Lake productivity and regional climate pattern in North Eastern Europe - surface sediment calibration set and palaeodata with focus on sedimentary Cladocera

Summary

The PhD project focusses on postglacial sedimentary Cladocera, lake productivity and regional climate patterns in North Eastern Europe (Baltic area and NW Russia) in cooperation with different palaeoproxy and a newly generated Cladocera surface sediment calibration set.

Research field:	Earth sciences
Supervisor:	Prof. Dr. Siim Veski
Availability:	This position is available.
Offered by:	School of Science Department of Geology
Application deadline:	Applications are accepted between June 01, 2020 00:00 and July 03, 2020 23:59 (Europe/Zurich)

Description

The subject of the PhD project „ Lake productivity and regional climate pattern in North Eastern Europe - surface sediment calibration set and palaeodata with focus on sedimentary Cladocera" is closely connected with 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 September 2020.

Sedimentary records of different organism groups are widely used to reconstruct changes in past climatic conditions. Palaeoecological proxies (pollen, macrofossils, aquatic biota, geochemical and isotope data) provide empirical archives of past climate and environmental change. The sub-fossil organism remains (Cladocera) deposited in lakes and bogs provide a record of past terrestrial and aquatic environment, many of which can today be used to quantitatively reconstruct the environmental conditions. The PhD project focusses on postglacial sedimentary Cladocera, lake productivity and regional climate patterns in North Eastern Europe (Baltic area and NW Russia) in cooperation with different palaeoproxy and a newly generated Cladocera surface sediment calibration set. Within this project a training (calibration) set of surface sediments will be developed with a focus on Cladocera to find environmental optima of lake productivity (in terms of total phosphorus) and climate pattern indicator taxa in North Eastern Europe. For surface sediment analysis a set of calibration lakes reflecting a gradient of environmental conditions will be chosen. Environmental data for lakes will be collected, same as distribution of indicator species in surface sediment cores (first 1 cm of sediments) will be analysed, with a focus on interspecific relationships between Cladocera and other organism groups.

Simultaneously, a present community of species will be determined both from plankton and littoral zones of the lake. Species distribution and environmental variables will be linked by statistical methods. The newly generated palaeoreconstructions can then be used as an independent variable to validate vegetation and environmental reconstructions of past conditions and to calibrate models in order to more realistically represent spatial and temporal patterns of future changes tracking the time-lags of species response to environmental change using palaeo-proxy data and modelling.

Responsibilities and tasks:

- Compile a dataset and evaluate the availability and potential of Cladocera remains preserved in sedimentary basins as climate proxies using published materials
- Collect and perform multiproxy palaeoecological analysis of sedimentary records with a focus on Cladocera-based reconstruction of environmental parameters from North Eastern Europe over the entire post-glacial period (ca 14700 years)
- Collect a Cladocera training set of North Eastern Europe
- Use gained information to reconstruct the post-glacial environmental parameters and incorporate the results in multi-proxy studies of past environmental change

The PhD position is available for a 4-year period and the **key tasks** as a PhD student at TalTech are:

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

The study will be conducted using new and existing sediment cores with a variety of multi-proxy data from European and Baltic locations, new material will be collected from low data coverage areas in North Eastern Europe. The PhD candidate will participate in fieldwork for collecting sediment samples and training sets. The palaeoecological analysis will be conducted in TalTech Department of Geology. The PhD candidate will be expected to have experience working with palaeo datasets, and a basic knowledge of palaeo-reconstruction techniques, and GIS based spatial modelling.

Qualifications

The applicants should fulfil the following requirements:

- General admissions criteria
  - a good BSc and MSc degree from an internationally recognised university in an Earth Science discipline (Geology, Quaternary geology, Palaeoecology) or relevant subject area (Limnology, Palaeolimnology, Ecology or Biology)
  - English language proficiency at a minimum of IELTS band 6.5 with no component score below 6.0, or equivalent level if not decided otherwise
- Specific candidate requirements
  - highly motivated earth science graduate, keen to work on a multi-disciplined project, good communicative skills, proactive and independent work, affinity with working in the field. The PhD candidate is expected to have experience in Cladocera species identification, working with palaeo datasets, and a basic knowledge of palaeo-climate reconstruction techniques, and statistical analysis
  - 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
  - drivers' licence (optional)

To get more information or to apply online, visit https://taltech.glowbase.com/positions/96 or scan the the code on the left with your smartphone.