News from Countries, Sites and Platforms: April 2022

"News from countries, sites and platforms" highlights the efforts of a great many eLTER colleagues in various roles - scientists, site and platform coordinators, national coordinators and so on - who are engaged in a wide variety of fascinating eLTER activities across Europe and beyond. So enjoy!

LTER-NL included on the National Road

Map for Large Scale Research Infrastructure

In 2021 the Netherlands Long-Term Ecosystem Research Network (LTER-NL) was **included in the list of Large Scale Research Infrastructure** (LSRI) by the Netherlands Organisation for Scientific Research (NWO).

This means that LTER-NL is now **recognized as a LSRI and can apply for funding** within the Dutch system. We therefore put in a large grant earlier this month where LTER-NL teams up with **LifeWatch-NL** and with a national scheme that monitors abiotic environmental variables (NemNet).

Making use of the synergy between these three LSRIs, we aim to develop so-called **Digital Twins of the two LTSER-sites of the Netherlands**: the Wadden Sea and the Veluwe. For these Digital Twins we will make the many existing long-term ecosystem datasets FAIR, as well as existing models on species interactions, and the way the environment affects species.

These data and models can then be combined in **Virtual Laboratories, facilitating collaboration between ecologists and data scientists**. When developed, the Digital Twins can be used for scenario studies to in silico evaluate the effect of mitigation measures on biodiversity.

The first Science National Park in the world contains an eLTER site

A proposal for the world's first science national park is currently being considered by the Finnish government. The 4800 ha park would be situated within **southern Finland's Lammi LTER** and aims to strengthen scientific activities in the area as well as serve as a platform for the general public and scientists to interact.

The **Evo area has a rich history of scientific research dating back over a century** and has been the site of intense ecological research and monitoring for many decades. With almost 700 peer reviewed papers published from the area since 1978, it is one of the most intensely researched geographic areas of Finland.

In the proposed science national park, the research done in the area will be brought to light for visitors, but the park also has a broader aim to **enhance visitors' scientific literacy through activities, opportunities to participate in citizen science** and the holding of annual science days.

Illustration credits: Maria Luna Tescar

EU encourages member states to use eLTER sites for the NEC Directive Monitoring (NEC-D)

The National Emission reduction Commitments Directive (NEC-D) sets national emission reduction commitments for Member States and the EU for five important air pollutants: **nitrogen oxides (NOx), non-methane volatile organic compounds (NMVOCs), sulphur dioxide (SO2), ammonia (NH3) and fine particulate matter (PM2.5)**.

These pollutants contribute to poor air quality, leading to **significant negative impacts on human health and the environment**. Nitrogen and

ozone affect ecosystems and biodiversity through various processes and degrees. As part of the directive's monitoring efforts, ecosystem data has to be reported every three years since 2018.

Member states are supposed to monitor ecosystem effects in their countries. So far, mostly existing monitoring sites of the CLRTAP International Cooperation Programs (ICP Forests, ICP Integrated Monitoring, etc.) have been used, but a **new guideline refers to national LTER networks, encouraging member states to take advantage of the upcoming eLTER RI** to fulfil the reporting obligations. Co-location of monitoring and research in Europe will foster cost-efficiency of the ongoing infrastructure development.

New project promoting the resilience of agroforestry systems in drylands is being implemented across the LTSER Montado Platform

A new project funded by Portuguese national funds (FCT - Fundação para a Ciência e a Tecnologia) started in March 2021 and will run **until 2024 with the support of LTSER Montado platform**.

Project RENEWAL (PTDC/ASP-SIL/7743/2020) is aimed at **promoting the resilience of agroforestry systems in drylands to a more arid future**, ensuring ecosystem functions and services. It addresses climate change effects on oak woodlands (montados), semi-natural agroforestry systems of high ecological and socio-economic importance, dominating southern Portugal.

Montados are **highly vulnerable to climate change and are currently in**

decline due to multiple interacting environmental factors, coupled with unsustainable land use. RENEWAL´s aim is to use complementary biodiversity metrics of taxonomic, functional, and phylogenetic diversity as indicators of resilience to climate of key ecological functions in these semi-arid systems. It also aims to promote the montados' resilience to climate change and inform land management strategies and decision-making. This will be done using a **spatiotemporal correlational approach**, studying these indicators along space and over time at different scales, complemented with drought-induced manipulative experiments.

These experiments are being installed at **three Research and Monitoring Stations of the montado Long-term Ecological Research platform**, namely at Companhia das Lezírias, Herdade da Ribeira Abaixo and Herdade da Coitadinha.

Extensive long time series and new interesting measurements at Hyytiälä

The SMEAR site (Station for Measuring Ecosystem-Atmosphere Relations) is situated in the Hyytiälä Forestry Field Station of the University of Helsinki, in southern Finland.

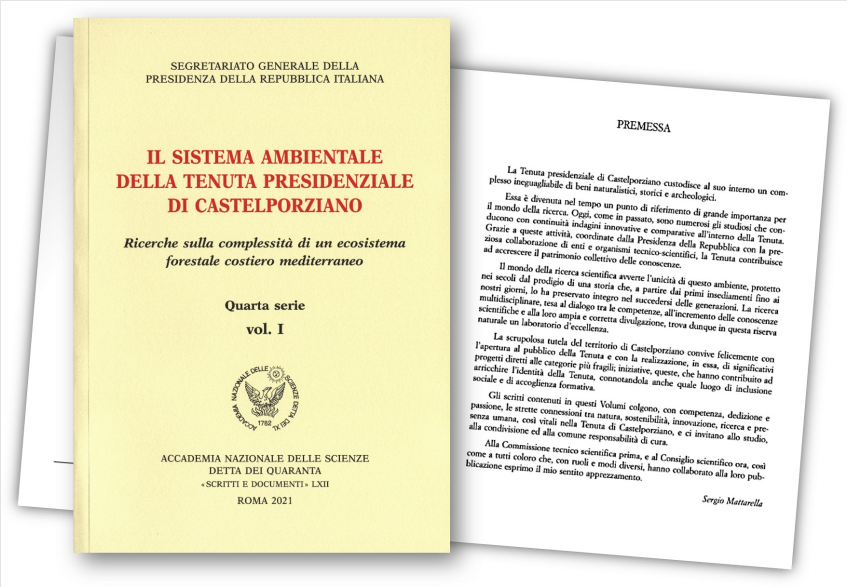
The site consists of a managed, **60-year old boreal Scots pine forest stand, two open oligotrophic fen sites and a humic lake with a forested catchment**. In addition to eLTER, the site belongs to the ICOS and ACTRIS infrastructures with four labelled ICOS stations and an ACTRIS labelling process currently beginning. There are also ICP-forest sites within the nearby area, managed by the Natural resources institute.

More recent campaigns and projects include a **thinning experiment** that produced data on forest management on matter and energy fluxes, and a snow removal experiment that revealed the physiological response of trees to reducing snow cover. A set of **soil chambers** that have been measuring the

continuum between mineral soil and treeless bog for about a year will enhance understanding of processes such as the effect of water conditions on **greenhouse gas exchange**.

Another current field of interest is to develop the biodiversity measurements conducted at the site. SMEAR II is part of the **LIFEPLAN biodiversity project** where automated methods are being developed to detect species diversity of fungi, animals and plants. The aim is to continue widening the measurements conducted at the site.

Read more



Castelporziano: A new work collects 7 years of research from the Italian LTER network

At the end of the first mandate of the President of the Italian Republic, Sergio Mattarella, the Presidential Estate of Castelporziano, published the fourth series of the work entitled **"The environmental system of the Presidential Estate of Castelporziano. Research on the complexity of a Mediterranean coastal forest ecosystem"**, issued in three volumes within the "Scritti e Documenti" series by the National Academy of Sciences known as the XL.

With over a thousand pages, the series collects **sixty-one scientific contributions grouped into nine thematic areas**, relating to the research and results achieved from 2015 to 2021. Topics such as **meteo-climatic trends, hydrogeology, monitoring of fauna biodiversity and plants**, the conservation of forest ecosystems and habitats, agro-zootechnical sustainability and the protection of the landscape but also the theme of social inclusion, the sharing of data on natural capital.

With an interdisciplinary vision aiming at a greater connection between natural and cultural capital, an entire volume has been dedicated to historical and archaeological research conducted within the Nature Reserve.

Download volume

The French LTER network met to discuss progress in their unique data portal

The annual meeting of the French OZCAR NRI (Critical Zone Observatories, research and applications) was held in the South of France, March 7 to 10th, 2022 at Vogüe on the banks of the Ardèche River under the scientific banner **“sediments and contamination”**.

The OZCAR NRI gathers 21 long-term field observatories monitoring one or several compartments of the Critical Zone and aims to develop a **systemic understanding of the environment**. The conference was held in a hybrid mode and allowed the participants (more than 110 people) to appreciate the achievements made over the past year by the NRI. This has included: **progress in developing a unique data portal, developments at the interface between data and models, progress in shared instrumentation and on the transverse research themes**.

Two invited keynotes, Gilles Brocard and Emma Rochel-Newall, illustrated the virtue of ecosystem multidisciplinary approaches. The field visit focused on the **hydrometeorological observatory** of the Claduègne watershed, the presentation of the ongoing research projects in this catchment and a meeting with local stakeholders.

The last day of the meeting focused on the international context with a presentation of the **International Critical Zone initiative** for early career scientists by Sylvain Küppel, a brief overview of the Critical zone observatory

of the Instrumented Farm at Leeds University (UK) by Steven Banwart and a presentation of the recent development of site categorization in eLTER-RI by Michael Mirtl. Participants enjoyed meeting physically after the long period of COVID-related travel restrictions and enjoyed the many opportunities offered by these busy days to exchange ideas about science and observation.

Photo ccredit: Hubert Rague

Transdisciplinary science in Israel Negev Highlands LTSER platform: Investigating Camel grazing in protected areas

How can nature conservation be combined with the Bedouin shepherds' traditions? To answer this question, we've collected a diverse group of experts from academia and civil society to consider dimensions ranging from ecological impact of grazing to the meaning of 'natural'.

Through discussions with **Bedouin shepherds, Nature and Parks Authority** (NPA) representatives, and legal experts, we aim to find collaborative, equitable solutions to this seemingly intractable socio-ecological challenge.

Platform scientists, including experts in **geology, anthropology, geomorphology, hydrology, ecology, botany, zoology, and social ecology**, toured the region of the Negev Highlands Reserve where cultural traditions and nature conservation are coming into conflict. They were accompanied by a camel herder, who had been fined for grazing his camels in the reserve, and his lawyer.

During the tour, various insights emerged from the encounter, particularly regarding the lack of knowledge pertaining to actual impact of camel grazing in the reserve, and further issues were raised regarding definitions of 'nature'

and ‘natural’, what constitutes ‘ecological integrity’ of the reserve, and what are the trade-offs in preservation versus traditional uses of the desert ecosystem.

The next meeting will be between the platform scientific committee and NPA representatives. These meetings will assist in **identifying knowledge gaps and designing a research agenda for platform scientists that can eventually yield results** directly relevant to the current conflict, in hopes of contributing to the creation of just policy solutions that address the needs of both ecological conservation and social equity.

Enhancing the knowledge of benthic communities in the Mar Piccolo of Taranto, Italy

Last autumn, a project started on **“Monitoring of the conservation status of the Mar Piccolo of Taranto, with particular reference to the presence of marine phanerogams and non-indigenous species”**. It was funded by the Apulia Region within the framework of POR-Puglia 2014-2020, aiming to select monitoring actions on Apulian species and habitat of the Natura 2000 network.

During the next two years, up to December 2023, mapping of marine phanerogams (i.e. Cymodocea nodosa and Ruppia cirrhosa) will be carried out and their life cycles will be monitored using innovative remote sensing, seasonal field observations and laboratory measurements. The main objectives of this task will be the **assessment of the phanerogam extension in the Mar Piccolo, as well as of their phenology**, in order to

verify the presence of sexual reproduction (i.e. production of flowers and fruits) and certify healthy populations.

Monitoring of non-indigenous animal and plant species is also planned, aiming to secure identification through the use of DNA-barcoding and the detection of new introductions. A second task will monitor the health status of the Pinna nobilis community (a type of Mediterranean clam) in the Mar Piccolo, following a drastic reduction in the last few years due to parasitosis.

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Photo: Mar Piccolo of Taranto - Italy

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