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报告一：How Plants Shape Mountains

报告人：Todd A. Ehlers 教授

英国格拉斯哥大学

报告二：The Greening Arctic: Vegetation Is Accelerating Climate Change

报告人：Wenxin Zhang 副教授

英国格拉斯哥大学

时　间: 2026年6月12日 下午2:30

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植被与环境变化重点实验室

Key Laboratory of Vegetation and Environmental Change

报告人简介

Todd A. Ehlers is a Dixon Chair Professor of Geology and Head of School at the University of Glasgow, UK. Before this, he was a Professor and former Department Speaker at the University of Tübingen, Germany, and an Associate Professor and Associate Chair at the University of Michigan, USA. He is an elected fellow of the Royal Society of Edinburgh (FRSE, 2025) and the Academia Europaea (AE, 2018), recipient of the EGU Ralph Alger Bagnold Medal (2018), and former Moore Distinguished Scholar at the California Institute of Technology, Division of Geological and Planetary Sciences (2021-2022). While in Germany, Professor Ehlers was the speaker for the German priority research program (SPP 1801) EarthShape: Earth Surface Shaping by Biota (2016-2024), and a former European Research Council (ERC) Consolidator Awardee. He has served on numerous USA and German Science Foundation (NSF, DFG) Senate Commissions for the future of Geo- and Earth System Sciences, as well as science review panels for the USA National Science Foundation and DFG. Professor Ehlers is on the Board of Review Editors for *Science* (2013-present) and former editor-in-chief for *Tectonics* (2009-2013) and *Earth Science Reviews* (2006-2010).

报告摘要

Fascinating interactions among biota, climate, and plate tectonics shape Earth's surface and drive topographic evolution. These processes operate across vast spatial and temporal scales, from seconds to millions of years and microns to thousands of kilometres. This talk examines these links, showing how coupled numerical models and cosmogenic isotope-derived erosion rates reveal how vegetation change influences mountain landscape form over seasonal to millennial timescales. Focusing on the Chilean Coastal Cordillera, I explore interactions among palaeoclimate, vegetation, and landscape evolution across an extreme gradient. Key questions include when climate or vegetation dominates erosion, and how past environmental changes shapes present-day interpretations. This study integrates LPJ-GUESS, Landlab, and TraCF-21ka simulations from the Last Glacial Maximum to today. Sensitivity experiments show that erosion varies with climate and vegetation shifts, especially plant functional types within ecological zones. The results indicate substantial variability in erosion rates since the Last Glacial Maximum, driven by changes in precipitation and vegetation composition. However, long-term mean erosion rates remain broadly consistent with steady-state rock uplift. These findings are supported by cosmogenic radionuclide data, which show a bidirectional relationship between vegetation and erosion. Overall, the results demonstrate that different climatic and ecological zones respond uniquely to environmental change without large shifts in total vegetation over.

报告人简介

Wenxin Zhang is an Associate Professor (Reader) in the School of Geographical and Earth Sciences at the University of Glasgow. He is also affiliated with Lund University. Sweden, where he serves as a Research Associate Professor (Docent) in the Department of Environmental and Earth Sciences and a Principal Investigator within the Swedish strategic research areas BECC (Biodiversity and Ecosystem Services in a Changing Climate) and MERGE (Modelling the Regional and Global Earth System). His research focuses on Earth system science with particular emphasis on vegetation-climate interactions, ecosystem modeling, and environmental change. He is the recipient of Swedish Research Council for fundamental research (VR) Starting Grant and has secured funding from several major funding agencies, including the Swedish National Space Agency (SNSA), the Crafoord Foundation, Swedish Research Council for sustainable development (FORMAS), and the Royal Society (UK). Wenxin has published widely in leading international journals, including *Nature Communications*, *Nature Ecology & Evolution*, *Geophysical Research Letters* etc., and has served as an Associate Editor for *Functional Ecology*, *Journal of Plant Ecology*, and *Frontiers in Environmental Science*.

报告摘要

The Arctic is warming at an unprecedented rate, with the past decade the warmest on record and winter temperatures rising faster than in any other season. This rapid change is transforming Arctic landscapes, driving profound shifts in vegetation structure, composition, and function. Across tundra and boreal ecosystems, we are observing widespread shrub expansion, treeline advance and fundamental changes in carbon and nitrogen cycling. Capturing these dynamics requires integrating observations across spatial and temporal scales with process-based ecosystem models. In this talk, I present research using a coupled regional Earth system modelling framework to investigate Arctic terrestrial ecosystem responses and their feedbacks to climate. A dynamic vegetation model, LPJ-GUESS, is coupled with the Rossby Centre feedbacks Atmospheric Model (RCA4) and the Rossby Centre Ocean model (RCO), enabling the assessment of biogeophysical feedbacks under multiple climate scenarios. Our findings show that vegetation change actively amplifies Arctic warming. Through albedo and evapotranspiration feedbacks, shifts in vegetation alter near-surface climate variability, reshape future ecosystem dynamics, and influence the strength of the Arctic carbon sink. These processes also contribute to accelerate sea ice loss and changes in cyclone behavior. These results highlight that vegetation is not merely a passive responder to climate change, but a key driver of Arctic system dynamics. Understanding these interactions is essential for improving predictions of future climate and for anticipating the trajectory of the rapidly changing Arctic Earth system.