Issue: July 2022

Due to a technical issue, the newsletter you received an hour ago was not finalised. Please disregard the previous newsletter. We apologise for the inconvenience and wish you happy reading of the final version.

Welcoming new people to the eLTER Head Office

Claudia Schuetze

Claudia Schuetze has her background in physics and geophysics and held a professorship in electrical engineering. She has worked for the UFZ since 2009 and coordinated several geophysical research projects.
Since 2017 she has led the implementation and coordination of the

Charlotte Wiederkehr

Charlotte Wiederkehr has an academic background in European Studies and Sustainable Development. In the context of her PhD she investigated dynamics between climate change, human migration and resource conflicts.
She has lived in

Uta Koedel

Uta Koedel is a geophysicist, interested in: developing suitable hierarchical monitoring approaches for complex heterogeneous environmental systems; studying the interaction of processes in different compartments; evaluating the variability of sensor measurements; and establishing the

MOSES RI (Modular Observation Solutions for Earth Systems) of the German Helmholtz Community.
This research infrastructure is focused on the observation of extreme events such as droughts or floods from the event generation to its impacts across the compartments.

Argentina, Brazil, Namibia, the Netherlands and Portugal and enjoys collaborating in multicultural and interdisciplinary environments.
She is looking forward to supporting the day-to-day research infrastructure business as well as the Integrated Governance of eLTER while being based at the Head Office in Leipzig.

requirements to evaluate the trustworthiness of data (FAIR+). She has worked for the International Institute for Applied System Analysis in Austria and the Japanese Environmental Agency. Since 2007, she is working at the Helmholtz Centre for Environmental Research, UFZ.

Highlights

90 scientists gathered for the first physical eLTER consortia meeting

90 researchers from 27 countries, part of the eLTER PPP and eLTER PLUS projects, gathered in Mallorca from 16 to 20 May 2022 for the first ever consortia physical meeting.

"This meeting was much needed and **delayed with at least a year**", said Prof. Jaana Back, project co-coordinator, “Unfortunately, due to the pandemic measures, it was impossible to happen earlier”, added Dr. Michael Mirtl, eLTER co-coordinator.

Indeed, the 5-day meeting was packed with sessions and discussions on a variety of important topics for the future research infrastructure: **data workflows, management of sites and platforms, human resources sustainability, jobs and research opportunities, active cooperation and exchange of experience** with other RIs in the struggle with the Grand Societal Challenges.

Among the highlights were the session on "**Enhancing eLTER's relevance to EU environmental policy**" and the scientific poster exhibition showcasing the most important work being done by work packages. Furthermore, a half day was dedicated on **early career members** (ECMs), their place in eLTER, job/training/research needs and ways of engaging them. The session was conducted in the form of a world café with six tables on:

- improving communication;
- career tracks;
- tutoring ECMs;
- **producing high-impact publications**;
- new research questions that can be answered with eLTER;
- increasing engagement of ECMs.

Last but not least, the evenings were filled with a number of community building activities like games on the beach and **medieval dance lessons** taught by Dr. Mark Frenzel (UFZ, Germany), as seen on the photo.

BioDT: a Digital Twin prototype to help protect and restore biodiversity

BioDT (Biodiversity Digital Twin for Advanced Modelling, Simulation and Prediction Capabilities) is a recently started HE project in which **eLTER is closely involved**.

BioDT aims to **enhance the predictive understanding of biodiversity dynamics by developing a Biodiversity Digital Twin** (BioDT) providing advanced modelling, simulation and prediction capabilities. By exploiting existing technologies and data from relevant research infrastructures in new ways, BioDT will be able to accurately and quantitatively **model interactions between species and their environment**.

BioDT brings together a dynamic team of experts in **biodiversity, high-**

performance computing, artificial intelligence, digital twinning and FAIR data to develop the first BioDT prototype. The scientific expertise and existing datasets from four major biodiversity research infrastructures (**eLTER, GBIF, DiSSCo, and LifeWatch ERIC**) will bring life to BioDT, allowing for coverage of several application domains such as environmental and earth science, climate science, ecology, biology, genomics, natural history, biodiversity informatics, computer sciences, and mathematics / statistics.

BioDT and its infrastructure will become an integral component of the **Destination Earth initiative** and actively participate in its ambition to realise a full Digital Twin of the Earth. The long-term objectives of BioDT are also tightly interconnected with the EC vision for a robust, federated European computing and data infrastructure, and initiatives such as the European Open Science Cloud (EOSC) and EuroHPC.

eLTER will contribute by enabling the biodiversity community to become involved, as well as by providing essential knowledge on data management and tools. There are 22 partners altogether, including eLTER beneficiaries CSC (project coordinators), UFZ, UH, EAA, and UKCEH.

Strategic Section

The 20th Anniversary of ESFRI – Related conference and considerations from the eLTER perspective

ESFRI (The European Strategy Forum for Research Infrastructures) was founded in 2002 for the purpose of further developing large-scale research facilities and research infrastructure networks in Europe in a strategy-driven and jointly coordinated process. ESFRI consists of delegates from the EU Member States and states associated with the EU Framework Programme for Research and Technological Development along with a representative from the European Commission.

The creation of the "**ESFRI Roadmap**" was a milestone of ESFRI. It lists the

priority European research infrastructures for the coming 10-20 years to be jointly set up, as well as RIs already in the implementation phase (ESFRI Landmarks).

The ESFRI Roadmap is updated about every two years in an iterative process and currently contains 18 ESFRI Projects and 37 ESFRI Landmarks covering the domains of energy, health & food, environment, physical sciences & engineering, social & cultural innovation and computing (as of 2018). In collaboration with the European Commission, ESFRI developed a framework for a sustainable legal entity to establish European research infrastructures. These legal entities are designated European Research Infrastructure Consortia (ERIC) enable a permanent institutional status. eLTER now aims at such eLTER ERIC.

The **20th Anniversary Conference of ESFRI,** took place on **25 March 2022 in Paris**, France, as part of the French Presidency of the Council of the European Union and emphasized RIs decisive role for *scientific discoveries*.

From the perspective of Europe´s diverse environments and the need for representative information across the continent´s natural and socio-economic gradients, it is important that the ESFRI framework allows for single-sited, but also **distributed research infrastructures**. Distributed RIs consist of a Central Hub and interlinked National Nodes/Facilities. This enables the integration of long-lasting networking and project based efforts of the European LTER with a formalized infrastructure development. The work towards secured common services and long-term funded eLTER Sites and eLTSER Platforms is driven by the national eLTER ESFRI processes in >20 countries. These processes mirror the European scale strategy represented by the **ESFRI Roadmap, which has proved as decisive door opener for concerted RI development.**

Research Infrastructure Co-location – When the whole is greater than the sum of the parts

With our whole system, place-based approach, the eLTER RI is well placed to address some of the most pressing environmental problems facing Europe today. **However, a single Research Infrastructure (RI) cannot hope to generate all the knowledge** needed to build a sustainable future. Instead that knowledge has to come from multiple sources, including a range of RIs.

Co-location of multiple RIs at the same physical location offers a unique opportunity to create actionable knowledge synthesized from the best information available using robust, state of the art analytical methods in a standardised manner. Observations made in this way support open, repeatable and refutable analyses and insights based on the best available data.

ICOS, the Integrated Carbon Observation System, is **one of the most important RIs for eLTER co-location**. The ICOS RI makes high quality, standardised carbon flux measurements at multiple sites across Europe. When these measurements are combined with eLTER observations on, e.g., biogeochemical process rates, land management actions and ecology, there is the potential to understand both "what is happening" and "why it is happening" in the terrestrial carbon cycle. **ICOS has unique strengths in documenting fluxes** while eLTER offers the contextual background needed to understand flux magnitude. Effectively, when eLTER and ICOS co-locate, the whole is greater than the sum of the parts.

Recently, representatives from the **ICOS and eLTER RIs took an important first step towards achieving this vision at a joint scoping meeting**. There are opportunities for synergies at the immediate, medium, and long-term time scales including collaboration on measurement protocols, IT systems and communication. There is a lot we can learn from ICOS, and there is even more that we have to offer.

Latest Research

Trade-offs and potentials of agroforestry in the LTSER platform Eisenwurzen, Austria

In the Austrian Eisenwurzen, **cultivation of local fruit tree varieties in traditional meadow orchards** was an historically important type of land use. While today, this practice is still part of the region's cultural identity and an important tourism asset, meadow orchards and their many ecological benefits disappeared from most European cultural landscapes during industrialization. In the course of **combating climate change and biodiversity loss, however, there has been a renewed focus on agroforestry** as a multi-functional and sustainable form of land use.

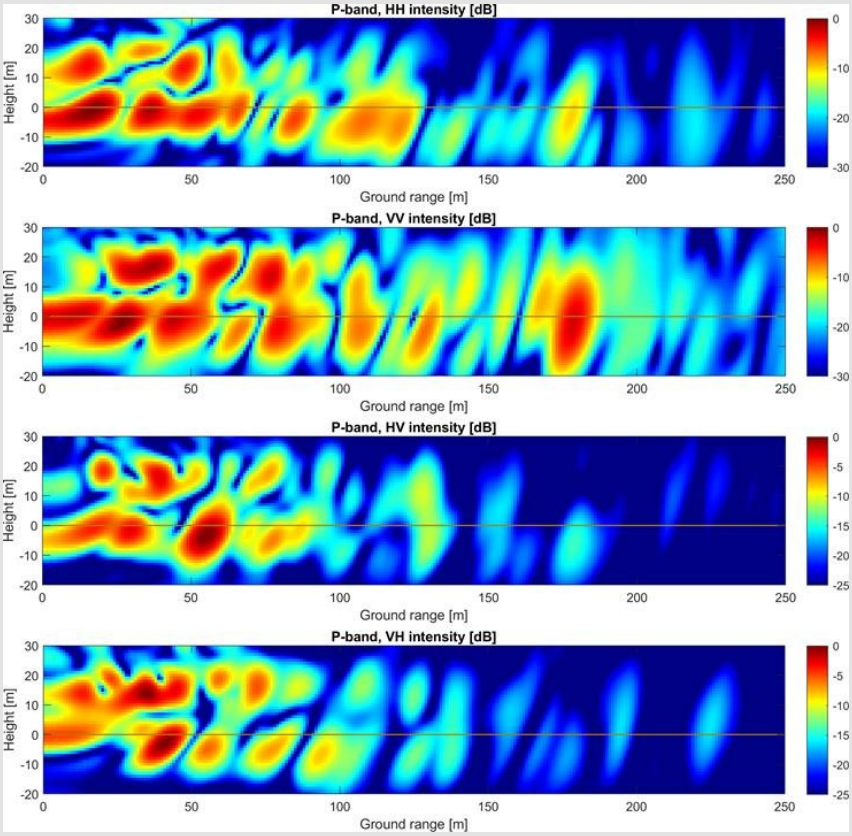
Implementing agroforestry systems on the landscape-scale nevertheless comes with **trade-offs between different ecosystem services**. In this study, we quantified in particular the potential effects of agroforestry on carbon sequestration and biomass provision. In doing so, **we integrated data from the agent-based land-use model SECLAND and the bio-physical agroforestry model YieldSAFE**, and applied the socio-ecological indicator framework HANPP to calculate the carbon dynamics of a hypothetical future agroforestry scenario.

Results indicate that **transitioning to agroforestry in the Eisenwurzen would strongly relieve the agroecosystem from human-induced pressure and create a substantial carbon sink**, but would also result in significant trade-offs with biomass provision. We conclude that harvest losses may inhibit large-scale implementation, in particular on highly productive grass- and croplands. On extensively managed plots and marginal lands, however, trade-offs are minimized and agroforestry constitutes an **attractive addition to sustainable land-use policy**.

Bertsch-Hoermann, B., Egger, C., Gaube, V., Gingrich, S. Agroforestry trade-

offs between biomass provision and aboveground carbon sequestration in the alpine Eisenwurzen region, Austria. Reg Environ Change 21, 77 (2021). https://doi.org/10.1007/s10113-021-01794-y

Photo: Traditional meadow orchard in the alpine Eisenwurzen region © Natur- und Geopark Steirische Eisenwurzen



Modern radar tower (BorealScat-2) is now operational at Svartberget (Sweden), and delivering data

BorealScat-2 is the new radar tower experiment located at Svartberget Experimental Forest for studying temporal variations in forest radar measurements. The tower, **previously used in the BorealScat experiment**, has been relocated and upgraded.

The **aim is to investigate forest moisture variations in P-/L-/C-/X-band tower-based radar observations** and to develop methods for **estimating forest evapotranspiration from space-borne radar observations**. The antenna array at 50 m provides full 3D tomographic at P- and L-band by mechanically moving the array horizontally. In autumn 2022, 2D vertical C- & X-band will be installed.

Evapotranspiration plays a central role in the carbon, water and energy cycles and is closely related to drought-induced tree mortality. The **boreal forest ecosystems are expected to be exposed to a rapidly changing climate and frequent drought stress**. Radar observations are directly

sensitive to the spatial distribution of water. By establishing a relationship between radar observations and variables contributing to evapotranspiration, space-borne radar is expected to contribute to high spatial and temporal resolution of evapotranspiration observations.

The location of the experimental forest within the Krycklan Catchment area, with its long-term measurements, and the measurement stations of the **European research infrastructures ICOS and ACTRIS** provides unique opportunities for cutting edge science.

Reporting Back

400 scientists visit the ENVRI booth at EGU 2022

Around **400 scientists visited the ENVRI booth during the EGU 2022** event in Vienna, lasting from 23 to 27 May. This marks a significant increase from the last physical EGU event where the booth was also visited by 400 people. However, this year the on site participants were **over 2 times fewer**

than in 2019.

eLTER was presented by its head of communication Kaloyan Konstantinov who was offering information about the RI, **our brand new brochure, and a number of ENVRI goodies like a coloring book, Rubik's cube, pencils with seeds, stickers, booklets with information**. At the booth, researchers could also enjoy lunch talks and presentations from members of the 26 research infrastructures.

ENVRI is a community of 26 environmental Research infrastructures working together to observe the Earth as one system. We collaborate so we can provide environmental data, tools, and other services that are Open and FAIR, and can be easily used by anyone for free.

Upcoming and ongoing events

ENVRI Community Summer School

Date: 10-15 July 2022 | **Place:** Lecce, Italy

The 5th ENVRI Community Summer School will take place in person on 10-15 July 2022 in Lecce, Italy.

Named "Road to a FAIR ENVRI-Hub: Designing and Developing Data Services for End Users", this Summer School organised by LifeWatch ERIC will cover topics such as user interfaces, packaging of services, reusability and validation of services, building and supporting networks through the lens of the ENVRI-Hub approach.

Learn more

AOGS2022

Date: 01-05 August 2022 | **Place:** Online

Asia Oceania Geosciences Society (AOGS) was established in 2003 to promote geosciences and their application for the benefit of humanity, specifically in Asia and Oceania and with an overarching approach to global issues.

The Asia Oceania region is particularly vulnerable to natural hazards, accounting for almost 80% of human lives lost globally. AOGS is deeply involved in addressing hazard related issues through improving our understanding of the genesis of hazards through scientific, social and technical approaches.

AOGS holds annual conventions providing a unique opportunity for exchanging scientific knowledge and discussion to address important geo-scientific issues among academia, research institutions and the public.

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Learn more

36th Congress of the International Society of Limnology

Date: 7-10 August 2022 | **Place:** Berlin, Germany

Founded in 1922 by visionaries August Thienemann and Einar Naumann, the International Society of Limnology (SIL), established the science of inland waters, encompassing lakes and ponds, streams and rivers, surface and ground water, and wetlands. This comprehensive coverage embodies the founders' broad perspective.

That double foundational mission was as important then as it is now, with limnology having evolved from a peripheral discipline into a backbone of environmental science. This is engrained in its motto of the Centennial: The next 100 years – Sensing and Safeguarding Inland Waters.

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Learn more

ESACSEE Annual Meeting

Date: 14-19 August 2022 | **Place:** Montréal, Canada

The 2022 Annual Meeting of the Ecological Society of America will be held at Palais des congrès de Montréal.

The organisers share the following view: Ecology is facing a disciplinary reckoning. Therefore, where we go and how we get there must be a collective enterprise built on principles that broaden participation, promote equity, and diversify metrics of impact.

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Learn more

6th European Congress of Conservation Biology

Date: 22-26 August 2022 | **Place:** Prague, Czechia

The 6th ECCB 2022 aims to bring together conservation biologists, environmental economists, practitioners, policy makers and social scientists including students, NGO representatives and academics.

They will not only report on latest results, but also explore the role of conservation science in policy formation and effective practice. The congress will provide unique opportunities for exchange and networking.

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Learn more

SPIE Sensors+Imaging's Remote Sensing of Clouds and Atmosphere conference

Date: 05-08 September 2022 | **Place:** Berlin, Germany

The conference focuses on methods, underlying technologies, and applications of remote sensing of clouds and Earth and planetary atmospheres, including topics such as:

- remote sensing and profiling of clouds, aerosol and trace gases and other meteorological parameters;
- radiative transfer;
- lidar, radar and other active/passive atmospheric measurement techniques and - technologies;

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Learn more

Workshop: Metrology for Climate Action

Date: 26–30 September 2022
Place: Online

The workshop is open to experts and stakeholders active in the fields of climate science, observations, modelling, GHG mitigation and

4th eLTERInterim Council

Date: 28-29 September 2022
Place: Uppsala, Sweden

The eLTER Interim Council is established to discuss and approve strategic issues such as legal, governance and financial matters, eLTER Site and eLTSER Platform labelling and location of Central

measurement and measurement science willing to contribute to the development of recommendations on key technical challenges.

Interest in participation can be registered below, including topics that the participant wishes to contribute to, with the list updated based on input received to date.

Learn more

Services in implementing the integrated European Long-Term Ecosystem, critical zone and socio-ecological systems Research Infrastructure (eLTER RI).

The role of the IC is to make decisions for implementing eLTER RI and preparing its legal entity, ERIC (European Research Infrastructure Consortium).

Learn more

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