

PhD position at CESBIO (Centre d'Etudes Spatiales de la BIOsphère), Toulouse-Auch, France on modelling carbon and water cycle/exchange with the atmosphere over crops
Starting date: 1st September 2009 at the earliest

Background:

Agroecosystems play a major role on global climate changes through greenhouse gas emissions and changes in land cover physical properties. They are also strong drivers of inter-annual climate variability at regional and continental scales because of irrigation, land use change and decreasing amount of precipitation projected by circulation models. Hutchinson et al. (2007) concluded that carbon sequestration potential of croplands should be considered as a modest but non negligible contribution to climate change mitigation (between 3 and 6 % of fossil fuel contribution) but quantification of crop carbon sequestration potential remains very uncertain, especially in a changing climate. Therefore, variability in stocks and fluxes of carbon and water in croplands are themes of major interest. Net CO₂ exchange between agroecosystem and atmosphere, defining crop potential for storing C, has been poorly studied so far and most models developed up to now that simulate those flux and budget are based on empirical approaches. Therefore such models are not really suitable for simulating the effect of a changing climate on C and water fluxes and budgets, changes in crop production and for assessing adaptation needs in crop management.

Objectives:

The successful candidate will work on a mechanistic surface model, ICASTICS, developed at CESBIO and resulting from the coupling of a crop model (STICS), a canopy model (CASTANEA) and a SVAT (Soil Vegetation Atmosphere Transfer) model (ICARE). This model is able to simulate the C and water fluxes of the different components of the agroecosystem. The different steps will consist in adjusting model parameters for different crops (winter wheat, rapeseed, maize...) representative of Southwest Europe, validating the model with measurements from instrumented sites (CESBIO's site are part of the CarboEurope and Fluxnet networks), applying agricultural and climatic scenarios in order to assess their impacts on C and water budgets for a crop or a 4-year crop rotation.

Requirements:

We seek a highly motivated person with a strong interest in interdisciplinary research. He/she should have a master (Diploma or equivalent) in the area of bioclimatology, environmental sciences and/or agronomy. He/she should have good programming skills and a good knowledge of English and/or French.

Application procedure:

Send your application (written in English or French) including a cover letter, curriculum vitae, and the contact information of 2 possible referees, to Nathalie Jarosz: nathalie.jarosz@cesbio.cnes.fr

Applications will be accepted until the position is filled.