



Assessing water requirements of winter and summer crops in Europe under climate change

Young scientist position

The Laboratoire des Sciences du Climat et de l'Environnement – LSCE - is looking for a motivated postdoc / young scientist for a project focused on the simulation of crop yields in Europe for future climate conditions, given different scenarios for irrigation water appropriation. Work will be performed in collaboration with researchers of the CLAND Convergence Institute.

Background

The choice of cultivating winter versus summer crops in Europe is generally viewed from a yield and farmer's revenues maximization perspective. This may change under future climate conditions in the light of increasing water demand by plants, giving rise to greater requirements for irrigation water during critical periods. If today winter crops are not frequently irrigated in northern and central Europe, the situation may change rapidly with an increasing frequency and severity of spring and summer droughts. In principle, winter crops should be better adapted to drought because during their maximum of growth in spring, soil moisture deficits tend to be less severe than in summer. Yet these crops may also require irrigation in the future in regions where they are rainfed today.

On the other hand, future increases in temperature will lead to shorter crop cycle durations, potentially offering an opportunity to harvest two crops in the same year by planting a summer crop just after harvesting a winter crop in mid to late spring. This new type of double cropping could increase European agricultural production, but its impact on annual water requirements has not yet been quantified.

Overall aim

The successful candidate will explore the water requirements needed to keep high yields for different climate scenarios, and the benefits of growing summer vs winter crops to sustain yields while minimizing irrigation water requirements. The work will enrich the development of the ORCHIDEE-CROP model by simulating the water requirements to keep high yields for winter and summer crops in Europe, optimize agricultural land allocation between summer and spring crops, while limiting as much as possible irrigation water withdrawals. The impacts of double cropping (two harvests per year) on production and water use will be explored as well. The research will include an improved parameterization of soy and tuber crops as well as the calibration of the model against eddy covariance measurements and yield data, with a focus on France and Western Europe. Ultimately, this work will provide biophysical inputs for socio-economic assessments using, e.g., the Nexus Land Use global socio-economic model.

Requirements

- Programming skills, preferably in Fortran / Python.
- Understanding of plant physiology, preferably for crops.
- Interest and motivation in modeling

Selection Criteria:

- PhD in modeling / preferably crop modeling.
- Demonstrated experience working with complex codes.
- Autonomy, ability to work in a team and time management skills.
- Experienced in multidisciplinary team-based activities with the ability to effectively communicate with colleagues and with staff from the partners of a project.

What LSCE can offer you:

LSCE <https://www.lsce.ipsl.fr> is an established, world-class research laboratory, representing a collaboration between CEA, CNRS and the University of Versailles Saint-Quentin (UVSQ). It is part of the Institute Pierre Simon Laplace (IPSL). LSCE hosts approximately 300 researchers, engineers and administrative staff including many PhD and master's students. This project will provide the employee with the opportunity to work directly on advanced methods with researchers from the LSCE and other institutions.

Location: Laboratoire des Science du Climat et de l'Environnement (<https://www.lsce.ipsl.fr>) located about 20 km from the heart of Paris in the Orme des Merisiers green area.

Contract duration: Up to 24 months.

Starting date: The position is available from Jan 2021 and will remain open until filled.

Salary: Competitive salary with full social and health benefits, commensurate with work experience.

How to apply: Applicants should submit a complete application package by email. The application package should include (1) a curriculum vitae including most important recent publications, (2) statement of motivation, (3) answers to the selection criteria above, (4) names, addresses, phone numbers, and email addresses of at least two references.

Contacts

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