Job offer

18 month postdoctoral position in Soil Organic Carbon dynamics modelling

The French National Institute for Agronomic Research, INRA, is a governmental research institute employing more than 10,000 people overall French territory. First European Institute in agricultural sciences, INRA is focusing its research on nutrition, environment and sustainable agriculture.

INRA also welcomes several hundred foreign researchers and students in its laboratories every year, in temporary positions, grant and exchange programmes, where they actively contribute to scientific challenges in the following fields of application: development of sustainable agriculture, nutrition and its effects on human health, environment and regional development.

Context, mission and activity

■ The INRA InfoSol unit based in Orléans (France) is seeking a highly motivated and reliable postdoc fellow who will work on biogeochemical modelling, to predict soil organic carbon stock changes in French agricultural soils. The proposed position is part of the French StoreSoilC research project (funded by the French National Research Agency (ANR)) lead by Prof. Claire Chenu.

The 4 per mil initiative promotes organic carbon sequestration in soils, in order to improve soil fertility, to adapt to climate change and to reduce greenhouse gas emissions. Rendering soils « climate smart » requires however an understanding and ability to assess carbon storage potential of different soils and its persistence with time.

■ The work for this 18-month postdoctoral position will be carried out within the StoreSoilC project (2018–2021). It focuses on arable land systems and is two folds:

- First, we will attempt to improve the specification of the stable soil organic carbon fraction in SOC dynamics models such as RothC or Century. The approach includes two stages : i) estimating the size of stable SOC pools by model inversion and optimization on a set of long term agricultural experiments (Clivot et al., 2019); and ii) building statistical functions to initialize the size of stable SOC pools in models using thermal analysis Rock-Eval measurements (Cécillon et al., 2018).

- Second, we will model the SOC storage potential related to several cropping practices and systems known to increase SOC stocks: organic wastes application, conservation agriculture, bioenergy crops. We will use default and improved model initializations, building on top of the work by Dimassi et al. (2018) and depending on available data and the results of the first fold of the postdoctoral work. This will be performed at two spatial scales, i) on the Versailles plain, where most agricultural fields are informed in terms of soil properties and cropping practices; and ii) at the regional scale using data from the French Soil Monitoring Network (RMQS). A specific focus will be made on the uncertainty analysis of SOC storage potential estimates. This second fold will help to assess the influence of scales, models and available data on the provided estimates of the SOC storage potential, and their consequences in terms of relevant local and regional public policies of SOC storage.

Cécillon, L., et al., 2018. Biogeosciences 15, 2835–2849. https://doi.org/10.5194/bg-15-2835-2018

Clivot, H., et al., 2019. Environmental Modelling & Software 118, 99–113. https://doi.org/10.1016/j.envsoft.2019.04.004

Dimassi, B., et al., 2018. Geoderma 311, 25–36. https://doi.org/10.1016/j.geoderma.2017.09.038

Requirements

▪ Applicants should have completed a Ph.D. in Agronomy, Ecology, Soil Science, or a closely related field. The ideal candidate also possesses computer-programming skills in order to facilitate data management and model application and a good background in statistical sciences. He has experience in writing high impact scientific papers and in communicating in scientific congresses, especially in English. A proactive and enthusiastic approach and excellent communication and interpersonal skills are essential. He could be able to work both independently and in collaboration with other researchers. Knowledge in soil sciences, biogeochemical modelling (e.g., Century, Daycent, RothC, ECOSSE…) and/or agronomy will be appreciated.

Tasks will include, but will not be limited to:

- Model parameterization, validation, simulation experiments
- Cropping system characterization
- Statistical analysis of large simulation outputs and uncertainty analyses
- Writing manuscripts.

Manuel Martin (InfoSol-Orléans) will supervise the postdoc work in close collaboration with Lauric Cécillon (Irstea, URA ECODIV), Bertrand Guenet (CNRS, UMR 8212) and Pierre Barré (CNRS, UMR 8538).

Interested applicants should send a cover letter, CV (with a list of publications, scientific presentations and analytical and programming skills), and the names/contact information for three references by email. Review of applications will begin in September 2019.

↘ Hosting unit

▪ Location: Orléans (France)

▪ Contract: fixed term, full time

▪ Duration: 18 months

▪ Starting date: 1st November 2019

▪ Salary: 2300 € gross per month

↘ Application instructions

Send a cover letter, your curriculum vitae to: Manuel Martin (manuel.martin@inra.fr) and Antonio Bispo (antonio.bispo@inra.fr).

Applications must be sent no later than 31 August 2019.