

Post-doctoral position in France at LSCE (IPSL-CNRS-CEA-University of Saint-Quentin-en-Yvelines) and LPC2E (CNRS/University of Orléans)

Subject: Modelling greenhouse gas emission processes (CH_4 and CO_2) by *Sphagnum* peats; Impact of global change on these emissions and feedbacks on the climate

Host laboratory:

- Laboratoire de Physique et Chimie de l'Environnement et de l'Espace (LPC2E)
- Laboratoire des Sciences du Climat et de l'Environnement (LSCE)

Persons in charge:

- Bertrand Guenet, LSCE, L'Orme des Merisiers-bat.712, 91190 Gif-sur-Yvette - France
- Fabrice Jégou and Christophe Guimbaud, LPC2E, 3A avenue de la recherche scientifique, 45071, Orléans cedex 2, France

Start and duration: July 2017 for 18 months, renewable up to 30 months

Description of the subject

Continental bio-geospheres represent the primary source of emission of Greenhouse Gases (GHGs) in the atmosphere: CO_2 , CH_4 and N_2O . Feedback on these emissions generated by the climatic changes, the pollution, or the exploitation of these environments are expected but not well quantified. For example, temperature and rainfall changes (water level) could increase carbon destocking soils, which in turn would increase GHG concentrations in the atmosphere. In this context, peatlands are relevant systems to study these feedbacks. *Sphagnum* peats are the most efficient terrestrial ecosystem as atmospheric carbon sinks. Indeed, these two last centuries, the amount of carbon that has been stored is equivalent to that of the emitted anthropogenic carbon. This storage result of a delicate balance between carbon inputs (CO_2 absorbed by photosynthesis) and carbon outputs (CO_2 and CH_4 production, dissolved and particulate carbon) leading to an accumulation in the soil of organic matter in the form of peat (carbon sinks). Actually, major uncertainties exist about the biogeochemical processes related to the interaction between chemistry cycles (C, N, P, S), the microorganisms, and the redox reactions under climatic change conditions. These processes have to be studied to better understand the vulnerability of this carbon sink face of global change.

This work is part of the key objectives of the French LABEX VOLTAIRE (<http://www.univ-orleans.fr/en/investissements-avenir/voltaire>, University of Orléans, OSUC, France) and European H2020 CRESCENDO (<https://crescendoproject.eu/>, LSCE, Gif-sur-Yvette, France) projects and will be achieved in the framework of the French peatland observatory network (<http://www.insu.cnrs.fr/node/3988>, SNO-Tourbières) based in Orléans with regular visits at LSCE. Efforts will be focussed on the understanding of the processes controlling the peatland emissions to the atmosphere and the induced impact on the climate. The ORCHIDEE (continental surface) model will be used with offline climatic forcings. Coupled simulations with the LMDz (atmosphere) and INCA (chemistry) models will be achieved in a second step. These models developed at the IPSL institute (Paris, France) will be used to assess the impact of climate change on emissions from peatlands and feedback of these emissions on the climate.

The postdoctoral research associate position is located the first 6 months at the LSCE and the last 2 years at the LPC2E. The position is available on July 2017. The initial appointment is for 18 months and is extendable to 30 months (duration of the grant): one year, renewable (LABEX VOLTAIRE fund), and 6 months (CRESCENDO fund). Salary will be in accordance with French public service positions based on experience and qualification. Prior experience in numerical modelling of the wetland emissions is desirable. A working knowledge of programming languages such as Fortran and data analysis tools such Matlab/IDL is required. Biogeochemistry knowledge on *Sphagnum* type peatlands would be also appreciated. Modelling development (ORCHIDEE) will be performed with the collaboration of ISTO-CNRS-Orléans (Fatima Laggoun-Défarge, Sébastien Gogo) and LSCE-IPSL-CNRS-CEA-University of Saint-Quentin-en-Yvelines (Bertrand Guenet, Philippe Peylin).

Applicants will be expected to show evidence of their potential through letters of recommendation and documentation of their related experience. Applicants should submit a letter of application stating research interests and experience, along with curriculum vitae, and the names of 2 references to:

fabrice.jegou@cnrs-orleans.fr, bertrand.guenet@lsce.ipsl.fr

Gross monthly salary: 2500€

Network and funds:

Regional (Centre)

- CARBIODIV (2013-2015) Centre project with financial supports of European fund FEDER and the General Council of the French Cher department.
- PIVOTS project (2015-2021): « Plateformes d'Innovation, de Valorisation et d'Optimisation Technologique environnementales - Contrat de Plan Etat Région Centre, Plateforme «PESA» : Plateforme sur les Échanges Sol-Atmosphère

National

- Service National d'Observation Tourbières » : French Peatland observatory network
- VOLTAIRE: French LABEX initiative (2011-2020)
WP5: Biogeochemical functioning of the surface environments – role in the formation of biogenic gas – role on the processing and transfer of pollutants.
WP6: Emissions and cycle of life of volatile compounds formed by continental surfaces.

European

- CliMireSiber EU-INTERACT TNA (2012-2014) within the framework of INTERACT Transnational Access European Union -Russia
- H2020 CRESCENDO (2015-2020)