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News from Countries, Sites and Platforms

Welcome to the latest product of eLTER Communications. We've decided to present the "News from countries, sites and platforms" section of the quarterly newsletter as a separate edition, to highlight 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. We are very glad to be part of such a vibrant and active community, and we invite similar examples of activities to include in future editions of "News from countries, sites and platforms". So enjoy!

TERRA FORMA: A Newly Funded Project for 10 Million Euros Benefiting the eLTER France Community

The eLTER France community shares the news of receiving 10 million euros in the span of the next 8 years

mid. 20th century onward, debates are still ongoing on the exact time it encompasses).

Led by CNRS, TERRA FORMA aims at developing a new kind of observatory of the critical zone and social-ecological systems. The project will strive for innovation in sensor development and sensor network for a wide range of applications in hydrology, geochemistry and biodiversity. Examples of foreseen developments include audio-video trapping with AI and multiparametric probe for matter fluxes.

Several French eLTER sites and platforms will be used as testbeds. There will be particular efforts to align the development of the TERRA FORMA observatories with stakeholders needs. The project will also provide new opportunities to upgrade existing sites and platforms and to increase their attractiveness.

TERRA FORMA will bring together a wide range of scientific expertise in environmental metrology, data sciences, geosciences, biodiversity science and social sciences. We anticipate that the project will not only benefit the French eLTER community but has the potential to catalyse emerging collaborations at the European scale within the eLTER RI framework.

LTER Bulgaria is Starting the Project Upgrading Distributed Scientific Infrastructure

LTER Bulgaria is starting the project Upgrading the distributed scientific infrastructure. The project was launched with an online kick-off meeting on January 21, 2021. The aim is to streamline collection of scientific information on biodiversity conservation and sustainable management and also on the ecosystems and their services. The existing scientific infrastructure will be upgraded and will enable extending the range of standard observations from centralized activities and distributed physical infrastructure.

Data will be derived from seven observation sites in Bulgaria: one new socio-ecological platform in Belasitsa Mountain's Castanea Sativa forests and the existing sites of Black Sea, Mesta River, Petrohan-Ponor, Sozopol – Black Sea, Srebarna and Parangalitsa. The selected sites cover most of the major ecosystem types in Bulgaria – several forest types, marine and coastal ecosystems, rivers and wetlands.

The project will be coordinated by the Institute for Biodiversity and Ecosystem Research – Bulgarian Academy of Sciences (BAS) and consortium partners the Institute of Oceanology "Fritjof Nansen" - BAS, the Forest Research Institute - BAS and the University of Forestry, Sofia. The project is implemented within the National Roadmap for Research Infrastructure (2020-2027) and the financial support from the Ministry of Education and Science. More information is available online.

The Ramon LTER Site Joins the LifePlan Project and Expects its Yorre

Country: Israel
eLTER site: Ramon (RMN)

There is a word in Hebrew that does not exist in all languages. The word is "yorre" and it means the first rain of the season. In places where rain comes all year round (most English-speaking countries) there is no such thing. In the desert the yorre is very important and there are prayers to make it come as soon as possible.

Climate change studies show that while the area is getting hotter and drier with more extreme events (droughts and floods) the most striking change in the Negev desert is that the yorre is coming later and later. The length of the wet winter is measured between the date when 10% of precipitation arrive until it reaches 90% and that is getting shorter and shorter, mostly due to a delay in the beginning of the wet season (Ziv et al. 2014).

In the Ramon LTER we had last year our wettest ever year (Baabad and Silver in press) changing the hyper-arid area in a unique way generating germination on the slopes, a very rare phenomenon. This year we are still waiting for our first flood. So, our work on plant diversity, butterflies, water use efficiency and soil meso-fauna is all suspended awaiting our yorre.

Meanwhile we joined the LifePlan project that generates collection of data using standardized protocols on a variety of taxonomic groups around all the world in many locations through semi-automated methods. It then brings together the large standardized data with expertise to analyse Big Ecological Data for a global synthesis of biodiversity. The project is funded by the ERC for 6 years and currently includes 116 sites all over the world sampling wildlife and sending them to Helsinki for analyses.

Finnish Ecosystem science meeting: ICOS, eLTER and AnaEE networks

📅 4-6 May 2021
📍 Online
🔍 https://www2.helsinki.fi/en/conferences/finnish-ecosystem-science-meeting

The aim of the meeting is to create possibilities for collaboration and integrated research in ecosystem sciences in the Finnish research community. The meeting welcomes presentations and discussions on site-based aquatic and terrestrial ecosystem research in a whole system approach, including experimentation, long-term observation, and modelling, with applications on the carbon cycle and natural climate solutions.
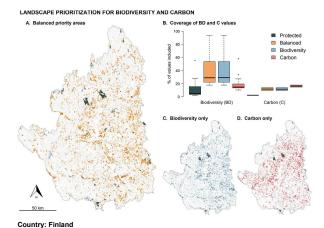
The sessions of the meeting are:

- Scaling - how to use measurements for modeling at different scales
- Lateral element transport between ecosystems and fluxes across boundaries
- Nature climate solutions - ways forward to enhance land carbon sink and reduce adverse climate impacts of land use

The workshops of the meeting are:

- Dynamic data and data linking
- Stable Isotope Measurements
- Integrated modelling

The abstract submission deadline is 9th April 2021. The abstract template can be found at the meeting website. You may simply register without abstract as well by 27th April 2021.

Developing a spatially explicit modelling and evaluation framework for integrated carbon sequestration and biodiversity conservation: Application in southern Finland

LANDSCAPE PRIORITIZATION FOR BIODIVERSITY AND CARBON

Country: Finland
eLTER sites: Lammi LTER **and** Hyytiälä SMEAR II LTER

Highlights

- A modelling framework allowing spatial and dynamic analysis of carbon processes and biodiversity aspects was developed.
- Modelling of forestry measures and emission reductions showed that carbon neutrality could be achieved in the area by 2030.
- Application of space and airborne measurements for mapping and monitoring biodiversity and ecosystem processes is described.
- Optimal allocation of set-aside areas for conservation would contribute to preserving both biodiversity and carbon values.
- Biodiversity gain in the area can be increased without a loss of carbon-related benefits.

The paper synthesises the development and application of an integrated multidisciplinary modelling and evaluation framework for carbon and biodiversity in forest systems. By analysing and spatio-temporally modelling carbon processes and biodiversity elements, an optimal solution for their co-management in the study landscape was determined.
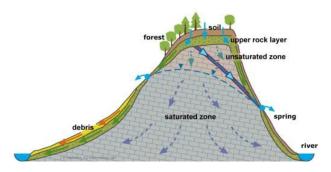
monitoring of biodiversity and ecosystem processes. The scenarios used for the dynamic models were based on official Finnish policy goals for forest management and climate change mitigation. The development and testing of the system were executed in a large region in southern Finland (Kokemäenjoki basin, 27 024 km2), containing two eLTER sites.

Authors: Martin Forsius, Heini Kujala, Francesco Minunno, Maria Holmberg, Niko Leikola, Ninni Mikkonen, Lida Autio, Ville-Veikko Paunu, Topi Tanhuanpää, Pekka Hurskainen, Janne Mäyrä, Sonja Kivinen, Sarita Keski-Saari, Anna-Kaisa Kosenius, Saija Kuusela, Raimo Virkkala, Arto Viinikka, Petteri Vihervaara, Anu Akujärvi, Jaana Bäck, Niko Karvosenoja, Timo Kumpula, Anton Kuzmin, Annikki Mäkelä, Atte Moilanen, Markku Ollikainen, Minna Pekkonen, Mikko Peltoniemi, Laura Poikolainen, Katri Rankinen, Terhi Rasilo, Sakari Tuominen, Jari Valkama, Pekka Vanhala, Risto K. Heikkinen

Read the full article

Long- and Short-Term Inorganic Nitrogen Runoff from a Karst Catchment in Austria

Country: Austria
eLTER site: LTER Zöbelboden

Airborne Nitrogen deposition from human activities is substantially affecting ecosystems. One such effect is increased nitrate in the groundwater which harms biota and drinking water quality. Usually these Nitrogen effects become obvious only over decades of high rates of deposition.

A unique dataset from Austria's LTER site Zöbelboden, which is exposed to the typically high Nitrogen deposition rates of the Northern Alps, provides backstage insights. The article presents an evaluation of the drivers of dissolved inorganic N (DIN) concentrations and fluxes from a karst catchment in the Austrian Alps from 27 years of records. In addition, a hydrological model was used together with climatic scenario data to predict expected future runoff dynamics.

Nitrate in the spring water has risen to some extent but the retention in the soils and the vegetation is still functioning with astounding efficiency. In theory Nitrogen should already have saturated in the system causing substantial nitrate outflow, but this did not happen.

Furthermore, evidence tells us that the retention will keep providing good water quality in the future. Climate warming might even increase retention by boosting forest growth, which is already the main sink of incoming Nitrogen. Long-term data is pivotal to these kinds of insights, which helps us managing the diverse ecosystem services humans depend on.

Authors: Thomas Dirnböck, Heike Brielmann, Ika Djukic, Sarah Geiger, Andreas Hartmann, Franko Humer,

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Long-term Monitoring of Palestine Oak (Quercus calliprinos) in Ramat Hanadiv Nature Park, Israel

Country: Israel
eLTER site: Ramat Hanadiv (RHD)

Ramat Hanadiv covers 450 hectares of Mediterranean garrigue at various densities. A long-term monitoring program was established in the park in 2003. The park hosts unique oak patches that create a dense habitat supporting rich biodiversity. In recent years, a clear trend of Palestine oak desiccation has been observed at the nature park. With the first signs of desiccation, we decided to perform long-term monitoring to quantitatively follow the state of the trees in view of the extensive, potentially climate change-related drought using different approaches and technologies.
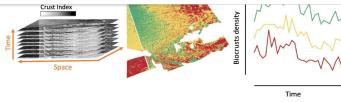
Ramat Hanadiv is a marginal area in terms of Palestine oak suitable conditions. Long-term monitoring can improve our understanding of the factors affecting the state of the oaks and our ability to predict the effects of environmental and climate change on it and will serve as a basis for educated decision-making regarding the management of oak stands in the Nature park (adaptive management) and for the development of a suitable conservation strategy.

After an extremely dry winter (2014), Over 70% of the trees showed a decrease in the density of green foliage. Yet, following the next very wet winter, foliage showed a plastic response, as>70% of the trees increased their crown density and the cover of dry leaves decreased to 10%. It seems that plasticity in canopy density enables most native oak trees to survive extremely dry years.

Authors: Liat Hadar, Yael Navon, José M. Grünzweig. Photo credit: Yael Navon

A long-term spatiotemporal analysis of biocrusts across a diverse arid environment: The case of the Israeli-Egyptian sandfield

Country: Israel
eLTER site: Negev Highland

Hightlights:

- Time series of Crust Index (CI), based on remote sensing retrievals, was used.
- Short and long-term trend analysis was performed over the CI time series.
- The area was partitioned into 3 clusters that represent the spatiotemporal dynamic.
- Biocrust dynamics was found to alter locally due to anthropogenic factors.
- Regionally, biocrusts are affected by long-term precipitation dynamics.

The current work strives to develop a unique framework for analyzing spatiotemporal trends of the spectral Crust Index (CI), thus identifying the drivers of the biocrusts' spatial and temporal patterns. To fulfill this goal, CI maps, derived from 31 annual Landsat images, were analyzed by applying advanced statistical and machine learning algorithms.

A comprehensive overview of biocrusts' spatiotemporal patterns was achieved using an integrative approach, including a long-term analysis, using the Mann-Kendall (MK) statistical test, and a short-term analysis, using a rolling MK with a window size of five years. Additionally, temporal clustering, using the partition around medoids (PAM) algorithm, was applied to model the spatial multi-annual dynamics of the CI. A Granger Causality test was then applied to quantify the relations between CI dynamics and precipitation.

Authors: Klil Noy, Noa Ohana-Levi, Natalya Panov, Micha Silver, Arnon Karnieli

Read the full article