FACULTY
OF SCIENCE

NNG009F, Ecosystem Modelling with LPJ-GUESS, 5 credits
Ekosystemmodellering med LPJ-GUESS,
5 högskolepoäng
Third Cycle/Forskarnivå

Confirmation

This course syllabus was confirmed by The Research Programmes Board at the Faculty of Science 07 March 2022. The course is in the third cycle and amounts to 5 credits.
The course syllabus is formally approved in Swedish. This is a translation.

Learning outcomes

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 conducted in MERGE and BECC. This course gives a broad and practical introduction to terrestrial ecosystem modelling with LPJ-GUESS, and provides specific help to students intending or wishing to apply LPJ-GUESS to their own PhD thesis topics.

The main aim of the course is to raise awareness of the importance and potential of ecosystem modelling, and to teach practical skills in ecosystem modelling.

On completion of the course, participants shall be able to:

Knowledge and understanding
- Describe the main processes included in dynamic global vegetation models (DGVMs) generally, and in the LPJ-GUESS model in particular
- Understand the spatial and temporal scales at which model simulations are possible

- Describe the main inputs to LPJ-GUESS, and the outputs produced by the model

Competence and skills
- Set up and perform model simulations with LPJ-GUESS for selected locations or regions to address specific research questions that are relevant to her/his research topic

- Analyse model output to quantify the effect of environmental drivers on vegetation dynamics and/or biogeochemical cycling

Judgement and approach
- Explain why the model output changes as a result of changing environmental drivers or model configurations

- Synthesize and evaluate the knowledge acquired from model simulations, accounting for model limitations and uncertainty

Course content

Short lectures will provide an overview of the structure of the LPJ-GUESS model as well as the background to the main process descriptions and input to LPJ-GUESS. Practical sessions will help the students to set-up, compile and run the model, and help with analysis of the standard model output. The course will 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 at the end of the course and hand in a written report.

Forms of instructions

Teaching consists of lectures, practical exercises and project work. It is compulsory to participate in the lectures, complete the exercises and present progress on the project work.

Forms of examination

The assessment is based on participation in the lectures, an oral presentation of project work and submission of a written report.

Grades

Possible grades are Pass and Fail. For a grade of Pass, the student must have participated in the lectures, completed the exercises, made an oral presentation of the results of their project work, and passed the written report.

Language of instruction

The course is given in English.

Necessary prior knowledge

A basic knowledge of programming in some computer language (e.g. Fortran, Python, R, C++ or Matlab) is required.

Additional information

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