Building a knowledge base to quantify the impacts of land use and management on the climate system in the EU

We are looking for a motivated candidate to work with us on building numerical tools to inform policies to achieve the land use management transitions required by the European Union’s Green Deal. The duration is two years and the work contributes to the EU project LAMASUS.

Background

In the framework of the European Green Deal, the EU intends to reach climate neutrality by 2050, for which changes in land use management (LUM) play a central role. To reach that goal, policy makers need to know about the climate impact of various land use management strategies and their socio-ecological consequences to find the right trade-offs with regard to objectives of the Green Deal and other EU policy objectives. The LAMASUS project will provide the tools to build science-based policies to best implement the LUM policies of the European Green Deal. More specifically, LAMASUS will establish an empirical database with annual data at high thematic and spatial resolution as well as a modeling toolbox for the development, assessment and monitoring of greenhouse gas exchanges and economic costs and benefits of LUM transitions across multiple levels of geographical scales. That toolbox will rely on a knowledge base of empirical response functions. These response functions will be emulated from the results of process-oriented land surface models, so that they consume less computation time and can be combined with scenarios and socioeconomic models for upscaling at regional, national and EU scale.

Work description

The task of the PostDoctoral research associate will be to establish response functions describing the impact of LUM changes on biogeochemical (carbon cycle and greenhouse gases) and biophysical variables (albedo and components of the surface energy budget) using the ORCHIDEE land surface model. These simulations will be evaluated against site level observations (LUM chronosequences and inventories), and then used for upscaling to regional GHG budgets for a range of future scenarios including business as usual and Green Deal policies. Environmental effects such as on water availability, biophysical climate forcing and nutrient inputs and losses will be examined in the perspective to detect and quantify trade-offs and co-benefits between GHG reductions and other environmental and climate consequences.

The work is expected to lead to a publication in high profile journal led by the candidate, and ample opportunity for further collaborations with the LAMASUS project partners, including IIASA and the Netherlands Environmental Assessment Agency (PBL).

Profile of the applicant

- PhD in a field related to the research subject (Earth system science, environmental science, meteorology, etc.)
- Robust background in land surface modeling and statistics
- Experience in coding (e.g. R, Python, Matlab, or FORTRAN)
- Good English skills, both in written and spoken language

**Academic supervision:**
Main supervisor: Ronny Lauerwald. UPSaclay, INRAe, UMR ECOSYS
Co-supervisor:
Daniel Goll, UPSaclay, CEA, UMR LSCE
Philippe Ciais, UPSaclay, CEA, UMR LSCE

**Work location:**
The workplace, INRAe/UMR ECOSYS ([https://www6.versailles-grignon.inrae.fr/ecosys](https://www6.versailles-grignon.inrae.fr/ecosys)), is located in the new research & innovation cluster *plateau de Saclay*, in the southern suburbs of Paris, France. ECOSYS has a longstanding expertise in the research of land management impacts on terrestrial carbon and GHG budgets. Being linked to the Université Paris-Saclay ([https://www.universite-paris-saclay.fr/en](https://www.universite-paris-saclay.fr/en)) and the CLand convergence institute ([https://cland.lsce.ipsl.fr/](https://cland.lsce.ipsl.fr/)), the successful candidate will profit from an international and interdisciplinary work environment.

**Starting date:**
Autumn 2022 (here we are relatively flexible)

**Salary:** in accordance with national regulations including full social and health benefits.

**How to apply:**
Applicants should submit a complete application package by email to ronny.lauerwald@inrae.fr. The selection process will start at the end of July, but we will accept applications until the position is filled (knowing that summer is not the best period to find candidates). The application package should include (1) a curriculum vitae, (2) statement of motivation, (3) PDF of PhD thesis, (4) names, affiliations, phone numbers, and email addresses of at least two references.