

Postglacial climate change in Northern and Central Europe: paleobotanical and microphenological approaches.

Summary

The focus of the PhD project is to examine the possibilities for reconstructing the local past climate at fine resolution and reveal the previously unknown aspects of past seasonality and dynamics of the length of the vegetation period. The main research topics are the postglacial climate change, local vegetation and humidity changes and the comparison of postglacial local and regional climate dynamics in Central and Northern Europe. The research questions will be addressed using the plant macrofossil analysis, peat analysis and microphenological analysis of the subfossil leaves. The PhD project will be carried out in international cooperation and under the supervision of the researchers of TalTech, Utrecht University, Poznan University and Polish Academy of Sciences.

Research field:	Earth sciences
Supervisors:	Dr. Leeli Amon 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, 2022 00:00 and June 30, 2022 23:59 (Europe/Zurich)

Description

The changing climate is one of the major challenges for the future generations. Paleoclimatic methods are one of the few means to understand the mechanisms behind the processes and the impact to the biota. The novel microphenological approach (developed in Utrecht University, the Netherlands) offers a previously unreachable knowledge about the past spring seasonality and the possibility to reconstruct the length of the past vegetation period. L. Amon has applied the microphenological method successfully to the Baltic subfossil leaf material.

In cooperation with Dutch and Polish paleoecologist we discovered an unique study site in Central Europe (Poland) where a postglacial peat core consist a long record of subfossil dwarf birch leaves. The core has been already analysed for tephra and has a good chronological framework. The peat analysis would give an overview of the local past climate, humidity and vegetation fluctuations. The subfossil leaves offer an unparallel opportunity to shed light on past dynamics of seasonality and growth-degree-days.

The PhD project will be carried out in international cooperation. The advisory board for this project consist of senior researcher Leeli Amon (plant macrofossil method, Taltech, Estonia), Prof Siim Veski (pollen analysis, TalTech, Estonia), Prof Friederike Wagner-Cremer (the developer of the microphenological approach, Utrecht University, the Netherlands), Prof Mariusz Lamentowicz (past climate humidity studies, Poznan University, Poland) and Prof Michal Slowinski (peat studies, Institute of Geography, Polish Academy of Sciences, Poland).

The goal of this PhD project is to examine the possibilities for fine resolution local past climate reconstructions using the classical peat analysis in combination with novel microphenology of subfossil leaf material. The combination would give a fresh insight into previously unknown details of the past climate dynamics, for example the spring onset and the length of the vegetation period. The thesis should address the following topics: 1) the postglacial climate changes, including the dynamics of the length of the vegetation period; 2) the postglacial local vegetation and humidity changes 3) the comparison of postglacial local and regional climate dynamics in Central and Northern Europe.

Responsibilities and (foreseen) tasks

- Fieldworks for sediment coring
- Learning the peat macrofossil identification
- Learning the microphenological method (with fluorescence microscopy)
- Selecting, preparing, microscoping the subfossil leaf material
- Analyzing the results, interpretation

- Reporting the results in high-impact peer-reviewed research journals
- Compiling the PhD thesis
- Possible teaching obligations

Applicants should fulfil the following requirements:

- a master's degree in Earth Sciences or related field
- a clear interest in the topic of the position
- excellent command of English
- strong and demonstrable writing and analytical skills
- capacity to work both as an independent researcher and as part of an international team
- capacity and willingness to help in organizational tasks relevant to the project
- capacity and willingness for fieldworks, internships in Europe

The following experience is beneficial:

- Light microscopy, fluorescence microscopy
- Previous background or interest in paleoecology

We offer:

- 4-year PhD position
- The chance to do high-level research with dedicated team in a well-equipped work environment
- Opportunities for conference visits, research stays and networking

About the Department of Quaternary Geology, Institute of Geology, TalTech

The main research topics cover postglacial climate and environmental change, vegetation (biota) change, marine environment studies, pollen record modelling. The Post-glacial Geology group has the necessary facilities for scientific research in the campus of TUT in Tallinn. The team has obligatory fieldwork equipment including transport and all kind of sediment coring gears, cold room for sample storage, sample chemical pretreatment lines with all necessary devices, microscopy laboratory for microfossil studies (including different light microscopes and SEM), sedimentology laboratory (with laser sedigraph, magnetic susceptibility apparatus, freeze drier etc) and elemental analyser, mass spectrometer for element isotope analyses.

Additional information

For further information, please contact Leeli Amon leeli.amon@taltech.ee or Prof. Siim Veski siim.veski@taltech.ee



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