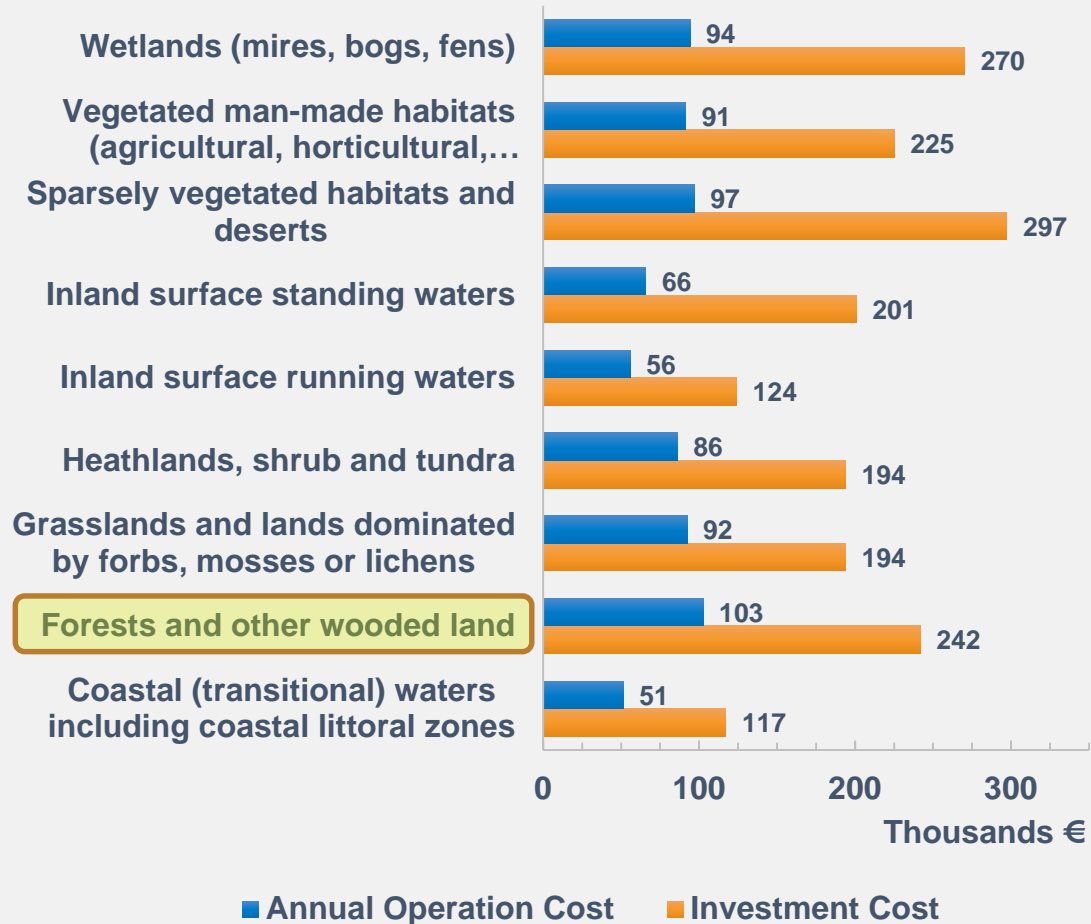
Kostenabschätzung

Basiert auf dem geschätzten Aufwand für Standard Beobachtungen:

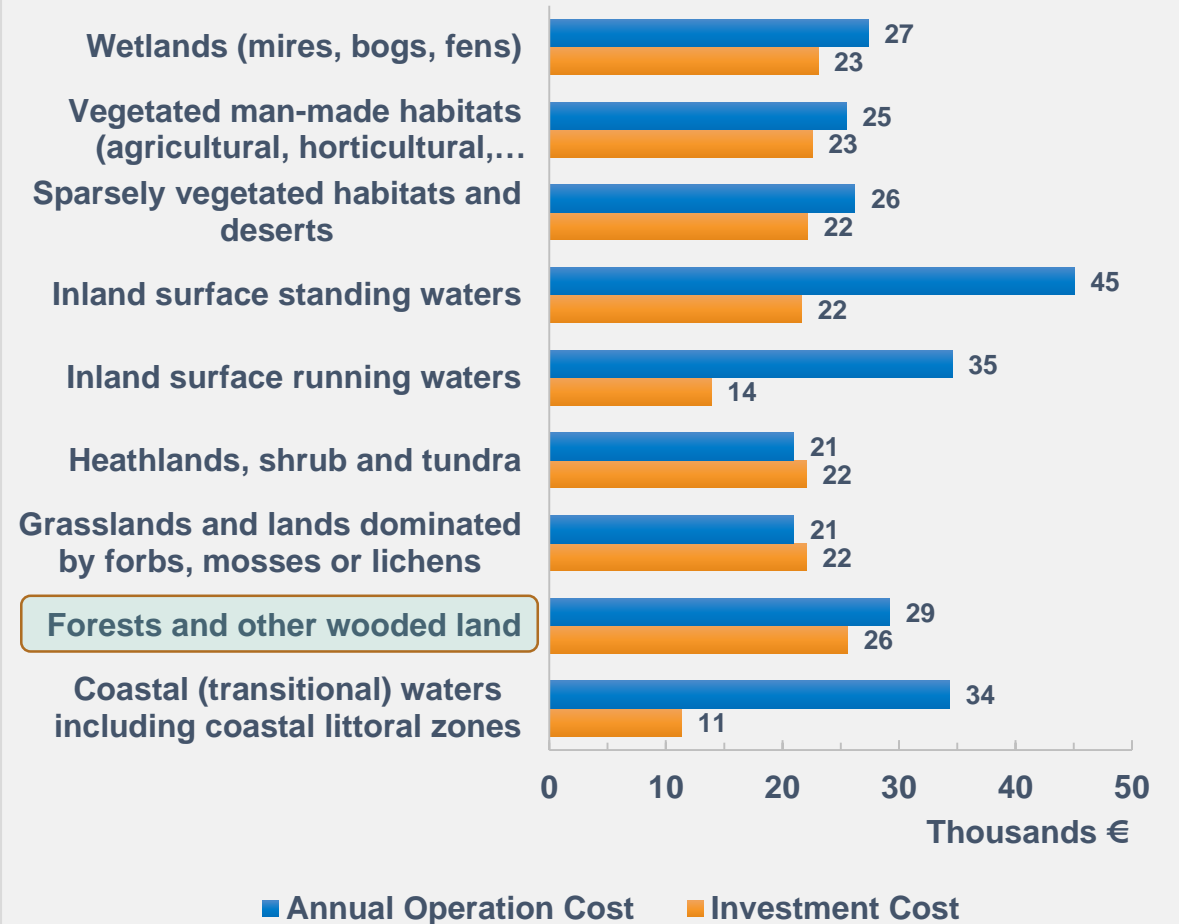
- Geräte (Investment)
- Operative Kosten (Wartung + Personal)
- **Standard-Beobachtungen:** siehe Folie für Beispiele
- **Zentrale Services und Topic Centers** (z.B. Modellierung, zentrale Analyse, Genetik, ...):
Kostenschätzungen liegen vor (Σ ca. 55 FTE)
- **Membership-Fees** (pro Gebiet): noch Gegenstand der Diskussion im Interim Council (BIP+x); Modell für Kostenübernahme?

Habitat-Specific Investment and Annual Operation Costs of SOs (Prime & Basic Method)

Habitat-Specific Investment and Operation Costs of SOs (Cat 1/Prime Method)

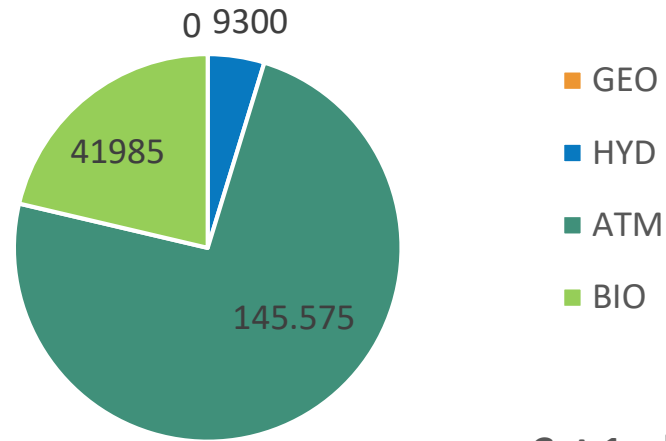


Habitat-Specific Investment and Operation Costs of SOs (Cat 2/Basic Method)

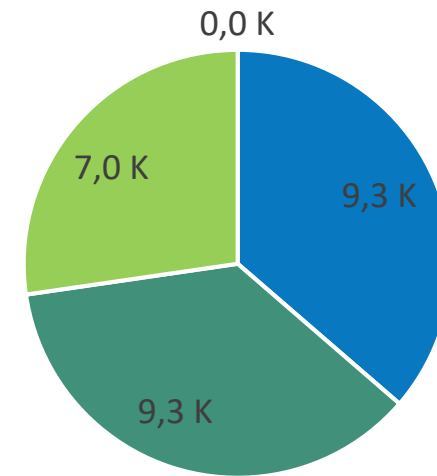


Example: *Investment Cost* of 'Forest & Other Wooded Land' (Cat 1 & 2)

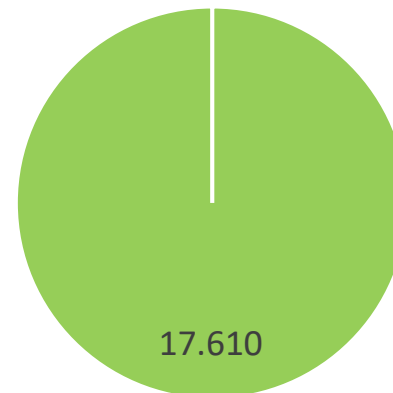
Cat 1 ⇒ 197 k€ (focus ATM & BIO)



Cat 2 ⇒ 26 k€

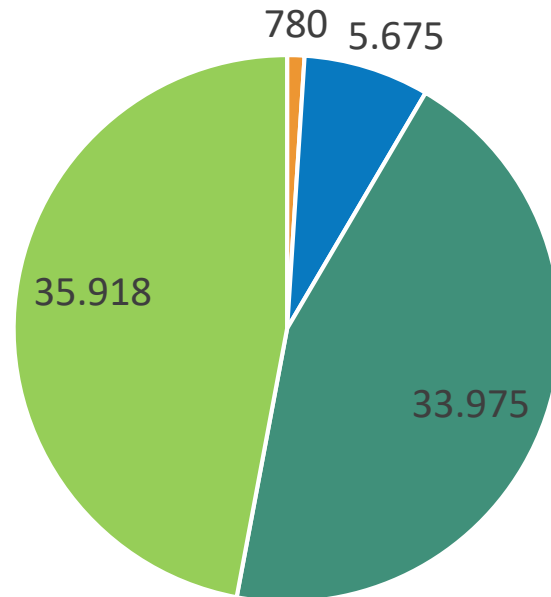


Cat 1 ⇒ 17 k€ (ATM and BIO), CASE HYYTIÄLÄ (co-location)

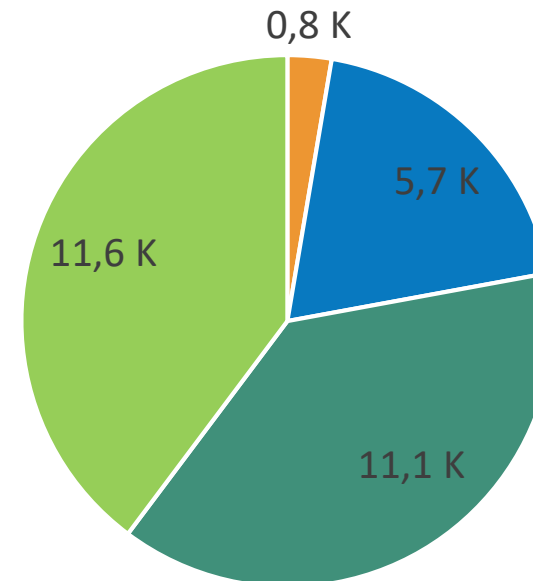


Example: *Annual Operation Cost* of 'Forest & Other Wooded Land' (Cat 1 & 2)

Cat 1 ⇒ 76 k€/a (ATM and BIO)

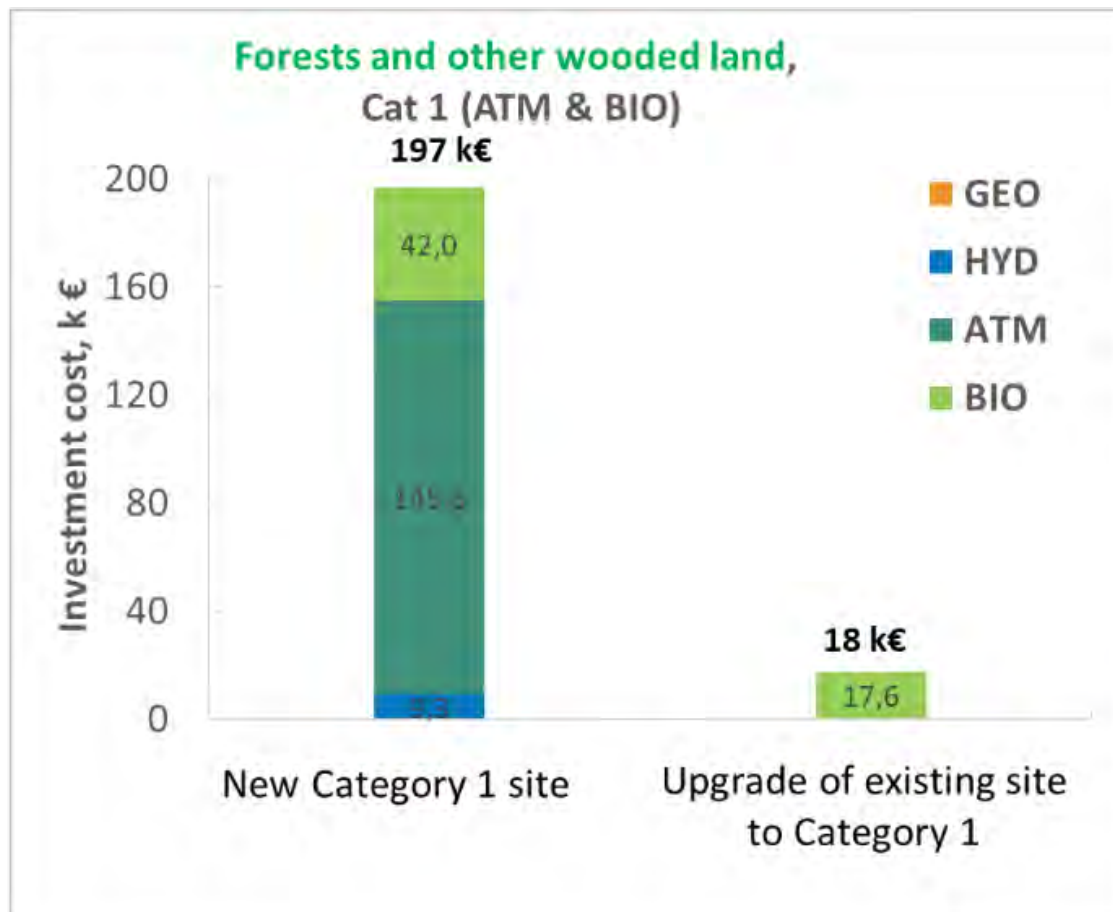


Cat 2 ⇒ 29 k €/a

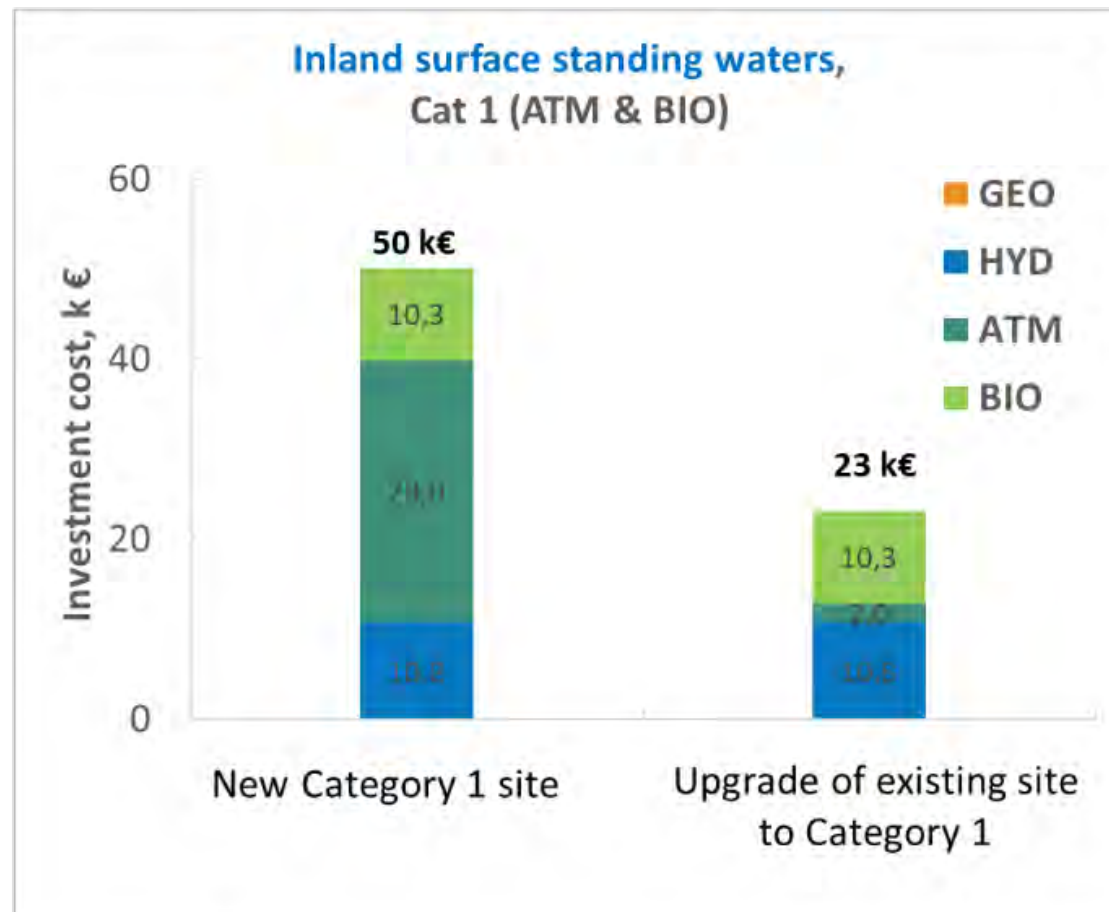


Comparing investment cost for a collocated site with a new site (1/2)

FOREST SITE



LAKE SITE



Der eLTER SO Abakus

Kostenkalkulation für Kategorie 1 und Kategorie 2 Gebiete

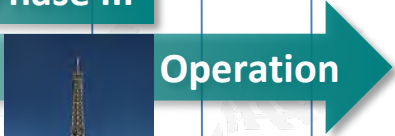
ShinyApp (R-basiert) programmiert von Allan Souza (Universität Helsinki)

Link to the App: <https://allantsouza.shinyapps.io/eLTER-SO-costs/>

Link to the GitHub repository: <https://github.com/allantsouza/eLTER-SO-costs-App>

eLTER RI timeline

2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032



Preparation phase supported by EU (6 years), afterwards based on country contributions only!



The European LTER: www.elter-ri.eu



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

An old African proverb