International
Long-Term Ecological Research
Network

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

Filling a critical gap for top-class science

Triggering global ecosystem RIs collaboration:

The European eLTER in the context of the global LTER network ILTER

FORUM on International Cooperation among Environmental Research Infrastructures, Brussels, 19 Nov. 2018

Michael Mirtl
Chairman of ILTER & eLTER ESFRI coordinator

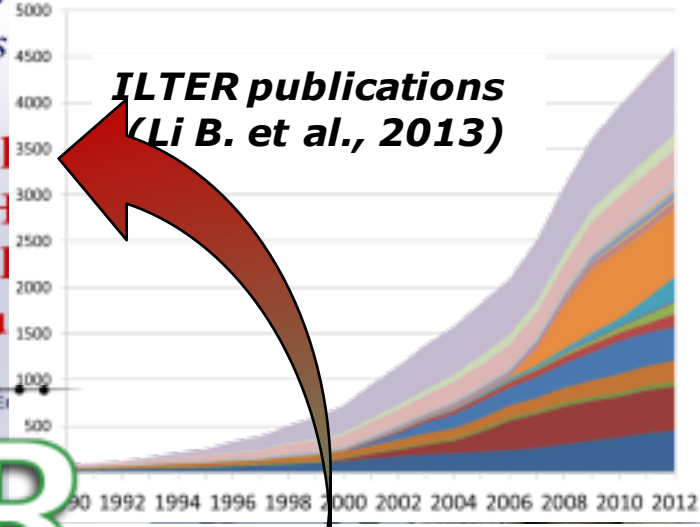
Helmholtz Center for Environmental Research (UFZ, Germany)
Environment Agency (EAA, Austria)

ILTER: Integrating and coordinating key elements of environmental systems research

Consequence of altered nitrogen cycles in the coupled human and ecological system under changing climate: The need for long-term and s

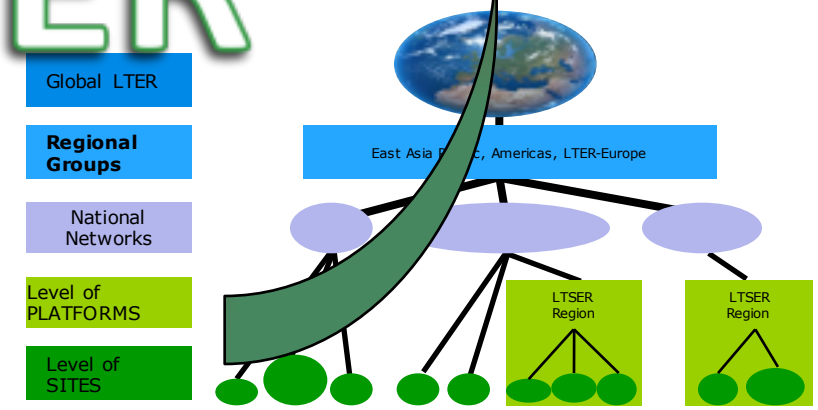
Hideaki Sh
William H
J. Mitchell
Tang, Lau

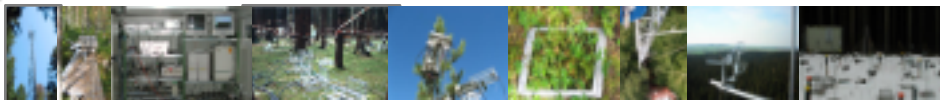
AMBIO



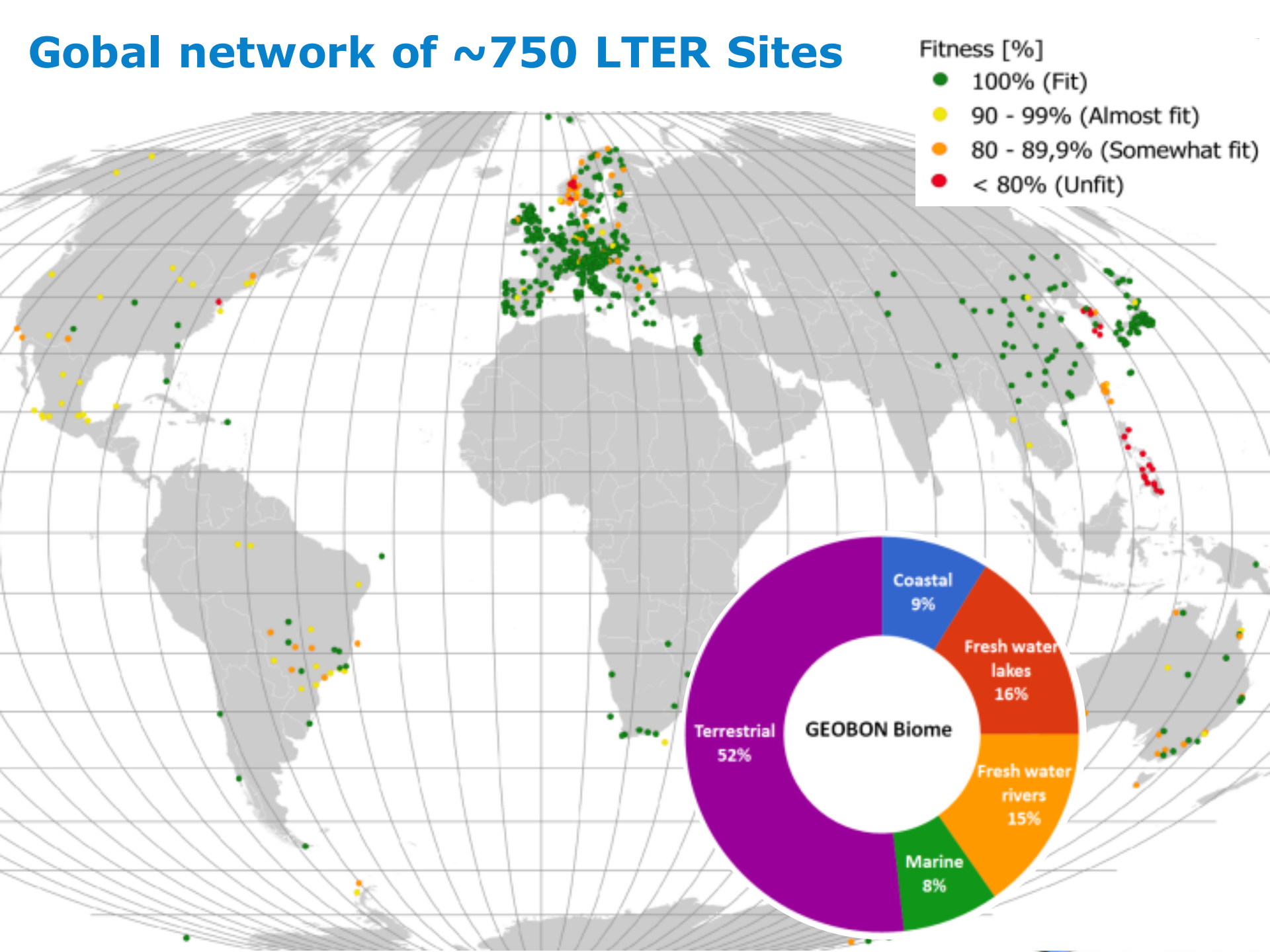
ILTER publications (Li B. et al., 2013)

ILTER

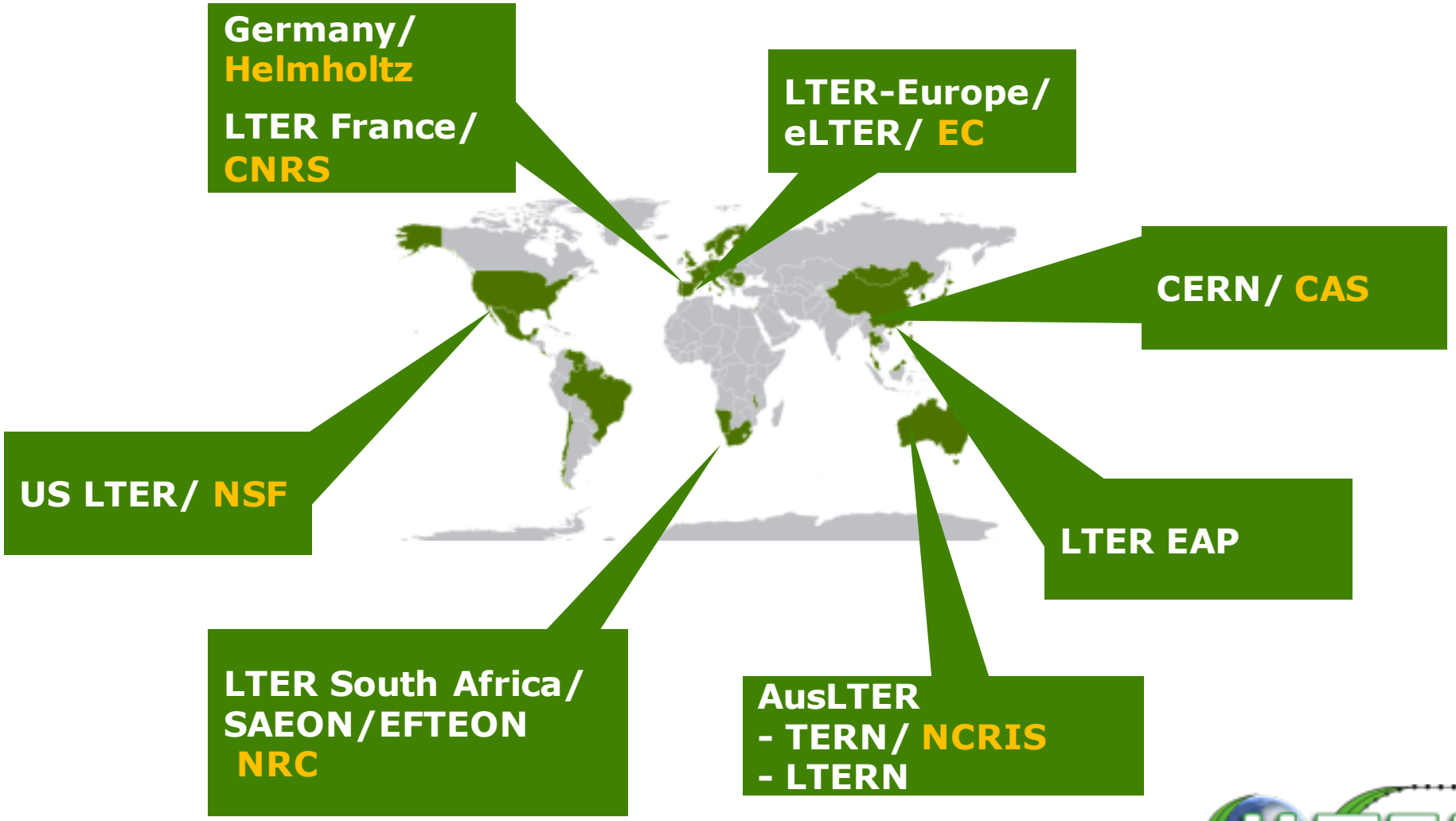




Gobal network of ~750 LTER Sites



ILTER: Benefiting from nationally/regionally funded exemplary networks and RIs



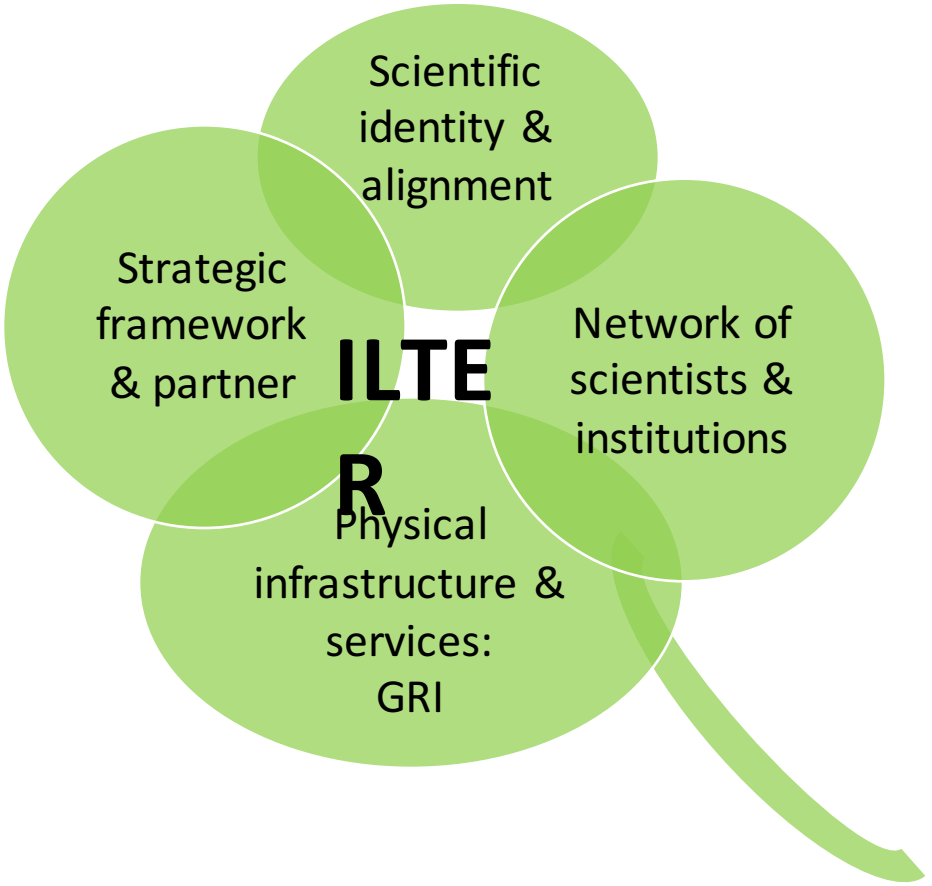
ILTER´s four main fields of activities

Regional Groups

National Networks

Sites & Platforms

Europe leading in close collaboration **with pace setting LTER networks/regions** in China (CERN), South Africa (SAEON), Australia (TERN), US-LTER, eLTER RI, EAP etc.



Strategic framework for national/regional network & RI development

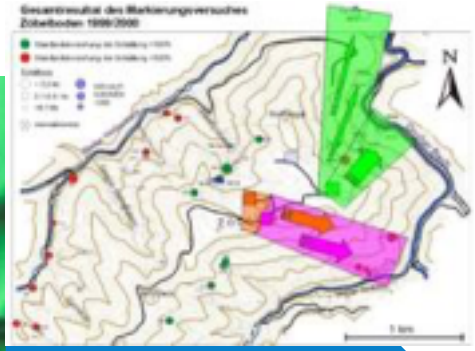
ILTER as platform for high-level global partnerships (e.g. GEO, UNESCO WNBR, NEON, ICSU/PECS, INI, Droughtnet, FutureEarth)

eLTER inputs designed for global usability and stimulating communities- & RI-collaborations

- Scientific concept – **Whole System Approach**
- In-situ design
- **Tools & services**
- **Standards**
- **RI development**

Example for LTER Site design & activities

Regular env. monitoring



Input

Ecosystem Change

Output

Co-location: Atmosphere, e.g. FluxNet; Experiments; Hydrology

<u>Integrated</u> LTER research on the whole system responding to Grand Challenges:

- **Climate change**
- **Biodiversity and land use**
- **Biogeochemistry and pollution**
- **Sustainable socio-ecological systems (LTSER)**

Supporting long-term observation

- **System structure & functions**
- **Main drivers**
- **Disturbance effects (slow presses, fast pulses – extreme events)**

ILTER

DEIMS-SDR - Dynamic Env. IM System – Sites and Dataset Registry https://deims.org

Home

Quick Se

Latest U

LTER Zöbelboden - Austria

Basic Inform

LTER

Site Name:
Site Code:
Web Addre

Country (S
LTER Meml
Parent Site
Contact: Si

Keywords
ground veg
Tea Decom

General Sit
The Zöbelb
Austria und

https://deims.

General Characteristics, Purpose, History

Metadata provi

Site Status: exi
Year Establishe
Size : 90.00ha
Purpose of Site
LTER Zöbelbode
Material inputs,
the ecosystem.
are determined
are studied. Ou
biodiversity and
... Show more

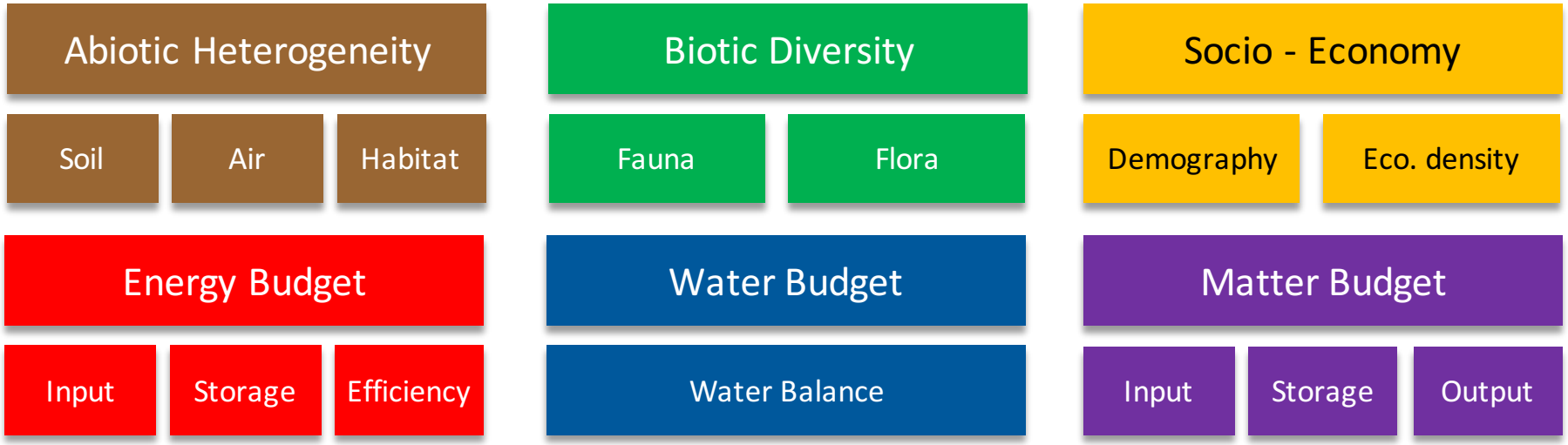
History of Site:
For a comprehe
https://www.y

Research Topic

Geographic

Coordinates:
Latitude: 47.842246069311
Longitude: 14.444136161386
Site Boundaries:
{"type":"Polygon","coordinates":[[[14.435427899355,47.84695277029],[14.45277090273,47.84695277029],[14.45277090273,47.837597720612],[14.435427899355,47.837597720612],

eLTER Standard Observation Variables (EEVs)

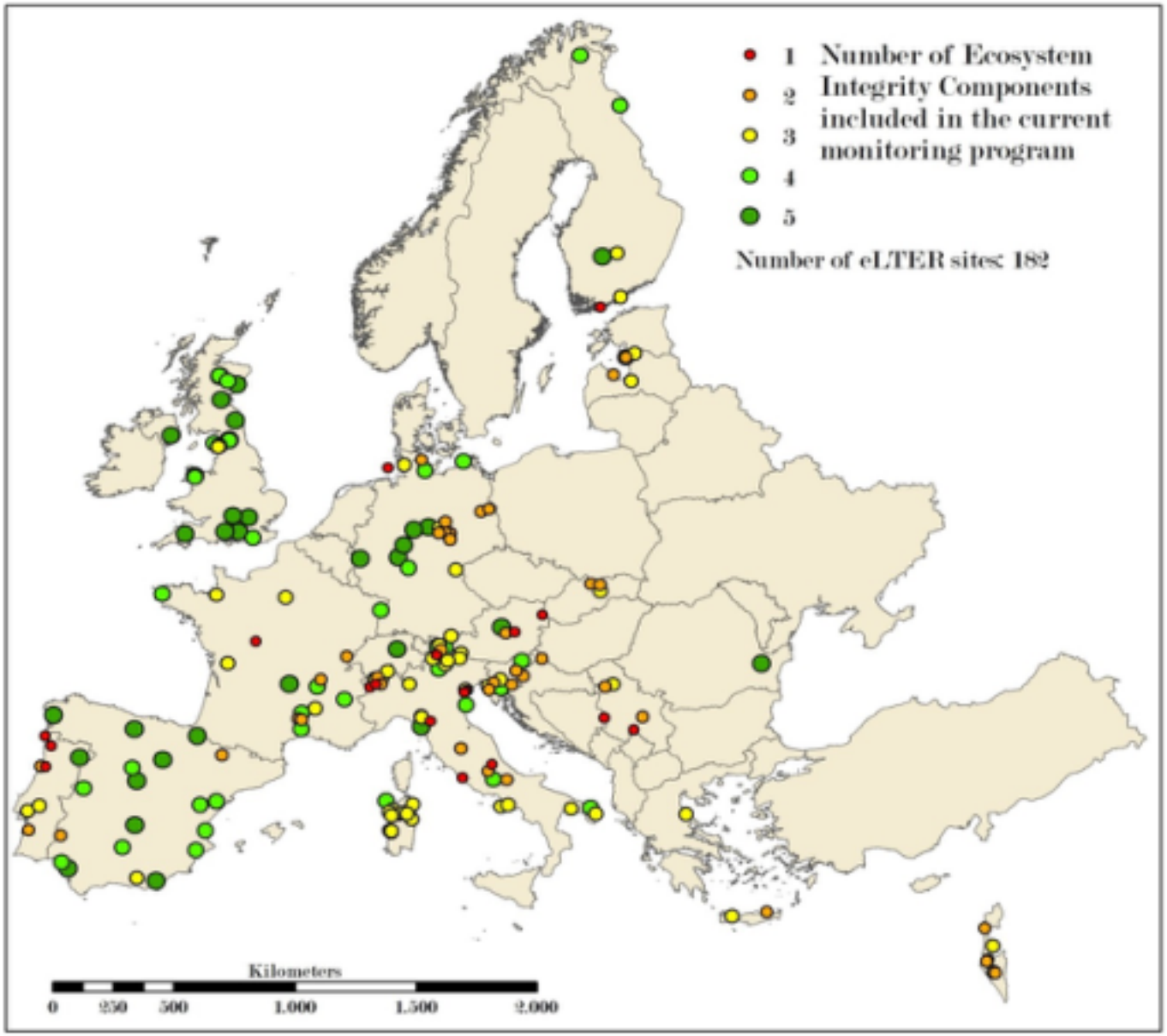


Simplicity (Parsimony)

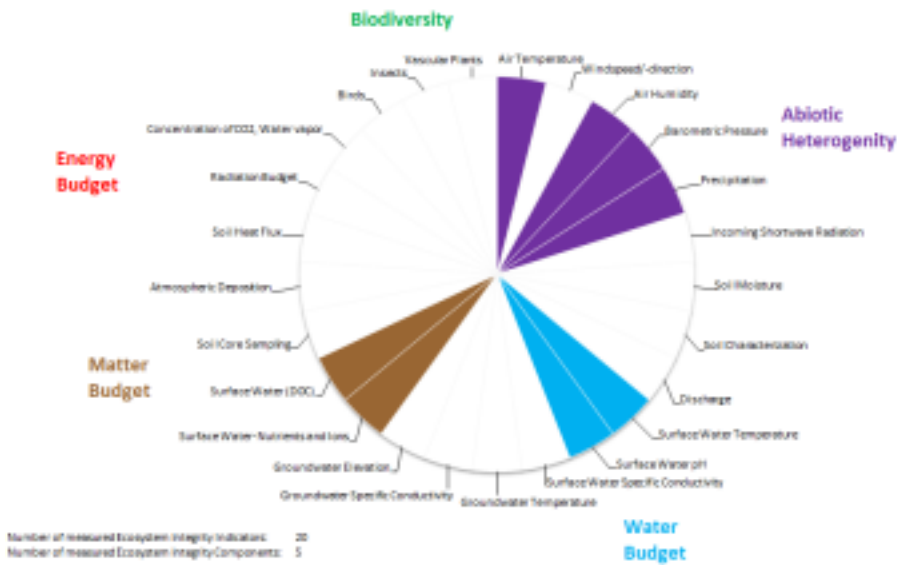
"A design too complex increases the risk of premature demise."
(Henry Janzen, 2014)

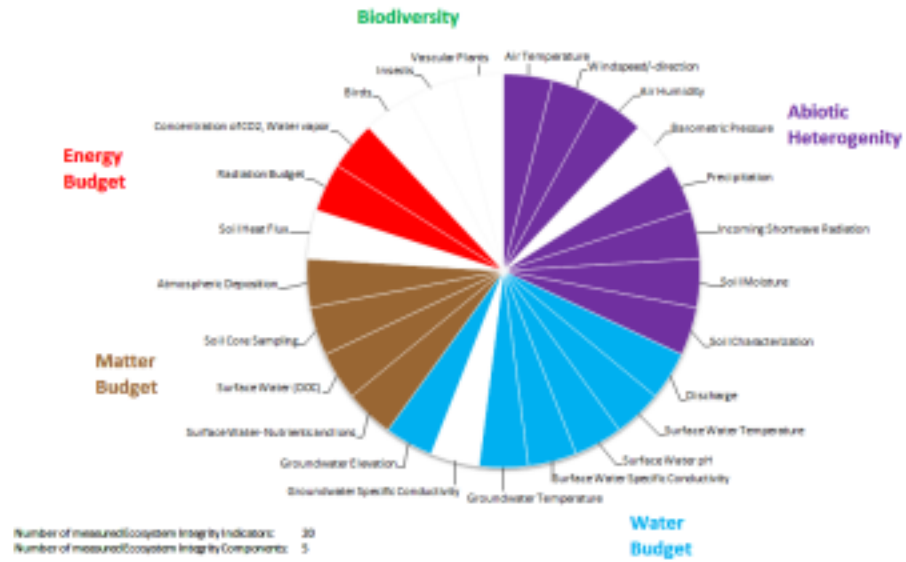
1. Representation of key elements of the Ecosystem Integrity Concept & EBVs
2. High sensitivity to environmental changes
3. Critical Relevance for environmental modelling

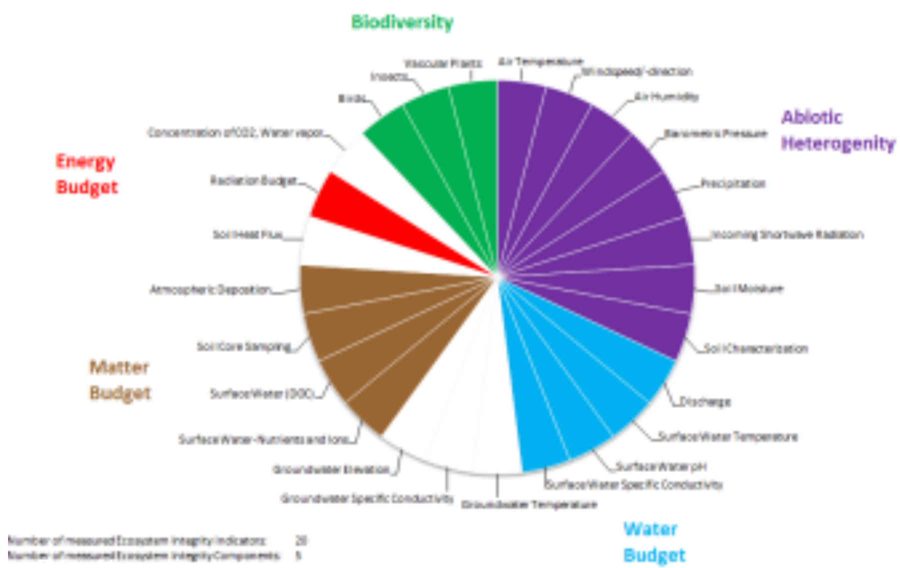
Geographical eLTER site distribution & level of standard observation



Compliance check for ~200 individual sites







Abiotic Heterogeneity

Energy Budget

Water Budget

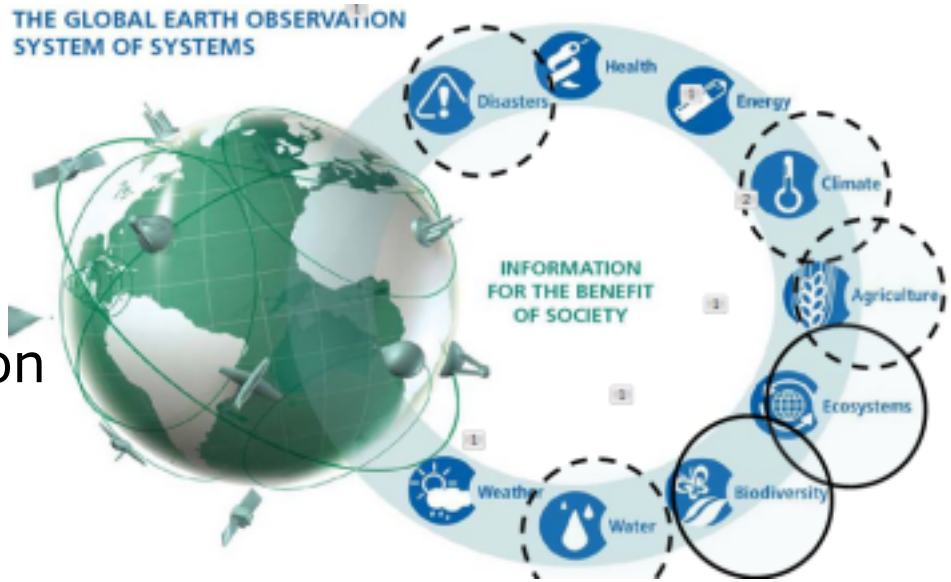
Biotic Diversity

Matter Budget

eLTER

LTER ties to GEO

- GEO
  - 100 national governments
  - 100 Participating Organizations
- ILTER =Participating Organisation
  - Observations contributing to several SDGs
    (e.g. 6/water; 15/biodiversity)



ILTER as **in-situ data provider**

User of RS products to better fulfil its own mission *(scale?)*

Calibration, verification and validation facility for RS service providers

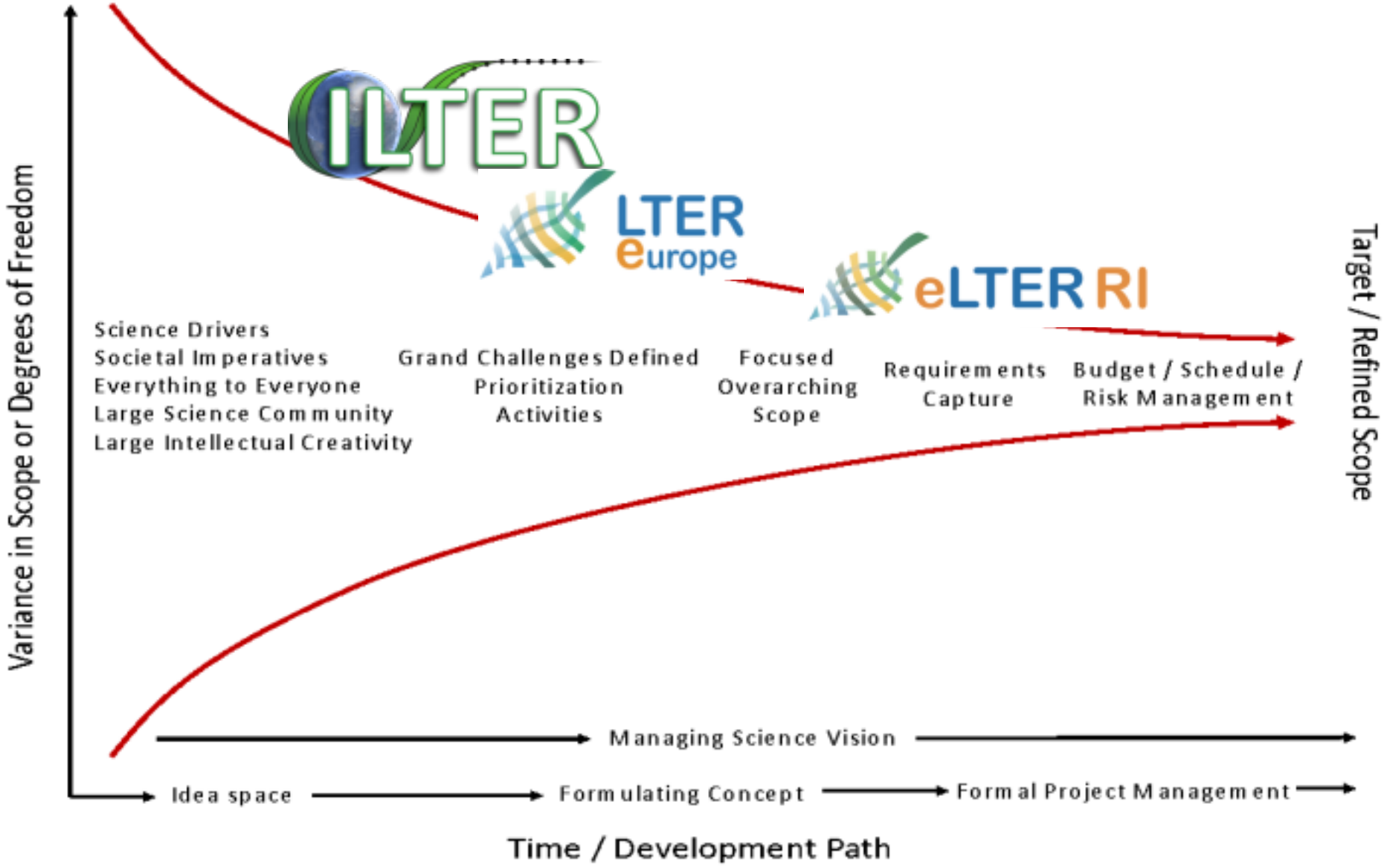
DEIMS SDR as agreed pilot for a **global site registry** across networks (incl. accreditation)

ILTER fosters **bottom-up integration**/consolidation of terrestrial in-situ observation networks

Contribution to the development of a **Global Terrestrial Observation System** successor

GEO 2018: eLTER/ILTER leading the related side event

Hitting limits: Network-RI-transitions reflected by the 6 sigma approach



Courtesy Hank Loescher 2018

The „Zhaoqing Think Tank" on the Global Research Infrastructure challenge for Ecosystem RIs

(China, 2018-04; *USA, 2019-04)*

- **Human resources** & staffing of RIs
- RI **design issues** incl. combining observation with experimentation
- **Organisational requirements** and system engineering
- Standard environmental **observation** and **trade off with hypothesis driven appraoches**
- **Globalisation** incl. requirements emerging from **wealth gradients** constraining global coverage

- Options for a **Global Ecosystem Ecology Research Infrastructure** („GERI")
- „GERI" as G8 Group of Senior Officers/**GRI case study**
- Clarification of **GEO-relevance**

Overview of involvements and outlook

Europe:

- ENVRIplus
    - Ecosystems & Biodiversity domain
- ENVRI-FAIR
- EuroGEOSS
    - lead of showcase myECOSYSTEM

Globally:

- ILTER
- GEO In-situ group
- GERI / GSO case study?
- COOP+/CoopEUS - FIERI
    - importance of collaboration platforms vs. lacking focus
    - domain-specific approach?
    - → be as concrete as possible, at least in some collaboration pilots

ILTER Open Science Meeting (OSM) 2019

- Covers Long-term ecosystem, critical zone and socio-ecological research
- Germany, Helmholtz Centre for Environmental Research (UFZ), Leipzig
- Save the date 2-7 September 2019
- www.ilter-2019-leipzig.de
- Field trip to Elbsandsteingebirge