



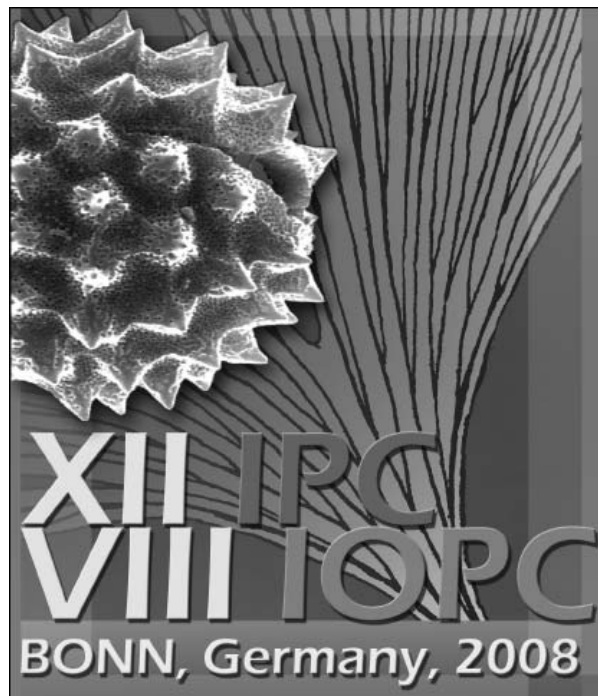
Terra Nostra 2008/2

Schriften der GeoUnion Alfred-Wegener-Stiftung 2008/2

12th International Palynological Congress (IPC-XII)

**8th International Organisation of Palaeobotany
Conference (IOPC-VIII)**

Abstract Volume



August 30 – September 5, 2008 in Bonn, Germany

TERRA NOSTRA – Schriften der GeoUnion Alfred-Wegener-Stiftung

Publisher

Verlag



GeoUnion Alfred-Wegener-Stiftung
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Vol. 2008/2

Heft 2008/2

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Editor

Herausgeber

Organizing Committee in Bonn
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University of Bonn
Nussallee 8, 53115 Bonn, Germany

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Redaktion

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University of Bonn
Nussallee 8, 53115 Bonn, Germany

Printed by

Druck

Bayleydruck GmbH, Bonn

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ISSN 0946-8978

GeoUnion Alfred-Wegener-Stiftung, Berlin, August 2008

Abstracts

geological research carried out by the GSP. Following the program that commemorates the 100 years after the death of N. Delgado, preliminary palynostratigraphic research was established in several samples from the N. Delgado collection, that allowed the discovery of a surprising new world in the old material of the Geological Museum. Investigated samples are from the *Xistos com Phyllocytes* Formation from the Mestre André quarry (Barrancos village). This rock unit crops out in the Estremoz-Barrancos sector of the Ossa Morena Zone (Southeast of Portugal) and consists of dark, green and reddish micaceous shales and siltstones. The upper part also contains psammites with abundant ichnofossil genera, such as *Phyllocytes*, *Nereites*, *Dictyodora*, *Palaeophycus* and *Gordia* genera. These uppermost levels yielded the graptolites *Expansograptus sparsus* and *E. hirundo* that indicates a late Floian age. The trace fossil assemblage and the graptolites indicate an offshore shelf depositional environment. The first determination on acritarchs in the upper levels of the *Xistos com Phyllocytes* Fm are from 1988, when Cunha & Vanguetaine recovered in two samples, from an outcrop along the road Sto Aleixo-Barrancos (Km 94,2), a moderated preserved assemblage assigned to the Floian-Dapingian boundary. The preliminary age determinations based on acritarchs, from the Mestre André quarry, are here presented. The acritarch assemblages are abundant and very well preserved and contain *Acanthodiacrodiium costatum*, *Acanthodiacrodiium uniforme*, *Arbusculidium filamentosum*, *Coryphidium bohemicum*, *Polygonium* sp., *Steelfiferidium stelligerum*, *Striatotheca principalis parva*, *S. rugosa*, *Veryhachium lairdii* and *V. trispinosum* suggesting a mid late Floian age, that confirms the preceding dating.

071

Lateglacial vegetation and climate changes in the central Russian Plain: reconstructions based on pollen floras

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The use of palaeobotanic data for climate reconstructions implies that the flora of a certain region is strongly influenced by the environment and climate. Geographical analysis of the modern spatial distribution of the plants of a fossil flora (compilation of a so-called *arealogram*) allows finding the location of the closest modern floristic analogue to the past vegetation at the site. The present-day features of plant communities and the climatic indexes of the region-analogue would be close to those that existed at the site in the past. A series of arealograms was compiled for the fossil pollen floras derived from a section near Moscow, which characterises the main climatic episodes of the Lateglacial. The closest modern region-analogues for the fossil floras of the cold stages of the Lateglacial are found in the depressions of the Altai and Sayan Mountains (southern Siberia). In the Oldest and Younger Dryas the central Russian Plain was covered by periglacial forest steppe. It combined herbaceous communities similar to modern cold dry steppe, open woodlands formed by tree species growing at present in the Siberian interior, and meadows with tundra elements. Ultra-continental climate was characterized by extremely cold winter (the mean January temperature (T) from -23° to -27°C) and relatively warm summer (the mean July T app. 18°C). The annual

magnitude of air T was 15° greater than the modern one. The mean annual T of -4°C was favorable for permafrost development. The mean annual precipitation was app. 400 mm. Modern region-analogues for the fossil floras of the Bølling and Allerød are found at the southeastern flanks of the Urals, where meadow steppes come into contact with pine-birch and spruce-fir forests with minor role of *Quercus*, *Ulmus*, and *Tilia*. The climate was significantly milder than during the cold stages: TJan -16°, TJuly 17-18°C. The mean annual precipitation was 650-700 mm. The mean annual T was above freezing, which permitted relatively thermophile broad-leaved trees to penetrate the area, thus indicating a complete degradation of permafrost. The Allerød was the most favorable time for the expansion of dark coniferous taiga of *Picea abies*, *Pinus sibirica*, and *Abies* in the central Russian Plain. Nevertheless, the interstadial climate remained more severe and continental than the modern one. The Younger Dryas cooling caused a temporary disappearance of the broad-leaved species, general reduction of the forests and, probably, a re-advance of permafrost in the region.

072

The archaeo-environmental reconstruction from the Roman-Gothic site Fiorina di Domagnano (Repubblica di San Marino, 1st cent. BC - 6th cent. AD) based on pollen and macroremains

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A multidisciplinary archaeobotanical investigation (pollen, seeds/fruits, woods/charcoals – EU PaCE project) has been carried out for reconstructing the landscape of Fiorina di Domagnano (260 m asl) renown for its Ostrogothic Treasure (late 5th - early 6th cent. AD). 13 pollen samples belonging to 5 layers cover the phases preceding the onset of the site (before the 3rd cent. BC), and the time it was inhabited (till the 6th cent. AD). Seeds/fruits and most of woods (including hand-made objects)/charcoals were collected from a Roman well secondarily used by Gothic people (6th cent. AD). Pollen data showed that, prior to the onset of the settlement, a conifer forest grew in the area. Traces of cultivations were absent. At the establishment of a Roman rustic-productive settlement (1st cent. BC), forest cover drastically reduced, pollen of *Olea*, *Juglans* and *Vitis* was recorded, and cereal pollen was found in notable amount (>13%). A clear impact of the Roman settlement on the plant landscape, with cultivations in the area and possibly cereal processing in the site, is shown by pollen. Later, a residential house was built (1st cent. AD), and accordingly cultivated trees increased and cereals decreased. When the Roman residential house declined (approximately 3rd cent. AD), cereals increased again. At the last phase, there was a rural Gothic building (6th cent. AD) in the site. The recovering of macroremains provided more detailed environmental reconstruction from this phase. The cultural landscape included grazing open areas, and cultivations of cereals

(*Hordeum vulgare* and *Triticum*), *Olea europaea*, *Vitis vinifera* subsp. *vinifera*. The high presence of cereal pollen, and the pips and olive endocarps broken by pressing suggest that agricultural products were processed in the site. *Anthemis tinctoria* (about 9% of the carpological record) was perhaps used for dye works. Other useful plants were grown around the building (e.g., *Ficus carica*, *Juglans regia*, *Pinus pinea*, *Taxus baccata*). There were kitchen gardens (e.g., *Coriandrum sativum*, *Fragaria vesca*, *Melissa officinalis*, *Papaver somniferum*, *Portulaca oleracea*, *Vicia faba*) with some fruit trees (e.g., *Malus domestica*, *Pyrus communis*, *Prunus domestica* subsp. *insititia*). Also, there were wet environments with *Alisma plantago-aquatica*, *Lemna*, *Najas minor*, *Nymphaea alba*, *Phragmites*, *Zannichellia palustris*, etc. Woods were in the background, not far from the site, including hygrophilous or deciduous oak wood, and beach wood with conifers.

073

Characterization of the male date palms by the pollen

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Date Palm (*Phoenix dactylifera* L.) is one of the most important plants of the desert in the world. It belongs to a heterozygotic and dioecious species. The female palms are characterized easily from their fruits, whereas the male trees, producing the pollen, pose a problem of characterization. We have used some pollinic characters as the shape, the size, the aspect of the exine and the sporoderm stratification for the characterization of the male palms. The present work consists in analyzing, by computer, of the scanning electronic microscope pictures of the date palm pollen. Twelve samples of pollen belonging to 4 different clones have been analysed. The obtained results allowed us to characterise in order to select the male palms according to the palynologic parameters studied. These results have direct practical uses because they contribute to the selection of the best types of pollens at the time of the artificial pollination of the date palm.

074

Wood anatomical variations in a ring porous species and application on a fossil wood study

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Wood anatomy is an excellent indicator of trees growing environment. Growth rings record the physical and meteorological events and thus constitute a very important information source in various topics, such as, palaeoenvironment researches, dendrochronology and forest management. The interpretation of archaeological and fossil wood has led to an extensive network of chronologies and information about past climates. Although wood structure is very complex and multidimensional, these data are almost entirely derived

from a single wood parameter: tree-ring width. In order to get a better comprehension of past climates and probably an accurate vision of them at a sub-annual resolution, we have to take into account other parameters in addition to annual ring width. The sensibility of other wood anatomical characters to geographical distribution has already been shown, but today the intraspecific answer of tree to climate is still nearly unknown. In this study, we explored wood anatomy variations in the temperate species, *Castanea sativa*, along a geographic gradient from Northern Spain to Northern France. Thanks to Image J, a medical image treatment software, we studied more particularly two groups of wood characters related to productivity (growth ring length) and porosity (vessels density, mean vessel area, maximal vessel area, and total porosity surface). This preliminary study, allowed distinguishing, among other, a few correlations between some wood anatomical variables, and a strong link between wood porosity and minimal winter temperature. Moreover, several profiles among growth rings could be described. In order to explain these groups, we introduced climatic variables as descriptive variable in a principal component analysis. This study constitutes an outline project for the global understanding of ring formation and quantitative wood anatomy character variations, as well as their climatic determinism. It thus brings knowledge about potential varying characters, and methods which could potentially be applied on fossil wood deposit so as to better decipher the huge records that fossil wood constitute. We applied the same methodology to samples of *Castanoxylon bavaricum*, from the upper Miocene of Cantal (South of France) in order to test this last point.

075

How green was *Cooksonia*? The importance of size in understanding the early evolution of physiology in the vascular plant lineage

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Because of the fragmentary preservation of the earliest *Cooksonia*-like terrestrial plant macrofossils, younger Devonian fossils with complete anatomical preservation and documented gametophytes often have received greater attention concerning the early evolution of vascular plants and the alternation of generations. Despite preservational deficits, however, possible physiologies of *Cooksonia*-like fossils can be constrained by considering the overall axis size in conjunction with the potential range of cell types and sizes, because their lack of organ differentiation requires that all plant functions be performed by the same axis. Once desiccation resistance, support, and transport functions are taken into account, smaller fossils do not have volume enough left over for an extensive aerated photosynthetic tissue, thus arguing for physiological dependence on an unpreserved gametophyte. As in many mosses, axial anatomy is more likely to have ensured continued spore dispersal despite desiccation of the sporophyte than to have provided photosynthetic independence. Suppositions concerning size constraints on physiology are supported by size comparisons with fossils of demonstrable physiological independence, by preserved anatomical detail, and by size correlations between axis, sporangia, and sporangial stalk in Silurian and Early Devonian taxa. Several *Cooksonia*-like taxa lump fossils