Дорогие коллеги!

Следующее заседание палеоботанического семинара состоится **12 ноября в 15.00**. Подключиться можно по ссылке: https://zoom.us/j/9104791704 Идентификатор конференции: 910 479 1704

Robert A. Spicer сделает доклад «**The Evolution of Earth's 'Third Pole' - how plant fossils have changed how we think our planet works».**

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С наилучшими пожеланиями, Наталья Завьялова

P.S. До конца года запланированы доклады Е.В.Бугдаевой «Юрско-раннемеловые растения-углеобразователи юга Сибири и российского Дальнего Востока», С.М.Снигиревского и А.П. Любаровой «Этюды о позднедевонской флоре Северного Тимана» и А.В.Гоманькова «Цикадовые в перми Ангариды».

The Evolution of Earth's 'Third Pole' - how plant fossils have changed how we think our planet works

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The Tibetan Plateau and surrounding highlands (the Himalaya to the south, the Karakorams to the west and Hengduan Mountains to the east) comprise the largest land orographic feature on Earth, which is often termed 'Earth's Third Pole', and is regarded as being an important amplifier of the Asian monsoon system upon which nearly half the world's human population depends for water, food, and industry. Trying to understand the orographic development of the region has generated heated arguments between geodynamicists, and ideas of how the region's orography evolved are many and varied. The problem has been that a lot of what is happening at depth in Earth's crust has to be inferred from limited surface data using models of how we think rocks behave deep below the surface where we have no direct access. Even deep seismic studies are subject to different interpretations.

The effect of the Tibetan Region topography on climate is largely a function of its area and relief and this has changed over time as a function of crustal processes, which remain poorly understood. What we need to do is measure surface height using proxies, and several such palaeoaltimeters have been developed. The most widely applied have been those based on isotopes of oxygen, carbon and hydrogen in lake and soil carbonates and plant waxes, as well as those based on fossil material, both plant and animal, using thermal lapse rates and conservation of energy principles. Each have advantages and disadvantages, but when used together can quantify surface height changes robustly.

Isotope-based palaeoaltimetry makes numerous assumptions about isotopic composition at the start of an air parcel's journey over a landscape, how isotopes fractionate in relation to surface height, how they are converted into a carrier (minerals or organic matter), whether or not they are altered during diagenesis and how they are eventually sampled and analysed. Using thermal lapse rates to convert temperatures derived from clumped isotopes or fossils is also fraught with complications, although recent explorations of using wet bulb temperatures, instead of the more conventional dry bulb measurements, shows great promise. Finally, while employing moist enthalpy and conservation of energy principles appears to be the most straightforward, and has been widely applied, even this approach can over-estimate surface height.

In this talk I will review the various concepts of Tibetan orographic evolution based on a range of palaeoaltimetric measurements and show how recent developments, and in particular new discoveries of plant fossils, have transformed our understanding of changes in the Tibetan landscape from the Cretaceous to present, the associated monsoon development and the origins of the extraordinarily rich biodiversity of Asia. I will show how the concepts of Tibet rising as a single entity, progressive north to south growth of the plateau and expansion north and south from a high Eocene Proto-Plateau have now been superseded. We now envisage transformation from a central Meso-Tethys sea to a great Paleogene Central Tibetan Valley hosting a diverse subtropical biota in the middle Eocene through to a near plateau with semi-desert vegetation by the start of the Neogene. The mid Miocene climatic optimum saw central Tibet hosting a warm temperate woodland before transforming to today's Alpine steppe as the high Himalaya developed and global climate cooled. Palaeogene surface height changes across Tibet as revealed by plant fossils have implications for how we think about deep Earth tectonic processes.