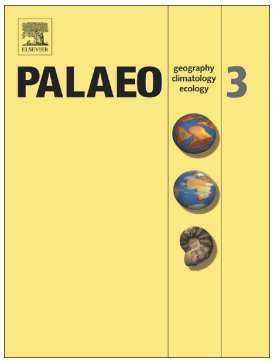

Tree-ring analysis elucidating palaeo-environmental effects captured in an in situ fossil forest – The last 80years within an early Permian ecosystem

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Tree-ring analysis elucidating palaeo-environmental effects captured in an in situ fossil forest – the last 80 years within an early Permian ecosystem

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Abstract

The early Permian Chemnitz Fossil Lagerstätte (Leukersdorf Formation, Chemnitz Basin, SE Germany) represents a diverse T^0 assemblage of a fossil forest ecosystem around Sakmarian-Artinskian transition (290.6 ± 1.8 Ma), which was preserved by a series of volcanic events. The multi-aged plant community consists of predominantly hygrophilous elements, which grew on an alluvial plain mineral substrate under sub-humid conditions, representing a wet spot environment. Strong seasonality triggered the formation of annual tree rings in arborescent woody plants, such as pycnoxylic gymnosperms, medullosan seed ferns and calamitaleans. From several hundred fossil trees, the 53 best-preserved specimens were selected and investigated in detail by measuring 2,081 tree rings in individual sequences of up to 77 rings. Ring sequences were analysed by standard dendrochronological methods to determine both annual growth rates and mean sensitivity. Morphological and statistical analyses on single tree rings reveal different tree-ring types according to the different plant groups. Pycnoxylic gymnosperms have distinct and regular