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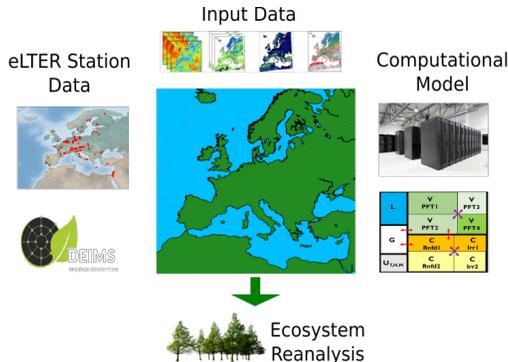
Modelling the Variability of European Ecosystems

Recently, European ecosystems are prone to stress derived from increasing drought incidence and severity and other direct human related disturbances. Modelling the whole European land surface including the ecosystem processes holds the opportunity to study these effects and their feedbacks for the different ecosystems on the continent. eLTER looks forward to providing services to projects with related research questions.

To be able to do so, we prepare the infrastructure and test it with a specific science case in [eLTER PLUS](#). The

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Centre. It can create time-series of processes of the bio geo chemical cycle: The fluxes of water and carbon play a key role in indicating variability and potential trends in ecosystems. Modelling them in high resolution is a leap forward in predicting the fate of ecosystems in Europe.



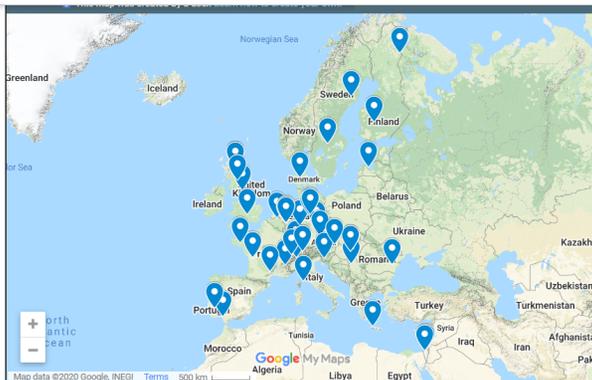
Essentially in eLTER PLUS, this, and other science cases are communicating their requirements to fulfil the desired scientific outcome. Meanwhile, the eLTER network is mobilising to provide the data from the participating stations. Climate, Biomass, Gas Exchange and Hydrology inter alia will be used to evaluate the model results and, in the end, get assimilated to create a consistent ecosystem reanalysis data-set. It will be attractive for researchers looking for ecosystem processes time series as input for their own project. The data and ICT requirements are determined declared and now, while the data is gathered by other work packages, the land-surface ecosystem model is being prepared.

The technical preparations on the model – for example preparing input data, the ‘spin-up’ of the carbon fluxes and pools in the simulated Europe are modelled to an equilibrium boot-state currently running. While handling the difficulties on the computers and engaging exchange with experts within eLTER PLUS on collaborative research, we are looking forward to eventually provide insights on ecosystems states across Europe and experience and prove the added value of eLTER.

Christian Poppe (Forschungszentrum Jülich)

TA/RA First call for proposals: Get free access to our site infrastructure!

The H2020 project [eLTER PLUS](#) provides opportunities to perform research at a selection of eLTER sites handpicked for the purpose of small to medium scale ecological and socio-ecological projects. All sites included in the scheme are equipped with state-of-the-art instrumentation to enable comprehensive ecological measurement and experimental campaigns. The first call for access to the well-equipped eLTER Sites is now open! The call offers access to 44 sites in 20 countries, mostly in Europe, but also welcomes researchers outside of Europe to participate! Scientists working in the areas of biodiversity, biogeochemistry, hydrology or socio-ecological research are encouraged to participate in the call, which will be closed on 23 December 2020.



The call provides two types of access: the Transnational Access (TA) enables in-person visits (e.g. to collect and analyse data), whereas Remote Access (RA) enables the “remote users” to specify what activities (e.g. sampling of material for analyses elsewhere) could be implemented on their behalf by the local teams. eLTER PLUS promotes both approaches but due to possible COVID-related travel restrictions, at present, a focus on RA is recommended.

TA/RA: First Call for Proposals

Global Ecosystem Research Infrastructure (GERI) agreement signed

The managing institutions that operate six different continental-scale ecosystem observing infrastructures, from Africa, Asia, Australia, Europe and North America (two from Europe), signed a landmark Memorandum of Understanding (MoU) on Tuesday 1 December, 2020, expressly committing to the development of the first-ever Global Ecosystem Research Infrastructure (GERI). This GERI is an integrated network of site-based research infrastructures dedicated to better understand the function and change of indicator ecosystems across global biomes to support excellent science that can also inform political and managerial decision-making addressing grand societal challenges.

It is envisioned that a fully functioning GERI will deliver the harmonized data, international partnerships and enable new understandings of global ecological processes—stretching across continents, decades, and ecological disciplines—in ways that were not previously possible. By bringing together these infrastructures, for the first time in history, we now have the infrastructure capability to ask environmental research questions with both societal and scientific importance across and among continents. The GERI’s capabilities are vital to better address future, critical challenges for the sustainable management of our limited natural capital under known environmental change, and future, yet unknown environmental challenges to assure long-term human well-being on the planet.

Table: Current participating Environmental Research Infrastructure (ERIs) in the Global Ecosystem Research Infrastructure (GERI) project. Please note that the Shareholders/Sponsors are NOT signees of the MOU.

Environmental Research Infrastructures	Host country/continent	Signatories / Managing Organizations	Shareholder / Sponsor
Chinese Ecosystem Research Network (CERN)	China / Asia	Chinese Academy of Sciences	Chinese Academy of Science

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Ecosystem, critical zone and socio-ecological Research (eLTER)		Environmental Research GmbH - UFZ,	
Integrated Carbon Observing System (ICOS)	Finland / Europe	ICOS ERIC Head Office	European Commission
National Ecological Observatory Network (NEON)	USA / North America	Battelle	National Science Foundation
South Africa Environmental Observation Network (SAEON)	South Africa / Africa	National Research Foundation	National Research Foundation
Terrestrial Ecosystem Research Network (TERN)	Australia / Australia	University of Queensland	National Collaborative Research Infrastructure Strategy

[Read the full article here!](#)

Latest Research

Climate change impacts pastoralism in the French Alps

Name of the site / network: *Sentinel Mountain Pastures program, LTSER Zone Atelier Alpes, French Alps, France*

The [Sentinel Mountain Pastures](#) program is a transdisciplinary network extended over the French Alps that aims at understanding and anticipating impacts of climate change on high altitude grasslands, which play a fundamental role for farm systems by providing non-cultivated fodder resources directly grazed by flocks, and by enabling specific management at the farm level (breeding calendar, pest control, work load...).

For up to 12 years in 2020, evolution of weather conditions, vegetation and agropastoral practises are monitored and analysed over 30 mountain pastures and associated farm systems (at present, three sentinel mountain pastures are included in the Platform Lautaret-Oisans). Results bring together scientific, technical and local knowledge, with the objective of supporting adaptation of farm systems while ensuring the high environmental quality of mountain pastures. Among tools that have been co-constructed to support adaptive management, the program developed a vulnerability analysis framework addressing the different physical, ecological, agro-pastoral and socio-economic dimensions of their agropastoral uses. This framework: i) characterizes pastures' exposure to climatic hazards in relation to physical features (location, slope, orientation...), ii) identifies the sensitivity of pastures' vegetation to climatic hazards, and iii) assesses adaptive management capacities on the mountain pastures and in the interaction with the farm systems (Deléglise et al. 2019).

The program seeks to support collective adaptation to impacts of climate change in mountain pastures. Field data from the sentinel pastures provides a knowledge basis that the program uses to stimulate dialogue on knowledge and practises among scientists, agricultural and pastoral technicians, protected area managers, breeders and shepherds. An integrated analysis of the impacts of climate change on the mountain pastures located in the [LTSER Lautaret-Oisans](#) is planned in 2021, taking advantage of the existing temporal hindsight and interdisciplinary expertise related to this site.

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Photo credit: S. Aubert, CNRS

Coordinating body and contact person: LTSER ZAA / Inrae, Mountain Ecosystems and Societies Lab (LESSEM) – contact: Emilie CROUZAT emilie.crouzat@inrae.fr

Source: Deléglise, C., Dodier, H., Garde, L., François, H., Arpin, I., & Nettier, B. (2019). A Method for Diagnosing Summer Mountain Pastures' Vulnerability to Climate Change, Developed in the French Alps. *Mountain Research and Development*, 39(2).

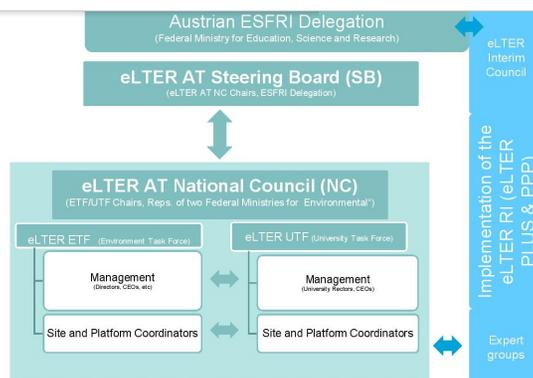
<https://www.alpages-sentinelles.fr/wp-content/uploads/2020/06/DELEGLISE-et-al-MRD-2019-Vulnerability.pdf>

*Philippe Choler, Mathilde Emery (University of Grenoble)
Virginie Girard (CNRS)*

Network news

Early lessons from governing eLTER in Austria

Despite some hurdles still existing, the way towards the European eLTER RI seems to be paved. But, how are we going to catch up with this process in Austria, is what we asked ourselves. In order to address this issue, site managers and the administration of the operating research institutions together with federal ministries have organized themselves in order to achieve decisions in a structured and acceptable form. This was by no means easy because six universities, eight research institutions, and four national park administrations are running sites and platforms, which may once be part of the eLTER RI. Moreover, they belong in one way or the other to three ministries while only one, the Federal Ministry for Education, Science and Research, is responsible for ESFRI. Many of you know this situation from your countries, right? In early 2020, we started this process with the aim to best govern the national ESFRI process allowing for 1) the formation of a common understanding on eLTER design and services, which include strategic aspects from the institutional management level, and 2) informed, targeted, time and cost efficient representation of Austria in the eLTER Interim Council through the national ESFRI delegation.



What we came up with is the governance structure shown in the graph and the respective procedures for communication and decisions. Early successes of this was a common approach of the six involved universities regarding their research strategies for 2021 to 2024 with a clear statement for eLTER. Furthermore, we had a meeting discussing the design of all the LTER sites interested and what standard observations we think make sense. Expert groups were formed, which will be actively involved in the respective [eLTER-PLUS](#) tasks. Last but not least, the Steering Board meeting with the Austrian ESFRI delegation will take place prior to eLTER Interim Council Meetings.

Our experience with the new governance structure is promising because it allows for clear communication and mandating decision-making, which we think is pivotal in a complex process such as ESFRI where so many stakeholders and funders are involved.

Thomas Dirnböck (Environment Agency Austria)

Veronika Gaube (University of Natural Resources and Life Sciences BOKU)

Ávróna oil spill in Israel: history and new developments

In December 2014 one of the largest environmental disasters occurred at the [Arava LTSER platform](#): an oil pipe was broken and around 5 million litres of crude oil was spilled into a hyper-arid nature reserve called Ávróna. Since then many organizations and scientists were trying to evaluate the damage to the reserve, monitor key indicators of the ecosystem and examine if the ecosystem is recovering from the spill. At the same time, the Nature Protection Authority were trying to deal with the oil with a minimum damage. Also at the same time a sue was taken out against the oil pipe company and a legal mediation process was taking place.

This year a few key events took place. The legal process was concluded with a compensation fee of a few tens of million euros was agreed on with most of it going to conservation. The 5-year monitoring programme of more than 10 groups of researchers, is ending. In addition, the conservation authorities decided after many experiments that adding oil-eating-bacteria together with watering the reserve is the best solution and they have started to add the water with bacteria to the reserve using sprinklers.

This disaster brought a lot of research into the relatively new LTSER platform and we hope to use the opportunity to learn more about hyper-arid ecosystems.

Elli Groner (The Dead Sea-Arava Science Center)

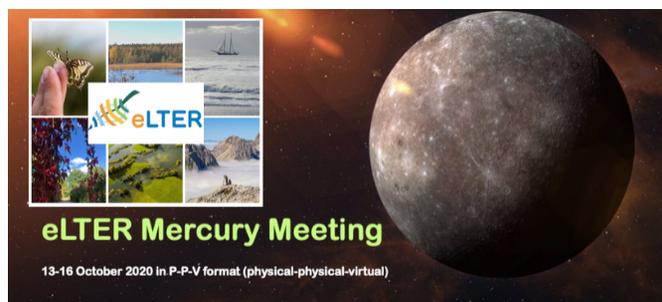
LTER Finland receives funding

The LTER Finland received funding from the Academy of Finland as a part of an integrated consortium INAR RI, for supporting the co-location and integration of our sites. The grant supports improving the capacities for multi-

Reporting back

eLTER community ventures new paths with hybrid conference format

The two EU projects [eLTER PPP](#) and [eLTER PLUS](#) already had to hold their kick-off meeting in virtual form during the first wave of the COVID-19 pandemic in March 2020. After several months of working conditions caused by the COVID-19 pandemic with mainly home office and purely virtual meetings in almost all European countries, the desire for a physical meeting was understandably high. But a reality check was done, and since the physical meeting was still not possible in October, it was decided that a hybrid meeting format would offer at least a partial solution to this problem. The hybrid meeting with many interactive tools was a great success: a total of over 100 participants from 27 countries attended the meeting. First project successes were presented, a series of workshops on the gearwheel topics were organised and mechanisms were worked out to further establish the integrated work culture necessary for progress towards eLTER RI.



[Read the full article here!](#)

Global ILTER meeting

[ILTER](#) held its annual Coordinating Committee meeting on 11 and 12 November. This time, the meeting had to be held virtually, but through using several interactive tools, it was nevertheless a lively and very productive meeting with substantial outputs including the presentation of the new ILTER Strategic Plan 2020-2030. The event focussed on jointly planning activities and identifying critical matters for 2021 and to brainstorm on the ILTER Open Science Meeting (OSM) contents in 2022.

Michael Mirti presented advancements of the main components of the European LTER process including the progress towards the implementation of eLTER RI and the related flagship projects [eLTER PPP](#) and [eLTER PLUS](#).

Enabled by these and preceding projects, [DEIMS](#) SDR continues to be a main contribution of Europe to the global ILTER service portfolio, offering an overview of the geographic distribution of the verified ILTER sites!

Board of European Environmental Research Infrastructures (BEERi) meeting

its third meeting in 2020. BEERI is in the signing process of a Memorandum of Understanding that will enable the RIs to speak with one voice. [The ENVRI projects](#) continue concerted communication activities and collaboration on matters of common concern for all environmental RIs in Europe (e.g. consistent metadata systems).

Upcoming and ongoing events

AGU Fall meeting

 1-17 December 2020

 Online

 <https://www.agu.org/fall-meeting>

The AGU Fall Meeting will be one of the world's largest virtual scientific conferences, with exciting programming and events. To focus on engagement, most sessions will be one hour long and organized as lightning presentations with moderated discussions. Sessions will generally be held in two-time blocks with a long networking break to accommodate a global audience.

eLTER has taken the task to present the Global Ecosystem Research Infrastructure initiative on behalf of all partners (NEON, TERN, SAEON, CERN, ICOS) on 9 December.

eLTER Interim Council

 10 December 2020

 Online

The founding meeting of the eLTER Interim Council will take place on 10 December, 2020. The meeting will be entirely virtual. Until November, 17 countries have nominated their delegates for the IC. 16 countries that support eLTER RI politically will attend the IC with overall about 50 participants.

The eLTER Interim Council, IC, will discuss and approve strategic issues of the eLTER RI planning and implementation such as legal, governance, financial and operational matters. Countries which sign a ministry level Expression of Support to the eLTER ESFRI process can become members of IC. Other countries may also participate as observers.

More information office@lter-europe.net.

eLTER Site and Platform Forum

 13 January 2021

 Online

On 13 January 2021, the first and founding meeting of the Sites and Platforms Forum (SPF) will take place, offering the eLTER Site and eLTER Platform Coordinators (SPCs) a platform for information, discussion and collaboration in prioritizing requirements and designing and shaping eLTER RI and its services. A detailed invitation and concept note on the SPF will be sent to all SPCs of verified European LTER sites. The SPF is supported by the [eLTER PLUS project](#)'s Work Package 2 and the related task lead by Stefan Bertilsson from SLU/Sweden.

Training Provenance Tracing in ENVRI Research Infrastructures: 'Bring your own provenance cases' workshop

<https://envri.eu/training-provenance-tracing-in-envri-research-infrastructures/>

A workshop-type session to discuss cases, issues, problems and questions collected from the community, working towards practical support and -possibly- solutions. The primary target group for the training is staff at the ENVRI data centres, especially those concerned with data management and service architecture. Other target groups are staff of data centres of key local, regional and national institutions dealing with environmental data, and early-career scientists (MS and PhD students and post-docs) associated with the ENVRI and their respective end-user communities.

EGU General Assembly 2021

 19 - 30 April 2021

 Online

 <https://www.egu21.eu/>

The EGU General Assembly 2021 will bring together geoscientists from all over the world to one meeting covering all disciplines of the Earth, planetary, and space sciences. The EGU aims to provide a forum where scientists, especially early career researchers, can present their work and discuss their ideas with experts in all fields of geoscience. The EGU is looking forward to cordially welcoming you at its General Assembly.

eLTER Session: 'Whole system approach for in-situ & long-term environmental system research on life supporting systems (WALS)'. Conveners: J. Bäck, T. Dirnböck, U. Mallast. Abstract submission deadline is 13 January 2021, 13:00 CET. A summary of the session can be found [here](#).

Feature article

Each nature experience is and isn't unique

Studying Cultural Ecosystem Services across eLTER socio-ecological research platforms

Does every ecosystem provide unique cultural benefits directly related to its biophysical environment? Yes and no. In 2017-18, Dr. Yael Teff-Seker, in collaboration with eLTER socio-ecological platform scientists, was testing a new methodology for assessing cultural ecosystem services (CES) drawn from the field of psychology, which combines meditative thought (focusing) with walking in nature. From the desert of Israel (Negev Highlands LTSE) to the riparian forests of Scotland (Cairngorms National Park) to the coastal dunes of the Netherlands (LTSE Dutch Wadden Sea) and to the coniferous forests of Finland (Hyytiälä SMEAR II LTER), she interviewed 120 walkers to define their multi-sensory experiences in these ecosystems and to record their perceptions of CES. Teff-Seker's research dug deeper into people's thinking than typical survey- or interview-based research on CES, as she uncovered feelings generated by being in nature – including nostalgic memories, calm pensiveness, discomfort and fear, and clarity and focus.

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 Relaxing	 Memories	 Imagination	 Cognitive Development
 Connecting to Nature	 Away from Stressful Life	 Energized	 Quiet
 Being "Here and Now"	 Another Perspective	 New or Different	Universal Cultural Ecosystem Services

While each site elicited positive feelings associated to the unique bio-physical aspects of that ecosystem and each were noted for their own unique smells, sounds and feelings, some experiences were universally common across ecosystem types. These "universal" cultural ecosystem services include references to granting perspective, learning about the natural world, inspiring the imagination, and instilling both energy and calm.

The knowledge provided by this research is both a contribution to our understanding of how humans perceive and enjoy nature, but also provides helpful information to local managers and planners who are interested in maximizing the positive experience of visitors to nature, while minimizing the negative impacts of the visit. When considering accessibility, for example, it is crucial that the infrastructure developed to provide more people with more nature benefits do not simultaneously degrade the characteristics of the ecosystem that provide those benefits.

"Access to a broad diversity of ecosystem types and to local scientists who were interested in promoting socio-ecological research was crucial to the success of this project," says Teff-Seker, now a visiting professor at the University of California, Davis. She continues: "The substantial support I received from the LTSER platform managers and researchers created research opportunities that would have otherwise been impossible to attain".

The first phase of the research, conducted in the Negev Desert, was [published in "People and Nature"](#), a new journal of the British Ecological Society.

The eLTER Research Infrastructure aspires to become a world leading RI for hosting socio-ecological research. eLTER's 70+ platforms, spanning across almost all of Europe's diverse ecosystems, feature scientists eager to collaborate on researching human-environment interactions, as well as policy relevant studies on the feedbacks between social and biophysical systems as they affect the grand environmental challenges. In 2021, eLTER-RI continues to encourage the use of its socio-ecological research infrastructure through transnational, virtual and remote access grants. Information can be found [here](#).



Daniel Orenstein

Technion - Israel Institute of Technology, Socio-ecology Theme Lead, eLTER-PLUS

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HAPPIEST HOLIDAYS!



With this issue we celebrate the Czech Republic, now officially part of the eLTER ESFRI process after signing the political support letter in November!

eLTER is now supported by 20 countries on high level! The Czech Republic is also a voting member of the eLTER Interim Council now.



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