
International Lecture in Geoecology

WEDNESDAY, 26. APRIL 2023, 11:00 - 12:00

Josef-Holaubek-Platz 2, 1090 Wien

Seminar Room Paläontologie 2B311

Prof. Mariusz Lamentowicz

(Adam Mickiewicz University, Poland)

"Unveiling tipping points in long-term ecological records from Sphagnum-dominated peatlands"

Ecosystems are increasingly prone to climate extremes, such as drought, with long-lasting effects on plant and soil communities and, subsequently, carbon (C) cycling. Unveiling past tipping points is a prerequisite for a better understanding how individual species and entire ecosystems will respond to future climate changes, especially soil moisture. In the first study, we identified the response of peatland vegetation to shifts in hydrological conditions over the past 2000 years using plant macrofossils, and testate amoebae-based quantitative hydrological reconstructions from seven Polish peat records. Using threshold indicator taxa analysis, we discovered that plant community composition strongly converged at a water level of c. 11.7 cm, indicating a community-level tipping point. We identified 45 plant taxa that showed either an increase or a decrease in their relative abundance between 8 and 17 cm of water level depth. In the other experimental study, we investigated the response of plant and soil fungi to the drought of different intensities using a water table gradient in peatlands—a significant C sink ecosystem. We show substantial changes in ecosystem respiration and plant and soil fungal communities when the water level fell below a tipping point of 24 cm. The talk will also present other palaeoecological high-resolution multi-proxy data in the context of the critical transition related to anthropogenic disturbance. Our results represent a significant advance in understanding the nonlinear nature of ecosystem properties and pave the way towards a truly mechanistic understanding of peatland tipping points using experiment and paleoecology.

Prof. Mariusz Lamentowicz and his team at the Climate Change Ecology Research Unit (Adam Mickiewicz University, Poznań, Poland) use palaeoecological and experimental approaches to understand the impact of current and past climate changes and anthropogenic disturbances on peatlands. He realised the research on the data from peatlands in, e.g., Siberia, Central America, Amazon, Switzerland, Falkland Islands, the Czech Republic, Lithuania, Latvia and Estonia. Furthermore, Prof. Lamentowicz is an expert in palaeoecology and the ecology of testate amoebae (Protista). He cooperates with specialists studying the morphology and taxonomy of these organisms. His long-term aim is the implementation of interdisciplinary research on the impact of climate change on peatlands through the integration of monitoring, experiment, and paleoecology. Recently, Prof. Lamentowicz has worked on questions related to peatland restoration and scientific communication with stakeholders. He is teaching courses: Global warming and ecosystems, Ecology of wetlands, Restoration ecology in the Anthropocene and Global change and nature conservation (including field trips).