

Post-Doctoral position

Carbon in deep soil in France. Controlling factors analysis and mapping

Deadline for application: September 5th, 2012

Duration: 12 to 24 months

Salary: Between 1820 and 2095 €/month, net of charges depending on experience with the possibility to apply for an additional gross mobility allowance of 1360 €/ month in case of eligibility to the Agreenskills programme (<http://www.agreenskills.eu>)

Location: INRA (National Institute for Agronomic Research) InfoSol Unit, Orléans, France

Starting date: November 1st, 2012 to January 1st, 2013

Rationale

It is well established that carbon in deep soil layers is a key component the dynamics of which should be understood to better model carbon sequestration and emissions from soils.

However, most soil carbon maps and estimates at national level are restricted to topsoil with maximal depths typically ranging 0.15 – 0.3 m (for France, see Meersmans *et al.* 2012 and Martin *et al.* 2011). In this work, we will use data from :

- The systematic soil monitoring network of French soils (i.e. ca 2200 sites, distributed according to a 16 to 16 km grid, SOC data available for the 0 to 0.3 and the 0.3 to 0.5 m layers).
- Numerous legacy SOC profile data (from soil inventory and mapping, irregularly spread over the French territory, various soil depths, years of sampling from 1960 to nowadays).

We will address the following issues:

- What are the main controlling factors of deep SOC distribution? Are they different from the ones that control topsoil SOC?
- How much SOC do the deep layers of French soils store? Can we map their geographical distribution?

Skills

PhD

Soil science, soil carbon

Ability to work with R packages

GIS – spatial analysis

Data mining, regression and classification tools, statistics

Scientific English reading, speaking and writing

Scientific referents

Dr Manuel Martin manuel.martin@orleans.inra.fr

Dr Dominique Arrouays dominique.arrouays@orleans.inra.fr

How to apply?

Send a mail including CV and a cover letter to the referents

Relevant recent publications

Lo Seen D, Ramesh BR, Nair KM, Martin MP, Arrouays D, Bourgeon G. 2010. Soil carbon stock, deforestation and land-cover changes in the Western Ghats biodiversity hotspot (India). *Global Change Biology*, 16(6): 1777-1792.

Jalabert S, Martin MP, Renaud JP, Boulonne L, Jolivet C, Montanarella L, Arrouays D. 2010. Estimating forest soil bulk density using boosted regression modeling. *Soil Use and Management*, 26: 516-528.

Martin MP, Wattenbach M, Smith P, Meersmans J, Jolivet CC, Boulonne L, Arrouays D. 2011. Soil organic carbon stocks distribution in France. *Biogeosciences*, 8: 1053-1065.

Angers DA, Arrouays D, Saby NPA, Walter C. 2011. Estimating and mapping the carbon saturation deficit in French agricultural topsoils. *Soil Use and Management*, 27, 448-452.

Grinand C, Barthès BG, Brunet D, Kouakoua E, Arrouays D, Jolivet C, Caria G, Bernoux M. 2012. Prediction of soil organic and inorganic carbon contents at a national scale (France) using mid infrared reflectance spectroscopy (MIRS). *European Journal of Soil Science*, 63, 141-151.

Orton T, Saby NPA, Arrouays D, Walter C, Lemerrier B, Schvartz C, Lark RM. 2012. Spatial prediction of soil organic carbon from data on large and variable spatial supports. I. Inventory and mapping. *Environmetrics*, 23, 129-147.

Orton T, Saby NPA, Arrouays D, Walter C, Lemerrier B, Schvartz C, Lark RM. 2012. Spatial prediction of soil organic carbon from data on large and variable spatial supports. II. Mapping temporal change. *Environmetrics*, 23, 148-161.

Arrouays, D, Marchant BP, Saby NPA, Meersmans J, Orton TG, Martin MP, Bellamy PH, Lark RM, Kibblewhite M. 2012. Generic issues on broad scale soil monitoring schemes: A review. *Pedosphere*, 22(4), 456-469.

Meersmans J, Martin MP, De Ridder F, Lacarce E, Wetterlind J, De Baets S, Le Bas C, Louis BP, Orton TG, Bispo A, Arrouays D. On line. A novel soil organic C model using climate, soil type and management data at the national scale (France). *Agronomy for Sustainable Development*.

Meersmans, J, Martin, M.P, Lacarce E, De Baets, S, Jolivet, C, Boulonne, L, Lehmann, S, Saby, N.P.A, Bispo, A, Arrouays, D. On line. A high resolution map of the French soil organic carbon. *Agronomy for Sustainable Development*.