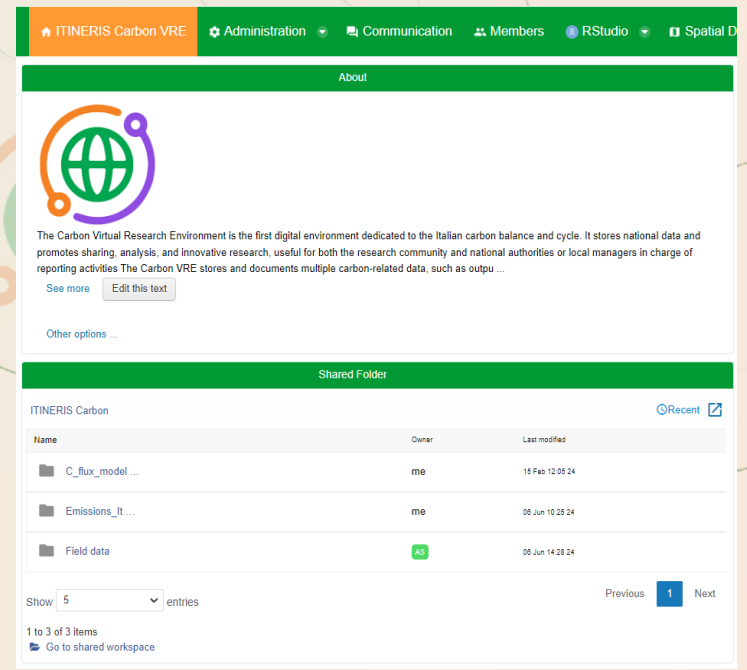
ITINERIS VRE CARBON

The first Italian digital environment for Carbon-related data and dynamics

The service was delivered and includes:

- Italian Carbon and ecosystem fluxes
- Italian emission data
- Tools and facilities for analyses
- Research field data and models



Promotes data sharing, analysis, innovative research

End user-oriented: facilitates reporting for administrations

https://itineris.d4science.org/group/itineris_carbon

IR0000032 – ITINERIS, Italian Integrated Environmental Research Infrastructures System
(D.D. n. 130/2022 - CUP B53C22002150006) Funded by EU - Next Generation EU PNRR-Mission 4 "Education and Research" - Component 2: "From research to business" - Investment 3.1: "Fund for the realisation of an integrated system of research and innovation infrastructures"

Finanziato dall'Unione europea NextGenerationEU
Ministero dell'Università e della Ricerca
Italiadomani

The main VRE Carbon sections:

(i) Above Ground Biomass: carbon stocks for Trento province, Tuscany, and maps for the Pantropical biome;
(ii) Amospheric Inversion Models: sample products from 6 models, infographics, and R code;
(iii) Carbon Fluxes Models: sample products from 3 models plus infographics and R code;
(iv) GHG Emissions Italy: sample products from EDGAR and ISPRA with code and infographics
(v) Local Research: data from local level research;
(vi) SOCAT Ocean Data: sample products and references;
(vii) Test Isoscape: isotope data and code, under development. In addition the
An Instruction folder provides info on how to manage and upload contents in the VRE.

IR0000032 – ITINERIS, Italian Integrated Environmental Research Infrastructures System
(D.D. n. 130/2022 - CUP B53C22002150006) Funded by EU - Next Generation EU PNRR-Mission 4 "Education and Research" - Component 2: "From research to business" - Investment 3.1: "Fund for the realisation of an integrated system of research and innovation infrastructures"

Finanziato dall'Unione europea NextGenerationEU
Ministero dell'Università e della Ricerca
Italiadomani

The VRE C supported several research activities, e.g. linking Carbon-related resources with:

- Habitat Biodiversity
- Ecosystem Functional Properties at ICOS sites
- Pan-tropical forest trait variations
- Forest health

Science Advances

Current Issue | First release papers | Archive | About

HOME > SCIENCE ADVANCES > VOL. 11, NO. 24 > MYCORRHIZAL SYMBIOSES AND TREE DIVERSITY IN GLOBAL FOREST COMMUNITIES

RESEARCH ARTICLE | ECOLOGY

Mycorrhizal symbioses and tree diversity in global forest communities

Cornell University

arXiv > q-bio > arXiv:2505.19199

Quantitative Biology > Populations and Evolution

[Submitted on 25 May 2025]

Pan-tropical plant functional trait variation from space

David Schimel, Andres Baresch, Adam Chlus, Phil Townsend, Fabian Schneider, Gaia Vaglio Laurin

ELSEVIER

Ecological Indicators

Volume 172, March 2025, 113254

Original Articles

Monitoring habitat diversity with PRISMA hyperspectral and lidar-derived data in Natura 2000 sites: Case study from a Mediterranean forest

Gaia Vaglio Laurin [a b], Chiara Zabeo [b], Diego Giuliarelli [b], Birhane Gebrehiwot Tesfamariam [b], Alexander Cotrina-Sanchez [b], Riccardo Valentini [b], Basil Tufail [c], Bartolomeo Ventura [c], Carlo Calfapietra [a], Anna Barbati [b]

ELSEVIER

Ecological Informatics

Volume 84, December 2024, 102867

A multi-source approach to mapping habitat diversity: Combination of multi-date multispectral satellite imagery and comparison with single-date hyperspectral results in a Mediterranean Natural Reserve

Chiara Zabeo [a], Gaia Vaglio Laurin [a b], Birhane Gebrehiwot Tesfamariam [a], Diego Giuliarelli [a], Riccardo Valentini [a], Anna Barbati [a]

SPIE. DIGITAL LIBRARY

CONFERENCE PROCEEDINGS

PAPERS | PRESENTATIONS | JOURNALS | EBOOKS

Presentation + Paper

20 November 2024

Linking hyperspectral PRISMA data with ecosystem functional properties at ICOS sites

Gaia Vaglio Laurin, Alessandro Sebastiani, Lorenza Nardella, Carlo Calfapietra, Anna Barbati, Bartolomeo Ventura, Dario Papale

Author Affiliations +

Proceedings Volume 13191, Remote Sensing for Agriculture, Ecosystems, and Hydrology XXVI; 1319100 (2024) https://doi.org/10.1117/12.3033908

Event: Remote Sensing, 2024, Edinburgh, United Kingdom

ELSEVIER

Remote Sensing Applications: Society and Environment

Volume 36, November 2024, 101329

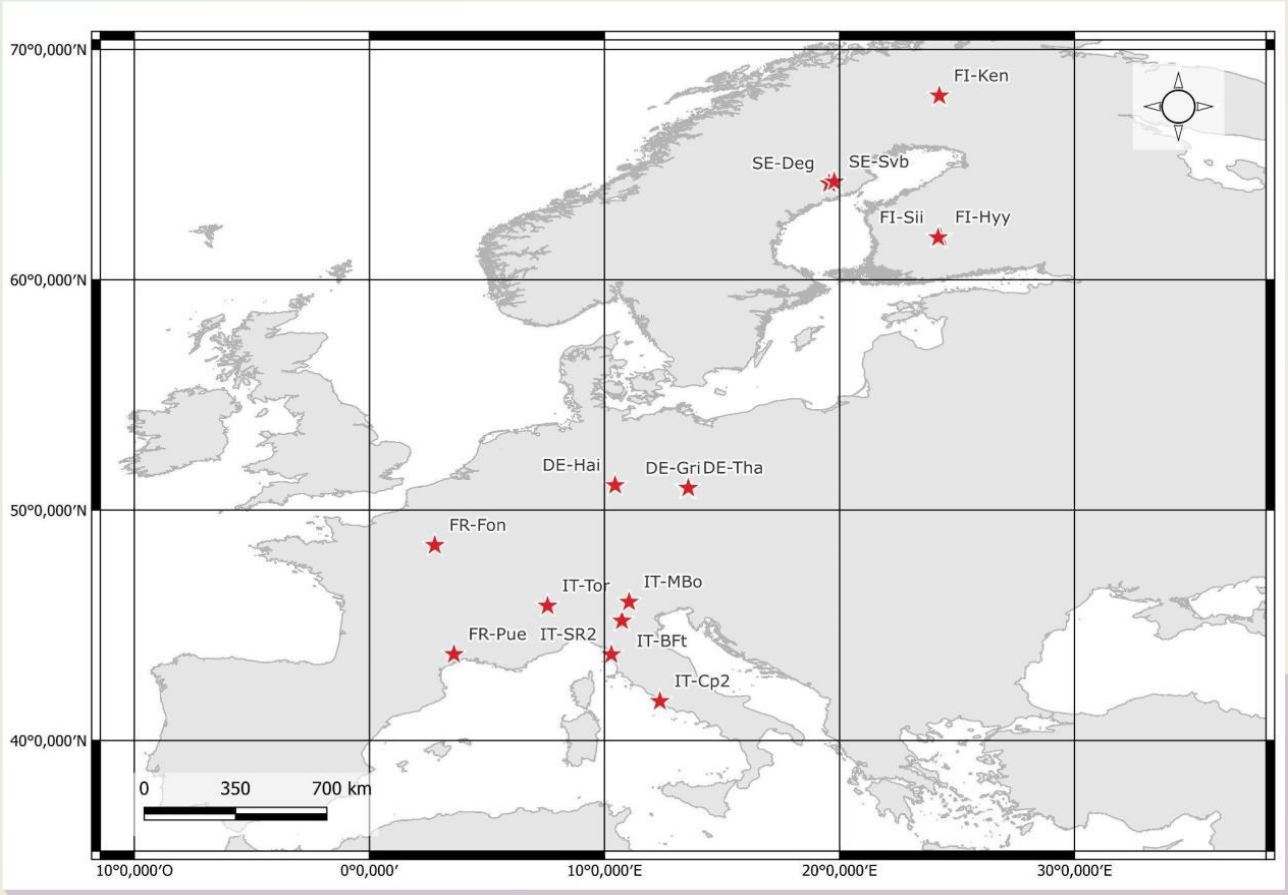
Monitoring ink disease epidemics in chestnut and cork oak forests in central Italy with remote sensing

Alessandro Sebastiani [a], Matteo Bertozzi [c], Andrea Vannini [b], Carmen Morales-Rodriguez [b], Carlo Calfapietra [a], Gaia Vaglio Laurin [a b]

Ecosystem Functional Properties estimated from satellite PRISMA and Sentinel-2 data over different European sites and plant functional types

Gaia Vaglio Laurin[1], Lorenza Nardella[2], Alessandro Montaghi[3], Alessandro Sebastiani[4], Bartolomeo Ventura[5], Alessandro Mei[6], Carlo Calfapietra[2], Dario Papale[1]

EFPs from 15 sites, with different plant function types, were modeled using PRISMA hyperspectral and Sentinel-2 multispectral satellite data.



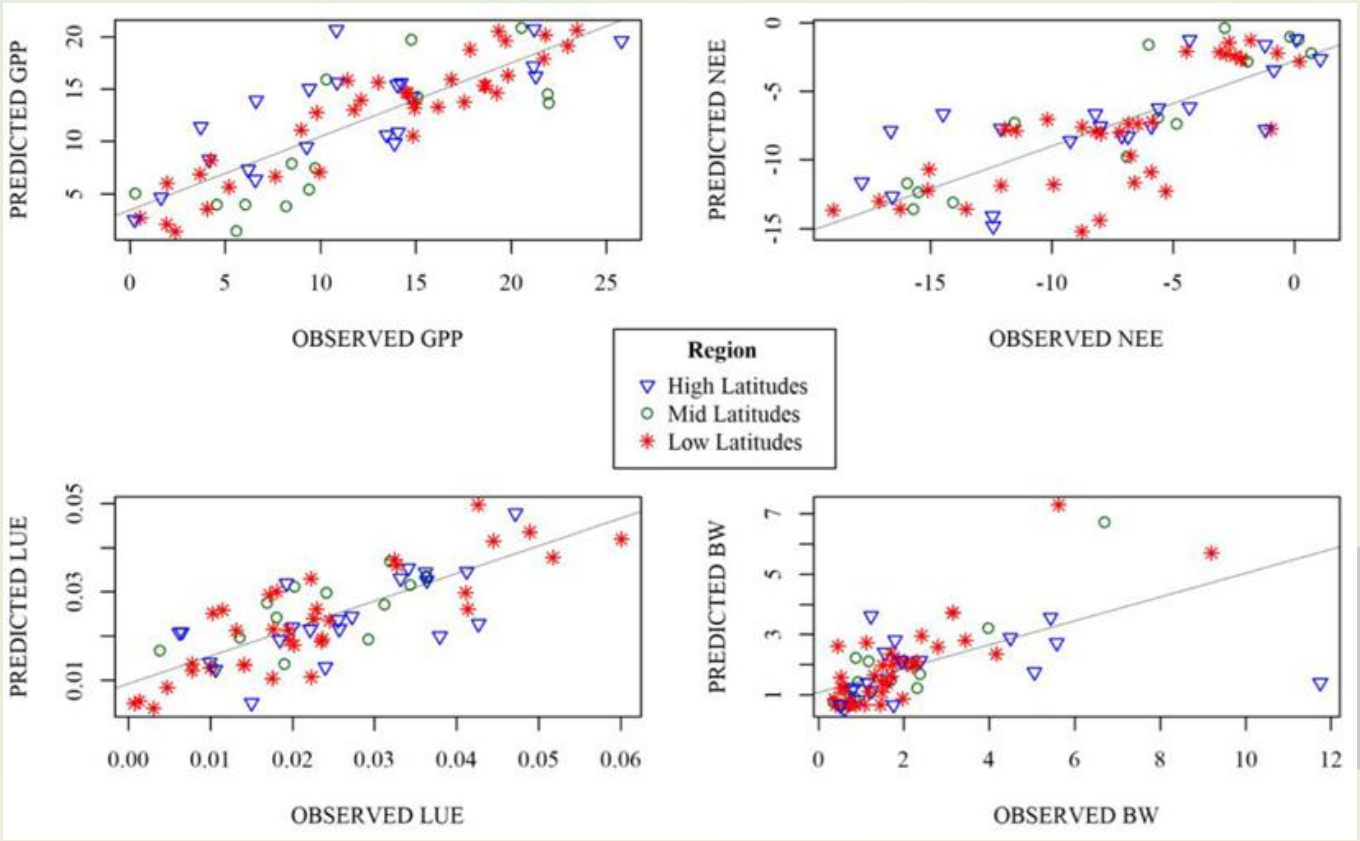
Ecosystem Functional Properties (EFPs), computed from flux tower data, provide a dynamic view of ecosystem carbon and energy related processes (GPP, LUE, WUE, NEE etc.)

EBF = Evergreen Broadleaf Forest (2 sites);
ENF = Evergreen Needleleaf Forest (5 sites);
DBF = Deciduous Broadleaf Forest (3 sites);
GRA = Grassland (3 sites);
WET = Wetland (2 sites)

Finanziato dall'Unione europea NextGenerationEU
Ministero dell'Università e della Ricerca
Italiadomani

Comparisons:
Random Forests vs. XGBoost
PRISMA vs. S2 as input data

- **Best models with PRISMA (R2: GPP 0.71; NEE 0.61; LUE 0.62; BW 0.37; WUE 0.03)**
- **XGBoost similar results but many parameters to be tuned**
- **Sentinel-2 lower results (R2: GPP 0.65; NEE 0.55; LUE 0.58; BW 0.5; WUE 0.03)**



- No impact of PFT: model is independent from ecosystem type
- No impact of latitude
- SWIR bands are relevant especially for LUE; WUE is an issue also in other studies
- Next tests on larger datasets; with mixed effects models to recheck PFT role; after disturbance