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Thermal maturity of Cretaceous deposits in the marginal trough of the Bohemian Cretaceous Basin – evidence for deep burial during Late Cretaceous inversion of Central Europe

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During late Cretaceous, Central Europe was affected by strong NW-SE contraction resulting in the uplift of basement highs, inversion of normal faults and graben structures (between 4 and 12 km) and subsidence of adjacent basins (> 2.5 km). Fission track data and deposition rates in northern Germany point to maximum rates of uplift and subsidence in the timespan of only 15 Ma during Coniacian, Santonian and Campanian times. While the sedimentary record of these inversion-related basins is well preserved in the north, Cenozoic regional uplift of the southern region resulted in widespread removal of the sedimentary cover. One of these inversion-related and partly eroded basins is the Bohemian-Saxonian Cretaceous Basin. Deposits reach only from Cenomanian to Coniacian; deposits of the maximum inversion pulse were not preserved. Coals and plant remains from the Saxonian part of the basin provide the opportunity to reconstruct the thermal history and the burial of these basins. Samples were taken from Cenomanian fluvial deposits at the base of the Saxonian Cretaceous from some boreholes close to the active basin margin. The random reflectance of vitrinite in these deposits fluctuates between 0.9 and 1.15%, pointing to maturation temperatures between 125 and 145°C. Assuming a normal present-day geothermal gradient of c. 25°C km-1 for Central Europe, a burial of more than 4 km can be concluded. Considering the preserved thickness between 500 and 1000 m in this basin, most of the overlying sequence was removed. We therefore conclude that more than 3000 m of syntectonic deposits of Santonian to Upper Campanian age were eroded and transported to the north to account for the thermal maturity values observed.