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Book of Abstracts



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Central Europe during Paleogene greenhouse conditions with respect to regional tectonic and volcanic influence. Except for PvH, which is most probably a small pull-apart basin, the other basins are maar lakes and formed as a consequence of phreathomagmatic eruptions. Based on revised $^{40}\text{Ar}/^{39}\text{Ar}$ dates the eruptions at Offenthal ($47.71/47.87 \pm 0.3$ Ma) and Messel ($48.11/48.27 \pm 0.22$ Ma) are nearly of the same age around the Lower/Middle Eocene boundary. Palynostratigraphic analyses indicate a Lower Eocene age for the studied part of PvH and a Middle Eocene age for Groß Zimmern. Our quantitative palynological studies revealed different pollen and spore assemblages in each basin, but similar general trends in the evolution of the vegetation can be recognized in all of the basins. The succession in the maar lakes starts with the progressive recolonization of the area in the vicinity of the craters by pioneering elements such as ferns or Restionaceae and continues into a paratropical rainforest and, finally, a climax vegetation with a dominance of juglandaceous and fagaceous plants. Nevertheless, each basin has its unique story to tell. In Messel the following undisturbed record of about 600.000 years reveals the influence of orbital forcing on the climate and the composition as well as on the diversity of the climax vegetation during the early Middle Eocene. A climax vegetation comparable to Messel is not documented at Offenthal mainly due to a significant shorter time period reflected in the respective succession of lake sediments. At Lakes PvH and Groß Zimmern regional tectonic activity had a much higher influence on the paleoenvironment than orbitally controlled climate change.

9:15am - 9:30am

Assessing the Late Quaternary climatic and environmental history of the Russian Arctic – keys results of the Russian-German PLOT (Paleolimnological Transect) project

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The joint Russian-German project 'PLOT - Paleolimnological Transect' aims at recovering lacustrine sediment sequences along a >6000 km-long longitudinal transect across the Eurasian Arctic in order to investigate the Late Quaternary climatic and environmental history. The climate history of the Arctic is of particular interest as the region is experiencing major impact of the current climate change. The project has been funded by the German and Russian Ministries of Research for a duration of three years (2015-2018) and was conducted under the umbrella of a bilateral Russian-German agreement in the field of polar and marine research. Since 2013 extensive fieldwork, including seismic surveys, coring, and hydrological investigations, has been carried out at lakes Ladoga (NW Russia), Bolshoye Shuchye (Polar Urals), Emanda (Verkhoyansk Range), Levinson-Lessing and Taymyr (both Taymyr Peninsula). Fieldwork in the Ural Mountains and on the Taymyr Peninsula was conducted in collaboration with the Russian-Norwegian CHASE (Climate History along the Arctic Seaboard of Eurasia) project. A multiproxy approach was applied to the analytical work of all cores, including (bio-)geochemical, sedimentological, geophysical, and biological analyses. First data implies the presence of preglacial sediments in the cores from all lakes, except Lake Emanda. Age-depth models, based on radiocarbon dating, OSL dating, paleomagnetic measurements, identification of cryptotephra, and varve counting (where applicable), are in progress except for Lake Ladoga (recently published). The records shall be correlated to that of Lake El'gygytgyn (NE Russia), which represents the master record for the Siberian Arctic. The outcome of the PLOT project will be a better understanding of the temporal and spatial variability and development of the Arctic climate. Here, we present and discuss the most important results available from the geophysical site surveys and core analyses, and provide an outlook on the future strategy and foci of the

project. Key results of the project have been published in spring of this year in a special issue of the journal *Boreas*, including publications about Lake Ladoga and Lake Levinson-Lessing.

9:30am - 9:45am

The Holocene lacustrine record of the Layla Lakes (central Saudi Arabia): The use of phytolith analysis for the reconstruction of paleoenvironment and paleoclimate

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The Layla Lakes in central Saudi Arabia are located 300 km south of Riyadh and were fed by groundwater, but dried up in the late 1980's due to intensive groundwater use, revealing a series of 21 dry hypogene karst sinkholes of different sizes in the Jurassic Hith Formation. In one of these sinkholes with a size of 400 x 100 m and a depth of 10 m several samples were taken by a field campaign in 2011. Furthermore, a sediment core was drilled at the margin of the sinkhole, revealing a lacustrine succession of 10.8 m.

First radiocarbon ages of mollusk shells and U/Th dating of carbonates indicate that the sedimentary succession covers the last 6000 years in a region, where such a complete sedimentary record is unknown so far for the Holocene. Mineralogical and geochemical studies show with sulphates (gypsum, anhydrite) and calcites (carbonates) two distinct types of sediment in the succession which regularly alternated in their dominance. The carbonates precipitated when the exchange between groundwater and lake water was too large to achieve supersaturation of gypsum, while the sulfates mark periods of strong evaporation. This may indicate cyclic climate variations between dry and more humid phases on a millennial scale.

The sediments revealed a rich assemblage of microfossils that comprise pollen, spores, diatoms, freshwater algae, testate amobae, other non-pollen palynomorphs, but above all a diverse and abundant phytolith assemblage. Therefore, for the first time we can present a qualitative and quantitative analysis of phytoliths from central Saudi Arabia. The study suggests an occurrence of grasses, but also shrubs, rice and other larger plants in the vicinity of the lake. The diversity and the changing abundances of these plant silicates indicate vegetational trends within an island vegetation in the center of the arid region of the Arabian Peninsula. In combination with geochemical and palynological results, the phytoliths show the occurrence of at least four humid phases with flooded habitats at the edge of the lake and the distribution of a dense herbaceous vegetation.

9:45am - 10:00am

A 8.5 kyr high-resolution multi-proxy paleoclimate record from lake Voëlvlei, Southern Cape, South Africa

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South Africa is a key region for paleoclimate studies reconstructing and understanding past changes in atmospheric circulation, because it is affected by both, the mid latitude Southern Westerlies and the tropical Easterlies. However, due to the scarcity of natural archives, the climatic and environmental evolution of South Africa during the late Quaternary is highly debated. Voëlvlei is a shallow lake situated at the junction of both climate systems near the southern Cape coast, and thus an ideal archive to investigate past regional environmental changes. A 13 m long sediment core was retrieved from this site and analysed using a multi-proxy approach, including granulometric and elemental analyses (ICP-OES, CNS, XRF), as well as leaf