Postglacial vegetation change in Northern Europe: Combining Ecosystem Modelling and palaeoecological reconstructions

Summary

TalTech School of Science, Department of Geology offers a 4-year PhD position in Earth Sciences

Research field:	Physical Sciences
Supervisors:	Siim Veski Anneli Poska
Availability:	This position is available.
Offered by:	School of Science Department of Geology
Application deadline:	Applications are accepted between September 01, 2020 00:00 and October 02, 2020 23:59 (Europe/Zurich)

Description

The subject of the PhD project is closely connected to the personal research funding team grant (PRG323) led by Siim Veski „Tracking the time-lags of species response to environmental change using palaeo-proxy data and modelling (TrackLag)". The PhD project is planned to start in 2020.

Current Earth System Model or Dynamic Ecosystem Model (DEM) based assessments of climate-induced shifts in species distributions rarely account for species interactions and usually ignore potential differences in response times of interacting taxa to climate change. As a consequence, most simulations of vegetation change project an immediate response of vegetation to climate change, with turnover rates at decadal rather than centennial scales. Howevere, the palaeoecological data suggests that non-climatic factors (migration and competitive capacity, nutrient availability etc.) can create substantial time-lags between the creation of favorable climatic conditions and range shifts.

The PhD project will focus on developing, evaluating, and employing a state-of-the-art version of an individual-based DEM LPJ-GUESS (Lund-Potsdam-Jena –General Ecosystem Simulator) in order to improve the predictions of the climate driven forest composition change in boreal and temperate zones using a combination of palaeoecological, ecological and remote sensing datasets.

This PhD project will:

1. Compile an overview of model based assessments of vegetation responses to current climate change in a temperate zone and compare that with known palaeoecological evidence
2. Prepare necessary inputs (e.g. climate, land use) for past, present, and future scenario runs of the DEM LPJ-Guess using the palaeoecological evidence and model based predictions
3. Conduct a series of scenario runs and model sensitivity tests, and use the gained information to improve the ability of LPJ-Guess to predict climate driven vegetation changes.

Job description
The position is available for a 4-year period and your key tasks as a PhD student at TalTech are to:

- Manage and carry through your research project
- Attend PhD courses
- Write 3 scientific articles and your PhD thesis
- Teach and disseminate your research
- Stay at an external research institution for a few months, preferably abroad
- Work for the department

The student will be expected to conduct a series of DEM simulations, write and modify code written in C++, and to systematize and apply a number of different environmental and ecological datasets (climate, land use, etc.).

Qualifications
The applicant should fulfil the following requirements:

- General admissions criteria
  - A BSc and MSc degree from an internationally recognised university in a relevant Earth or Environmental science discipline (e.g. Physical Geography, Ecology (Paleoecology), Forestry etc.). Applicants with a strong Physics, Chemistry, or Mathematics background with an interest in modelling and ecosystem sciences are also welcome.
  - English language proficiency at a minimum of IELTS band 6.5 with no component score below 6.0, or equivalent level.
- Specific candidate requirements
  - Highly motivated graduate, keen to work on a multidisciplinary project, good communicative skills, proactive and independent work
  - Certified knowledge of at least one programming language and a willingness to learn C++
  - An ability to work with GIS software
  - An emphasis will also be laid on previous publications (if any) and relevant work experience
  - Previous experience or proven interest in the research field of Earth Sciences

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