DEAD BUT STILL INTERACTIVE – FOSSIL WOODY DEBRIS AS ARCHIVE FOR DEEP-TIME INTERACTIONS IN CONTINENTAL ENVIRONMENTS

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Since the Middle Devonian woody debris has formed a significant component in vegetated continental ecosystems and depositional settings. Compared to other plant tissues, lignified matter has greater mechanical stability and chemical resistance, thanks to its composition and structure. As a result, wood can attain high retention times in depositional systems, allowing for numerous environmental interactions. Although relations among deadwood and organisms are well reflected in modern ecosystems, they remain poorly understood in deep-time environments. This talk scrutinises the significance, diversity, and abundance of interactions that deadwood had with other organisms and depositional processes in past continental settings. We provide fossil evidence of woody debris associated with microbes, plants, animals, and sediments, based on case studies from late Palaeozoic lacustrine, fluvial, alluvial and volcanic strata of both hemispheres. One example concerns permineralised conifer stems from the early Permian Manebach locality/Germany. At this site, the fossil wood occurs within microbialites at the base of the lacustrine Manebach Lake Unit. The preservation of the stems and the microstructure of their host rocks reveal that woody debris provided an important colonisation substrate for the stromatolite formation in littoral environments. By contrast, silicified stems from Winnweiler, Kyffhäuser (both Germany), the northern Czech Republic and north-central Brazil document the abundance of woody debris in Late Pennsylvanian–early Permian alluvial settings. Based on three-dimensional analyses of the log-bearing sediment architectures, the examples elucidate the role of woody debris in alluvial-fan deposition and fluvial bar formation. Finally, early Permian petrified deadwood from Chemnitz/Germany indicates that woody debris served as a shelter for animals during volcanic eruptions, making such accumulations excellent fossil traps. Our selection proves the potentials of fossil-wood research in understanding biosphere-geosphere dynamics on ancient Earth and supports evolution as a significant driver of landscape formation and biodiversity.