Ecosystem Modelling with LPJ-GUESS

Lund, May 13-17 2019

LPJ-GUESS is a leading terrestrial ecosystem modelling framework, offering state-of-the-art descriptions of vegetation dynamics and terrestrial biogeochemical cycling. It is a key component of the research we conduct in MERGE and BECC. This ClimBEco course will give graduate students a broad but practical introduction to terrestrial ecosystem modelling with LPJ-GUESS, but also provide specific help to students intending or wishing to apply LPJ-GUESS to their own PhD thesis topics.

Short lectures will provide the background to the main process descriptions and input to LPJ-GUESS, and practical sessions will help the students to set-up, compile and run the model, and help with analysis of the standard model output.

We will also offer specific, targeted help to students who wish to run modelling experiments relevant to their thesis topic.

The students will work with the teachers on a modelling topic of their choosing and present their results on the final afternoon of the course.

Our aim with the course is to make the students aware of the importance and potential of vegetation modelling, and to provide practical skills in ecosystem modelling generally.

Course dates:

May 13-17, 2019

Credits:

5 ECTS, Lund University (no grades – only Pass or Fail)

To get the credits the students will need to:

- Participate in the lectures and complete a modelling project during the week.
- Present the results of their project work on the final day of the course.
- Write a three page report summarising the results of their project, highlighting both its relevance to their own PhD topic and the importance of ecosystem modelling generally.

Application:

Deadline: 12 April 2019.
E-mail your application to: Paul Miller (paul.miller@nateko.lu.se) to register for the course.

Your email should contain a short description of what you are most interested in learning on the course, preferably with reference to your own research project.
Location:
Geocentrum I, Sölvegatan 12, Lund University, Lund, Sweden (www.lu.se)
Room: Biosfären, Geocentrum I, 2nd floor, room number 220
For directions and travel instructions, see https://www.nateko.lu.se/contact-us

Detailed Programme

Day 1: Introductory lectures and getting started with LPJ-GUESS
A series of short lectures will cover the following topics:

- Dynamic vegetation modelling – a perspective (Prof. Ben Smith)
- General introduction to LPJ-GUESS & plant functional type (PFT) descriptions (Paul Miller)
- Coupled carbon-nitrogen cycling (David Wårlind)
- Land use and management (Mats Lindeskog)
- Wetland and high-latitude soil processes (Paul Miller)

Other, specific topics will be covered on request, depending on the needs and interests of the participating students - please email Paul Miller in advance: paul.miller@nateko.lu.se. Examples of topics that could be included: Detailed forest and crop management, BVOCs, Fire, other disturbances, N₂O emissions, tree migration, etc.

Day 1 (afternoon): Model troubleshooting workshop – getting set up

Day 2: First simulations with LPJ-GUESS

- Initial practical help to get started
- Common assignment for all participants
- Start of the individual project work

Day 3: Project work and hands-on guidance

Day 4: Project work and hands-on guidance

Day 5 (morning): Final project work and hands-on guidance.

Day 5 (afternoon): Project presentations in the afternoon.

Requirements:
A basic knowledge of programming in some computer language (e.g. Fortran, C++, Python, Matlab) is required. In the course, we will provide a hands-on introduction to the structure of the LPJ-GUESS model, which is written in C++. We request that the students bring their own laptop for use on the course, running Windows or Linux. Some help will also be available for those using Mac OSX, on request.
Pre-course activities:

We will send instructions on how to download and install the model before the course begins. Though we strongly encourage participants to install the model before the course begins, there will be a troubleshooting workshop on Day 1 for those that do not succeed. We also request that the students email in advance any specific preferences they may have regarding topics to be covered or specific help they will need during the week.

Teachers:

Dr. Paul Miller, Assoc. Prof. Veiko Lehsten and Dr. Stefan Olin will lead the scientific aspects of the course, and Dr. Johan Nord will provide practical and technical guidance with the model. Other confirmed teachers and lecturers will include Prof Ben Smith, Dr. David Wårlind, and Dr. Mats Lindeskog.

Assessment:

The students will write a three page report summarising the results of their project, highlighting both its relevance to their own PhD topic and the importance of ecosystem modelling generally.