newsletter 2023 #1

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Browse the AnaEE-ERIC Platform Catalogue here

Foreword

Dear reader,

Welcome to the spring edition of the AnaEE-ERIC newsletter.
After a rapid take-off, AnaEE-ERIC has progressively reached its cruise altitude and we have quite a lot of news to share with you this spring.

First, we have three new staff members on our team: Lavanya Premvardhan as Senior Programme Manager, Mireille Kelly Matene Fah, as Chief Administrative Officer, and Véronique Ozier-Lafontaine as executive secretary / office manager, and counting myself, that makes four of us at the AnaEE-ERIC Central Hub office. Soon, Sarah Dramé (AgroServ Project Manager), and Imen Ben Mahmoud (AgroServ Communication Officer), both currently on a contract with CNRS, will officially join as staff of AnaEE-ERIC as well. We have now moved to the permanent premises of our official headquarters, in the CNRS campus of Gif-sur-Yvette, located in the vibrant area of the "French Research Valley" of Paris-Saclay, just south of Paris.

Second, the AnaEE-ERIC platform catalogue, based on the ISIA software application developed by AnaEE-France, has been publicly released, and accessible via our website. This is an important step forward, as the ISIA catalogue allows users to query and request for an integrated set of experimental, analytical, and soon modelling, facilities across AnaEE RIs. Indeed, the ISIA catalogue, which is also used for the AgroServ project, has been included as the catalogue application of choice in several proposals in the framework of the last INFRA call of Horizon Europe. Another key online resource is our data and modelling portal offered, and you may read more about it in our feature article.

Third, we have been busy during the first part of the year, writing proposals in response to the EU Horizon Europe call. In total, we participated in three INFRA SERV proposals, offering new, integrated, services to the research communities in many domains, including environmental sciences, biodiversity and ecosystem sciences, and aquaculture. This demonstrates the pivotal role of AnaEE-ERIC, at the interface of life and environmental sciences, but also at the interface of fundamental research and the economy and societal challenges. We also participated in several proposals for the development of research infrastructures, for new axes of research, and for synergies between RIs. Not forgetting our involvement in the ERIC-Forum 2, a project that has already been accepted, that will promote a registry of the ERICs, and propose new areas of collaboration, development, and implementation of this very effective tool to pool activities and resources in the European Research Area.
AnaEE-ERIC is also a very active community of platform managers and scientists, with many ideas, projects, and achievements. This issue of the AnaEE Newsletter reports on the very lively platform meeting, which was held in Copenhagen, last month, and features the BIOMA modelling factory developed by CREA. As usual, each node is invited to present their recent

developments, and there are many.

Finally, I would like to advertise the European Research Services on Agroecology Conference (June 5-6, CZU, Prague), the first in a series organised by the AnaEE-ERIC coordinated project, AgroServ, which brings together 11 RIs. At this meeting, the first call for projects will be presented to the user community; it will be a forum to brainstorm, and start preparing ideas and potential proposals, in this important and challenging domain that responds to the need for sustainable and resilient agriculture and the agroecological transition.

Best wishes,
Michel

Michel Boër, Director General of AnaEE-ERIC

AnaEE-ERIC Platform Meeting and Technology Workshop
16 - 17 March 2023, Copenhagen - Denmark

The AnaEE-ERIC Technology Centre organised the 2023 platform meeting and Technology Workshop in Copenhagen on 16-17 March, which was attended by 33 AnaEE representatives and platform managers. We learned about the newest technologies to measure greenhouse gases (GHG), discussed future collaborations and benefited from a fruitful exchange of information and ideas.

AnaEE-ERIC Central Hub and Technology Centre presented recent activities and initiatives, focussing on two topics: the different Horizon Europe INFRA proposals in which AnaEE-ERIC was a partner, and the AnaEE-ERIC platform catalogue, which was released online in March. Discussions in small and large groups provided feedback on these and other actions.

Poster session at meeting: presentation of the Ecotron at Hasselt University (BE).

Platform managers had an opportunity to discuss the short-term, and long-term, priorities for their platforms, and in particular those that would bring most value for platforms. To respond to the needs of the platforms, AnaEE-ERIC will,

- Organise online meetings for platforms, focusing on specific technologies, calls, activities or challenges.
- Structure the procedure related to grant applications to ensure that all platforms are informed sufficiently in advance, and thus have an equitable opportunity to participate in the proposal.

The second day of the meeting focused on the upcoming Horizon Europe calls (2024) in clusters 5 (Climate, Energy, Mobility) and 6 (Food, Bioeconomy, Natural Resources, Agriculture and Environment), as well as the MSCA calls, to gauge the potential interest of the AnaEE community in these calls. The initial feedback will be used to seed the setup of future applications to calls, which will be overseen by the Central Hub and the AnaEE community members with an interest in a particular call.

The meeting was a great success and much appreciated by its participants and we are all looking forward to the next meeting, which is scheduled to occur at least once a year!

LI-COR Biosciences, represented by Max Murphy and Graham Leggett

The Dutch Scientist, represented by Rob Peters, distributor for Picarro, UGT, Eosense and Ionicon

Dansk Miljørådgivning, represented by Poul Larsen and Preben Jørgensen©

Companies that showcased their technologies at the meeting.

A closer look ...

The BioMA platform
Biophysical Modelling Analysis

https://data.anaee.eu/
https://developer.anaee.eu/

The BioMA (Biophysical Modelling Analysis) platform is a key AnaEE-ERIC data and modelling platform, and its services and facilities represent the reference technology for several European crop modelling initiatives, including the JRC-operated Agri4Cast programme. BioMA is one of the very few data and modelling facility in the AnaEE-ERIC platform family, and with this newsletter feature, we would like to give you both an overview, and peek into the 'innards', of the platform, and the people behind BioMA that 'keep the motor running'.

The BioMA platform provides a framework for designing and coding modelling solutions based on biophysical process modelling, which has an advantage over purely statistical methods l based on machine learning, to be able to generate plausible, realistic forecasts in contexts where little or no historical data is available. This is particularly relevant for modelling phenomena in the current climate-change context. With BioMA, researchers may describe how plants, the soil, insects, and other environmental processes, are supposed to function and interact with each other at the macroscopic level.

Coding such models from scratch may become a daunting task for most researchers, and the adoption of BioMA lifts the burden of most of the low-level work from the developer allowing its user to focus on the definition of equations and interactions. Moreover, the BioMA platform provides researchers with ready-to-use components that help disentangle complex interlinked data into correlated information that could fit real-life events or phenomena. Via BioMA you have a collection of reusable model components and, more importantly, an approach towards model construction. This versatility, and flexibility, of BioMA sets it apart from its 'colleagues and competitors' in the field, and researchers may avail of its wide portfolio of services that include modelling solutions, modelling components, variables, data providers, constraints, and several other entities that help you design and build a conceptually "clean" model.
All without having to have programming skills!

The BioMA modelling platform also provides ready-made models as RESTful APIs which can be used by your researchers to run well-known crop and infection models over their data and to produce new data products without having to install complex dependencies or to code their own model implementations.

Screenshots of the Data (left) and Developer (right) portals

And if you ever wondered what is RESTful? Read on…

Over the past years RESTful APIs (Application Programming Interface) emerged as an industry standard to publish software services on the Web. The reasons behind the paradigm's success are several and include ease of use, decoupling of abstractions, and the wealth of ready-made software already supporting the http protocol on which they are built. Through RESTful APIs it is possible to demand computational work to the cloud, access to databases and other resources hosted in the cloud, and to access other services. This allows the segregation of a series of technical problems including installation of dependencies, environment configuration, scaling, and more. In a nutshell, RESTful APIs are like functions that can be called from the web. There are many tools to build these APIs, Django being one of them, and there is no shortage of alternatives.

AnaEE is actively promoting the diffusion of such a paradigm in the environmental research community, as we believe its widespread adoption may greatly improve FAIR data, research replicability, and knowledge transfer. AnaEE's Data and Modelling Centre has published the Developer Portal (developer.anaee.eu), a catalogue of RESTful API services to be used in Virtual Research Environments (VREs) and other applications, providing programmatic access to large-scale datasets and modelling solutions. The Developer Portal serves two purposes: providing researchers with a comprehensive catalogue of API services under a single endpoint and to allow researchers to leverage the infrastructure maintained by the DMC to implement user identity management, access control, throttling, caching, usage monitoring, and other service-level requirements, thus focusing on business logic development.

You may contact the BioMA platform for more information on RESTful APIs publication on the Developer Portal.
https://developer.anaee.eu/
https://data.anaee.eu/

In the upcoming months new APIs will be published on the developer portl
Keep an eye on it

Behind the models

DMC director Marcello Donatelli has assembled a team of professionals from various fields of Information Technology, ranging from enterprise-level application development to artificial intelligence, to lead AnaEE's transition towards the REST API paradigm and to develop new innovative digital research services for AnaEE platforms. The DMC personnel includes a few familiar faces for the ENVRI community, namely Davide Fanchini, a software architect who is

currently the lead developer of the BioMA framework, Dario De Nart who has extensive background in data science and Artificial Intelligence, and Luca Cervone who is a User Experience expert with a legal informatics background.

News from our National Nodes

With the delivery of the new Mesoscale Ecotron at the University of Antwerp in the summer of 2022, the construction phase of the Belgian AnaEE platforms is complete on the Flemish side. The first trial run at this Ecotron is planned in 2023, and will study the optimal use of irrigation water to salvage a crop during prolonged drought. On the Walloon side, the TERRA-Ecotron of Gembloux has received new funding from the regional government to build additional units.

Meanwhile, AnaEE-Flanders has been refinanced for the next two years by the Fonds Wetenschappelijk Onderzoek Vlaanderen (Research Foundation Flanders) under the programme International Research Infrastructure. The consortium will invest more in policy-relevant research, connect with social scientists, collaborate with industry, and further integrate its platforms. As part of this integration action, two of the UAntwerp research teams have merged into a new group with six professors. They will coordinate all the freshwater aquatic research as the ECOSPHERE group.

All the governance bodies of both AnaEE-Flanders and AnaEE-Wallonia (Advisory Board, Management Committee and Scientific Council) are now 'up and running'.

The Mesoscale Ecotron at the University of Antwerp.   Inside the TERRA Ecotron at the University of Liège

CzechGlobe launched a unique infrastructure for the airborne monitoring of volatile organic compounds (VOCs) released from ecosystems.

The CzechGlobe (Global Change Research Institute, Czech Academy of Sciences) operates a unique airborne platform with the capacity for remote sensing research of terrestrial and aquatic ecosystems. The platform is primarily equipped with a suite of state-of-the-art imaging hyperspectral and thermal spectroradiometers, and a laser scanner allowing spatial analysis of the land surface including, canopy structure, pigment composition, eco-physiological processes, and/or mapping heat islands in cities.

In 2022, the operation of the airborne platform with a PTR-ToF-MS (Proton Transfer Reaction-Time-of-Flight Mass Spectrometry) equipment was successfully certified by the Czech Civil Aviation Authority. The high-frequency PTR-ToF-MS is a powerful technique for the online

detection of a wide spectrum of VOCs and aerosols in the atmosphere. It was previously used for ground-based measurement of biogenic VOC emissions from forest ecosystems. PTR permits, among other capabilities, the precise detection of 2-methyl-3-buten-2-ol (MBO), a compound whose enhanced emissions are closely linked to the infestation of coniferous forests by the bark beetle (Ips typographus). Such infestation, in combination with drought, was the main cause of the devastation of large forest areas in the Czech Republic during the last decade.

Preliminary tests have shown that the connection of the airborne platform and the PTR mass spectrometer allows us to monitor the composition and concentrations of VOCs at different altitudes, which is key to the investigation of the changing chemosphere. The subsequent application of the Mixed Layer Gradient (MLG) approach allows us to determine VOC fluxes over large land areas and may improve the parameterisation of the current global Model of Emissions of Gas and Aerosols from Nature (MEGAN).

An airborne platform for remote sensing research (CESSNA Caravan).

On-board installation of PTR-ToF-MS (model 6000X2; Ionicon Analytik, Austria) for airborne monitoring of volatile organic compounds.

The Root laboratory (LUKE) was funded by the Finnish Academy for acquiring new instrumentation and updating measurement techniques. Soil gas concentrations of O2, CO2, CH4 and N2O etc., are commonly measured as background variables, but additionally to assess effects of environmental stress conditions (e.g., soil waterlogging) on soil conditions, that itself affects the functioning and health of plants. A portable gas analyser (LI-COR 7810) and stem psychrometers (ICT International PSY1) was brought to add more flexibility to, and complement, already existing measurement techniques.

In addition to determining soil gas concentrations with a gas chromatograph, we now also have the option to use the portable gas analyser to determine CO2 and CH4 levels, giving us the flexibility and the opportunity to carry out sampling more frequently and at a lower cost. We were able to determine the transpiration stem sap flow from tree seedlings using sap flow sensors (Dynagage sensor, Dynamax), and we now have the possibility to measure the in -situ stem water potential from the stems. Both techniques complement each other and, together with other measurements like photosynthesis and chlorophyll fluorescence, give insight into the overall physiological plant status and how it is affected by environmental conditions.

Pine saplings in LUKE's root laboratory.

In 2022, AnaEE France, which brings together more than 40 platforms including 11 sites in AnaEE-ERIC, consolidated its management plan and service offer. Our platforms hosted more than 300 projects involving 330 external users, trained more than 1300 persons and organised 170 outreach events. Research performed at our platforms has led to 240 publications, 20 PhD theses and 60 master theses,with around 20% of our activities including private partners and international users. Examples of remarkable newly funded scientific activities of the year that benefit our platforms include the TREC EMBL project with Ecotron IleDeFrance, ERC DOPAMICS at Nouragues, or ERC RECODYN at the Terrestrial Metatron in Moulis.

Extensive work has been carried out to update our service offer during the year 2022 including the organisation of a General Assembly with approximately 70 participants, changes in the perimeter of the national infrastructure with newly integrated platforms and a mapping of the different kinds of services, which will soon be listed on our website. Our technical group, dedicated to the pricing of services organised a workshop with all AnaEE-ERIC platforms, are now engaged in an auditable pricing process.

New technologies have been developed, some funded by an internal call of the national infrastructure, such as soil warming equipment in two open-air facilities, soil lysimeters, multiplexers for automated sensors in the two Ecotrons, and a new single-cell analyser in an environmental genomics platform. Data management has been improved due to investment in the updating of the information system of long-term open air experiments, in semantic tools and in a new data portal dedicated to critical zone and biodiversity data funded by the Equipex+ GaiaData national project. We also supported more specific methodological initiatives in the field of remote sensing and environmental DNA. The first project includes a workflow to calculate plot-level vegetation indices from Copernicus satellite data at all AnaEE France open-air facilities. Data and metadata of this workflow will soon be included in our data portal. The second project will be dedicated to the development of a standardised eDNA method designed to quantify zooplankton biodiversity in open-air and enclosed aquatic facilities.

The project outlining the work plan for our future investment budget was submitted to the French Ministry of Higher Education, Research and Innovation at the end of 2022, with key initiatives to support new technologies, update our instruments and to accompany the integration of new devices in aquatic ecology. This project was selected in 2023 with start-up funds currently under negotiation and investments which should commence in 2024.
Our future is bright!

A mobile soil warming and drying experimental device designed at AnaEE France O3HP open-air facility (Ilja Reiter, CNRS).

Events

European Research Services on Agroecology
(ERSAC), 5 - 6 June, Prague - Czech Republic

The AgroServ project uses a multi-scale approach to respond to diverse research questions; from the level of the molecule and the organism, to the large-scale from farms to entire ecosystems. The first edition of the "AgroServConf" will be devoted to the research community where it willpresent the diverse agroecological services accessible via AgroServ and

the different facets that shape research in the emerging field of agroecology. To promote and encourage interdisciplinary and transdisciplinary approaches to address the agroecological transition, AgroServ's first call for transnational access (TNA call) to access our services will be launched during this event. Follow the project on linkedin to stay informed.
Website: https://www.linkedin.com/company/agroserv-eu/

The AgroServ Webinar
15 May 2023, Online @ 14:00 CEST

As a lead up to the "AgroServConf" AgroServ is pleased to invite you to the webinar on "European Research Services in Agroecology" on 15 May 2023 at 14:00 CET time via Zoom. Participants will learn about AgroServ's agroecological services accessible via the project's catalogue of services, and how to apply to the next TNA call for proposals that will be officially launched during AgroServ's annual conference in June at Prague.
Registration: https://lnkd.in/eUv3yGPz

The 2023 EU AgriResearch Conference
31 May (13:30 CEST) - 1 June (18:00 CEST) 2023, Brussels - Belgium
Live streaming available

This year's edition will give participants the opportunity to engage with scientists, farmers, rural communities, industry, advisors, policymakers, citizens and NGO representatives. It will provide an overview of European research and innovation activities and their achievements in agriculture, forestry and rural development.
Website: https://agriculture.ec.europa.eu/events/2023-eu-agriresearch-conference-2023-05-31_en

The 20th International Boreal Forest Research Association Conference
(IBFRA) 28-31 August 2023, Helsinki - Finland

The boreal forest, the second most extensive terrestrial biome on earth, is experiencing environmental changes at rates that are unprecedented. Climate change increases disturbances such as wildfires, drought and insect outbreaks. Many boreal ecosystems are shifting to new ecological states and it will affect society who are relying on these ecosystems for subsistence living, cultural practice and economic development. The 20th IBFRA conference theme is Climate resilient and sustainable forest management and the conference can also be followed remotely. Registration is now open!
Website: https://sites.google.com/tyrskyconsulting.fi/ibfra-2023/home?authuser=0

The 9th European Conference on Ecological Modelling, ECEM 2023
4-8 September, 2023, Leipzig - Germany
The ECEM 2023 continues a series of conferences launched by the European chapter of ISEM, the International Society for Ecological Modelling. ISEM promotes the international exchange of ideas, scientific results, and general knowledge in the areas of systems' analysis and

simulations in ecology and application of ecological modelling for natural resource management, and welcomes contributions that directly or indirectly support transformation. Registration opens April 15, 2023.
Website: https://ecem23.eu/

Summer School on " Microclimates: physical bases, modelling and characterization in ecology", 25-29 September, Jardin du Lautaret - France

The 2023 AnaEE France Summer School is particularly aimed at PhD students, post-doctoral fellows and young researchers wishing to learn and deepen their knowledge on the physical bases, mechanistic and statistical modelling, and the ecological consequences of microclimates. It will consist of a series of lectures to cover theory and concepts, and practical courses with local speakers to conduct field measurement campaigns, analyse data and use modelling tools.
Registration is open until June 30, 2023 - about 25 places available with accommodation and training costs covered!
Contact: ecoleanaee2023@sciencesconf.org
Website: https://anaeeschool2023.sciencesconf.org/?forward-action=index&forward-controller=index&lang=en

ALL-Ready final conference, 27 September 2023, Brussels - Belgium

Agroecology Living Labs and Research Infrastructures in Europe – experiences from ALL-Ready & AE4EU. The one-day conference will shed light on how the two projects paved the way for a European Network of Living Labs and Research Infrastructures. Experiences from involved Living Labs and Research Infrastructures will give practical insights and a focus will be on how Regions can best support the agroecology transition with the help of Living Labs and Research Infrastructures and what role the future European partnership "Accelerating farming systems transition: agroecology living labs and research infrastructures" will play.

Website: https://www.all-ready-project.eu/communication/news-events/news/all-ready-final-conference.html

Calendar of Events

- **15 May 2023 AgroServ Webinar** (14:00 CEST). **Link**

- **31 May** (13:30 CEST) **- 1 June 2023** (18:00 CEST), Brussels - Belgium
  The 2023 EU AgriResearch Conference (Live streaming available). **Link**

- **5 - 6 June 2023**, Prague - Czech Republic
  European Research Services on Agroecology Conference. Link

- **28 - 31 August 2023**, Helsinki - Finland
  The 20th International Boreal Forest Research Association Conference (IBFRA).
  Link

- **4 - 8 September 2023**, Leipzig - Germany
  The 9th European Conference on Ecological Modelling, ECEM 2023. **Link**

- **25 - 29 September 2023**, Jardin du Lautaret - France
  AnaEE France Summer School on "Microclimates: physical bases, modelling and characterization in ecology" Link

- **27 September 2023**, Brussels - Belgium
  ALL-Ready final conference Link

AnaEE-ERIC