EMF Newsletter December 2024

2024-12-12

Activity conducted at EMF between *15/06/2024* and *06/12/2024*

Basic support activity

- **Programming support**: E. Doblas, L. Stewart, M. Banque, O. Binks
- **Data management support**: M. Banque
- **Statistical support**: G. Bexultanova (Ph.D. student, M. Mencuccini), C. López (technician, A. Ribas), C. Azpiazu, S. Albacete.
- **Modelling support**: M. Banque, J. Peñuelas

Participation in research projects

- **WILDE** (EU - Researchers: J.M. Espelta, L. Brotons): Participation in a workshop on scenario definition and post-doc hiring to work on the Barcelona case study (https://www.wilde-project.eu/)
- **RESONATE** (EU - Researchers: J. Martínez, F. Lloret, J.M. Espelta): Assisting in the use of MEDFATE for the evaluation of forest ecosystem services.
- **FORGENIUS** (EU - Researchers: M. Mencuccini): Collaboration with Nicolas Martin-StPaul on comparison and parameterization of models of plant hydraulics.
- **BOMFORES** (Spain - IP: M. De Cáceres): Species parameter estimation and project finalisation.
- **IMPROMED** (Spain - IPs: M. De Cáceres / J.M. Espelta): Improving process-based models in their capability to forecast responses to drought. Project Kick-off.
- **DRASTIC** (Spain - IP: M. Mencuccini): Tree water use and Drought responses: the roles of allometry, water storage and transport under climate change
- **C4N** (EU - IP: A. Broekman): Transfer knowledge and best practices, as well as harmonising policies, to tackle the challenges related to biodiversity protection and climate change.
- **TOFU** (Catalunya - IP: J. Oliva (UdL)): Healthier forests for a sustainable future.
- **CARDIMED** (EU - CREAF coordinator: P. Andrés): Climate Adaptation and Resilience Demonstrated In the MEDiterranean region
- **RESFIRE** (Spain - IPs: L. Brotons, S. Fraixedas): Assessing the potential of REStoring ecological FIRe regimes as Nature-based Solution to extreme wildfires in Mediterranean ecosystems.
- **STOIKOS** (EU - IP: M. Fernández Martínez) Elemental ecology: towards an element-based functional ecology.

Participation in transfer projects

- **Contract with Centre de la Propietat Forestal** (A. Tovar, J. Vayreda, M. De Cáceres, R. Molowny): Evaluation of the effects of changes in silvicultural practices on carbon sequestration and forest function using modelling approaches.
- **Contracte programa / Oficina Catalana de Canvi Climàtic** (M. De Cáceres, J. Vayreda, M. Banqué, R. Molowny): Assistance to M. Banqué in the generation of project report, interpreting the simulation results of management scenarios and climate scenarios.
- **Grup de treball de Carboni al Sòl** (R. Molowny, several CREAF researchers and other 7 Research Centers in Catalonia): Soil carbon modelling for Catalonia (Generalitat).
- **VULNEMAP** (M. Banqué, J. Vayreda, V. Granda): Modelling the vulnerability of Catalonian forest to drought events (Generalitat).

Network building

- M. De Cáceres participated in an international workshop on country-scale forest modelling (Potsdam; 2 days Sept. 2024), funded by PROCLIAS Cost Action.
- M. De Cáceres visited INRAE-URFM Avignon (3 days, Aug 2024) to collaborate on species parameter estimation from plant trait databases (package `traits4models`).
- Software hackaton held in CREAF (2 days, Oct 2024), with researchers from U.Zaragoza and U.P. Valencia to progress in the coupling between `medfateland` and the hydrological model SERGHEI.
- Meeting between EMF and two research groups from CTFC, with the aim to strengthen the collaboration in development of simulation and post-processing tools (e.g. estimation of ecosystem services).

Training & mentoring

Courses taught:

- Introduction to R: basics, tidyverse, ggplot2 and Quarto (V. Granda, R. Molowny and A. Tovar, Watering Talents, CREAF).
- Process-based forest modelling using medfate and medfateland R packages (CAMBIUM group / Universidad de Valladolid, Campus de Soria)

Mentoring:

- Ms.C. level: A. Sañé (Presented Sept. 2024)
- Ph.D level: J. Dávila, J. De la Casa
- Ph.D level (co-supervision R. Molowny): F. Andrade (CREAF)
- Post-doc level: R. Balaguer-Romano, F. D'Adamo

Software & model development

Design and implementation:

- Development of R package `forestables` (alpha version) for loading and harmonizing national forest inventory from several countries (Spain, France, USA). Currently available on EMF GitHub only.
- Profiling and code optimization for packages `medfate` and `medfateland`.
- Development of R package `hydrospain` (submitted to CRAN).

Model parameter estimation:

- Harmonization of additional plant trait data sources and development of plant species parameter datasets for Spain, France, US and Australia.

Model evaluation

- Evaluation of watershed-level runoff against river gauge data (section in `medfateland` website).

New software & update releases

- New version of package `meteospain` (v. 0.2.0) released on CRAN
- New version of package `meteoland` (v.2.2.2) released on CRAN
- New version of package `medfate` (v. 4.7.0) released on CRAN
- New version of package `medfateland` (v. 2.4.7) released on CRAN
- Update of the *Laboratori Forestal Català* web:
  - Maintenance of all apps to keep up to date library dependencies and web tools.
  - Update of map library from leaflet to mapdeck, not in production yet.

EMF internal infraestructure improvements

- Internal notification system (ntfy)
- Public data transfer repository (https://data-emf.creaf.cat/public/)
- Started migration of data pipelines for the LFC to a new system

New datasets in the EMF catalog

External datasets:

- *CARBOSOL*: Physical and chemical properties of 6,609 soil profiles in Spain.

Publications developing/using EMF tools

- Balaguer-Romano R, De Cáceres M, Espelta JM Second-growth forests exhibit higher climate sensitivity in both drier and wetter years consistent with differences in root allocation. Ecosystems (in press).

- Ameztegui A, Coll L, De Cáceres M, Morán-Ordóñez A (2024) Disturbance impacts on Mediterranean forests across climate and management scenarios. Journal of Environmental Management 371: 123193 (https://doi.org/10.1016/j.jenvman.2024.123193).

Publications from other collaborations

- Druel A, Ruffault J, Davi H, Chanzy A, Marloie O, De Cáceres M, Mouillot F, François C, Soudani, Martin-StPaul N (2024). Enhancing environmental models with a new downscaling method for global radiation in complex terrain. Biogeosciences. (https://egusphere.copernicus.org/preprints/2024/egusphere-2024-1800/)

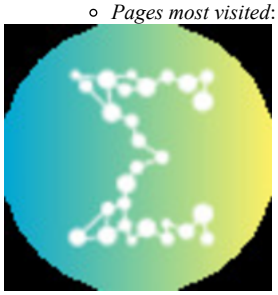
- J.M. Espelta, M. Banqué, R. Molowny-Horas, M. de Cáceres (2024). Incendis, gestió i decaïment forestal a Catalunya: Quina ha estat la seva incidència recent (1986-2023)?. Catalunya Forestal 160, 2n trimestre 2024, 18-20 (https://www.forestal.cat/web/revista-i-publicacions/hemeroteca/?n=169)

Communication

- Oral presentation at *Jornades PATT*: **Aplicatius informàtics de suport a la gestió. Laboratori Forestal Català** (Víctor Granda)
- Participation in **V Jornada de la funció de les dades: La funció de les dades en el canvi climàtic**, organized by the *Associació d'Intel·ligència Artificial*, *Societat Catalana de Matemàtiques* and *Societat Catalana d'Estadística* (Víctor Granda)
- Oral presentation given at *IUFRO XXVI World Congress. Stockholm* (Sweden) 23-29 June 2024: **MEDFATE 3.0.0: A trait-enabled model to simulate Mediterranean forest function and dynamics at regional scales** (Miquel De Cáceres)
- Oral presentation given at *I Jornadas de Ecoinformática AEET* (Alcalá de Henares, Madrid) 24-25 October 2024: **forestables: un enfoque estructurado para la armonización de Datos de Inventarios Forestales Nacionales** (Adriana Tovar)
- Creation of a new profile on the BlueSky platform: https://bsky.app/profile/ecosystemmodelf.bsky.social

EMF Online impact 15/06/2024 - 06/12/2024

- Laboratori Forestal Català (LFC):
  - *Stats*: 653 visits / 6:06 mins average visit duration / 2166 page views
  - *Apps most used*: Allometrapp (341 times) / IFN App (229 times) / DeBosCat App (187 times)
- EMF Web:
  - *Stats*: 1303 visits / 3:58 mins average visit duration / 4194 page views
  - *Pages most visited*: External models (536 visits) / Training (493 visits) / External data (476 visits)



Ecosystem Modelling Facility

WHAT WE DO

- Provide training and technical support for modelling activities to research groups at CREAF.
- Develop and promote the use of process-based and empirical models aimed at predicting the response of terrestrial ecosystems to global change at multiple scales from the forest stand to the region.
- Facilitate discovery of data sets or models relevant for ecosystem modelling activities.
- Develop tools aimed at facilitating the interoperability between data sources and models, and between different models.
- Develop and maintain interactive web applications for ecosystem data exploration and visualization.

CONTACT

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