Post-doctoral fellow in ecological modelling of agroforestry systems

Location Eco&Sols research unit, Montpellier (France)
Contract duration 24 months
Start July 1st 2022 at the latest

Following a multitude of local experiments, agroforestry (AF) has been identified as one of the nature-based solutions to help mitigating the climate crisis. Yet, little is known on the large-scale potential of AF to tackle climate change. The main reason for this is the gap between AF ecosystems' complexity and variability, and the surface homogeneity hypotheses relied upon by Land Surface Models (LSM).

The DM-TropAFS project funded by Agropolis Foundation aims at a first evaluation of a land surface model applied to a tropical AF system (as a proof of concept). More specifically, we will focus on a semi-arid ecosystem in Senegalese Faidherbia parklands as a proof-of-concept tropical AF system and evaluate the potential for LSM of accounting for vertical heterogeneity in plant canopy energy budget.

For this, we are looking for a candidate with a background in ecological modeling and data processing as well as a keen interest in agroforestry systems.

Work duties

The successful candidate will work with the ORCHIDEE land surface model to evaluate the potential of recent multi-layer energy budget developments to simulate competition for light in a semi-arid tree/crop ecosystem. The developments will be tested at site level based on carbon, water and energy data collected at the experimental Faidherbia-flux platform before taking the simulations up to the regional scale. In parallel, the candidate will work on developing a global database of agroforestry system types at a level of detail usable by the global land surface model ORCHIDEE, that is including main ecophysiological parameters, locations, and available evaluation datasets.

The work will be conducted in close collaboration with LSCE and HORSTSYS project partners for model development and data analysis respectively, as well as 2 PhD students already working on complementary topics, thus providing an active research team. The successful candidate is expected to present results at international conferences, produce high quality scientific papers, and drive the disseminating of the results.

Requirements:

- PhD in ecology, environmental science, mathematics or other natural sciences
- Documented skills in mechanistic modelling
- Proficiency in spoken and written English
- Demonstrated skills to work in a team

Work environment
The successful candidate will be hired by CIRAD and hosted at Eco&Sols research unit with visits to Horstsys and LSCE laboratories.

CIRAD is the French agricultural research and cooperation organization working for the sustainable development of tropical and Mediterranean regions. CIRAD works with its partners in southern countries to generate and pass on new knowledge to support agricultural development. It puts its scientific and institutional expertise at the disposal of policymakers in those countries and global debates on the main issues concerning agriculture. It also supports French scientific diplomacy operations.
The Eco&Sol research unit focuses on understanding the functioning of agro-ecosystems in particular with respect to soil-plant interactions.

Application
Please send in a single pdf your CV, motivation letter, one meaningful publication and contact of a reference person who you worked with to aude.valade@cirad.fr

For more information contact aude.valade@cirad.fr