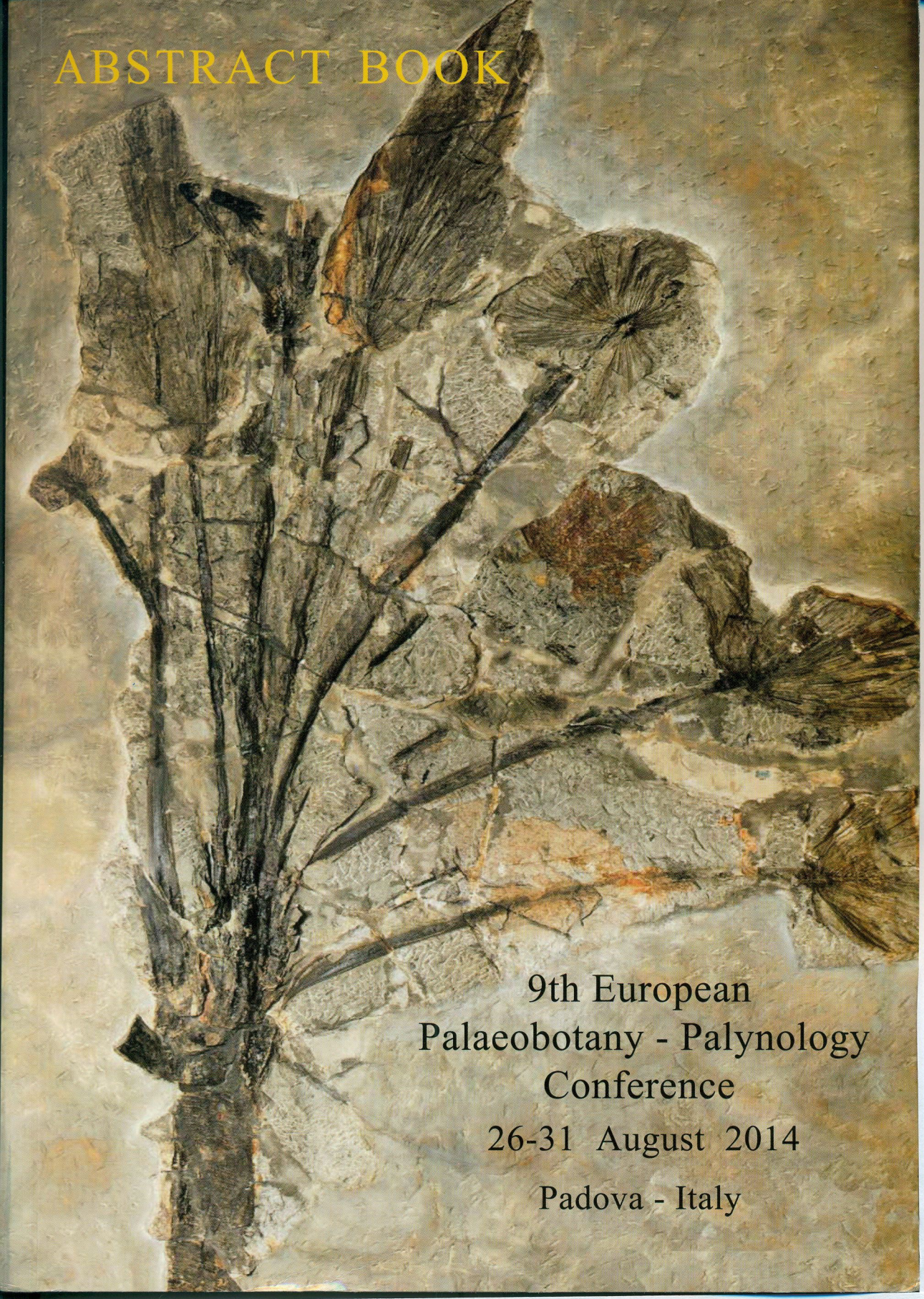
ABSTRACT BOOK



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The impact of the 8.2 ka rapid climate change event on the vegetation and lake ecosystem of the South Carpathian Mountains, Romania

TALK IN SESSION S28

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The Early Holocene (11600–7000 cal yr BP) was a climatically unstable period, rich in rapid climate change events (RCCs). Out of the short cooling events, the 8.2 ka event is of particular importance, partly because it is also detectable in the $\delta^{18}O$ record of the Greenland ice core (NGRIP). Research results from Europe suggest changes in pollen production and treeline both in the Alps and Eastern Carpathians. In this study we present high-resolution Early Holocene pollen, charcoal, plant macrofossil, diatom, biogenic silica and loss-on-ignition records from a mountain lake (Tăul dintre Brazi) in the South Carpathians in order to reveal ecosystem response to the 8.2 ka climatic oscillation. We found significant changes both in terrestrial vegetation and lake diatom assemblages in the northern slope of the Retezat Mts between ca 8300 and 8000 cal yr BP. Rapid changes in relative frequencies and pollen accumulation rates of the major deciduous pollen types (*Carpinus betulus*, *Quercus*, *Fraxinus excelsior*, *Quercus*, *Ulmus* and *Corylus avellana*) associated with peaks in microcharcoal accumulation rates suggested that vegetation disturbance mainly took place in the mixed-deciduous forest zone, where woodland fires partially destroyed the populations of *F. excelsior*, *Quercus* and *C. avellana*, and facilitated the establishment of *C. betulus* in the forest openings. Macrocharcoal accumulation rates were low at these times showing no changes in vegetation composition in the subalpine zone. These data corroborate the pollen-inferred positioning of the fires to the deciduous forest zone and the absence of vegetation disturbance in the spruce zone where the studied lake is situated. The diatom record furthermore showed the spread of a planktonic diatom species, *Aulacoseira valida*, at 8150 cal yr BP, coincidently with a short-lived expansion of *C. betulus*. Since diatom blooms mainly occur in spring in the Retezat Mts, increased spring water-depth and increased water turbulence was inferred from these data. The expansion of *C. betulus* against *F. excelsior* and *C. avellana* at the same time suggested a modest increase in available moisture during the growing season. Taken together, our data imply that during the 8.2 ka event winter and spring season available moisture increased, while summers were characterised by alternating moist/cool and dry/warm conditions.

DNA analysis as tool for identification of bacteria in archaeological waterlogged wood

TALK IN SESSION S32

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In this work molecular techniques were applied in order to integrate the results obtained by Optical (OM) and Scanning Electron (SEM) Microscopy, to understanding and assessing the changes in the anatomical structure of archaeological waterlogged wood (*Pinus* sp.) induced by bacteria colonization. Observation of wooden thin sections by OM showed the presence of black and dark-brown areas (must probably due to sulfur compound) and mineral concretions. The SEM micrographs revealed a specific cell wall alteration, attributable to bacterial activity and abundant pyrite framboids (as single structure or clustered). The presence of sulfur compounds in archaeological waterlogged wood, indicate both long-term burial in anoxic environment and colonization by sulfate-reducing bacteria. Molecular biology investigation was performed through *ad hoc* protocols by direct DNA extraction from wood samples and *in vitro* amplification of

bacteria DNA target sequences (16S, ITS regions-rRNA). The results reveal and identify bacterial genus as *Pseudomonas*, *Cellulomonas*, *Xanthomonas* and *Bacillus* that, as reported in the related scientific literature, are the most common cellulosolytic and ligninolytic bacteria. Moreover were also revealed the presence of *Marinobacter* sp. and *Desulforudis audaxviator*, respectively iron - oxidizing and sulfate - reducing bacteria. The investigation protocol set up in this work can be applied to a range of wooden artifacts of archaeological findings for both identification of bacteria colonization shed some light on the degradation phenomena, indispensable for correct conservation and restoration strategies.

Ecological insights from a long pollen record from a mid-altitude site in SW Balkans

TALK IN SESSION S28

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Lake Prespa is situated at an altitude of 849 m a.s.l. in a mountainous region of SW Balkans (40°57'50" N, 20°58'41" E), which at present is characterized by a sub-Mediterranean climate and a diverse modern flora. A long composite sediment core covering the last 92 ka was investigated using pollen analysis. This continuous pollen record suggests that the wider Lake Prespa catchment sustained refugial temperate tree populations throughout this period. Oak pollen comprises the majority of the temperate tree percentages and the continuous oak curve suggests their survival at Prespa over the last glacial at lower elevations and sheltered locations. Oak forests are dominant within the catchment over the Holocene. Increasing anthropogenic activity including deforestation (mostly pines), pastoralism and agriculture resulted in an increase of herb percentages during the late Holocene. In order to evaluate the impact of grazing on understory species in oak forests, moss polsters from mid-altitude oak forests with different grazing regimes were analyzed. The modern pollen spectra suggest that grazed oak forests are more diverse in terms of herbaceous pollen species. In the fossil pollen spectra, a distinct increase of palynological richness is recorded after ca 2 ka cal BP. Considering that herbaceous pollen is usually underrepresented in forested stages due to limited wind dispersal below the canopy, the pollen suggests that this increase in palynological richness recorded in the Prespa catchment is most likely triggered by forest clearing and intensification of agriculture that produced a mosaic vegetational structure.

This project is part of the Collaborative Research Center 806"Our Way To Europe; Culture-Environment Interaction and Human Mobility in the Late Quaternary" (www.sfb806.de).

Modern pollen and charcoal studies from eastern Mediterranean

TALK IN SESSION S30

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The Pollen Monitoring Programme (PMP) aims at better interpretation of past vegetation changes by monitoring modern pollen deposition and inventorying vegetation around the pollen monitoring sites. Fire events constitute a major ecological disturbance that can cause large changes in the vegetation. Charcoal analysis is the main tool in assessing past fire regimes of an area. Sets of pollen traps placed in the Pieria Mts. (north-central Greece), Timfristos Mt (central Greece) and Troodos Mt (Cyprus) were analysed for their content in pollen and charcoal fragments several years after the fire events in 2007 (Pieria Mts., Troodos Mt) and 2008 (Timfristos Mt). Four size classes of charcoal fragments, 10–50 μm, 50–100 μm, 100–200 μm, and >200 μm were recorded. Deposition of charcoal fragments lasted for 2–3 years after the large (>2000 ha), mainly surface, fire in the Pieria Mts. In the Timfristos Mt, where a few small-size and relatively distant fires occurred in 2008, deposition of charcoal fragments ceased after 2009. In the Troodos Mt the large (>1000 ha), mainly crown fire resulted in the deposition of charcoal fragments in all traps until 2012. In the trap located closest to the fire, a significant rise in charcoal accumulation rates (ChAR) was observed in 2012, which is attributed mainly to sediment washed in the pollen trap. Charcoal fragments