



Palynology, stable isotope signatures and clay mineralogy of the Triassic-Jurassic boundary interval of the W Carpathians (Tatra Mts., Slovakia): clues for climatic change reconstruction

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The Triassic-Jurassic sedimentary series of the W Carpathians represent deposits of the NW Tethyan shelf area. The studied key sections expose a complete succession of a proximal setting. The Upper Triassic Fatra Formation is characterised by bioclastic limestones and fine-grained clastics overlain by dark claystones with intercalated sandstones of the lowermost Jurassic Kopieniec Formation. Based on a significant negative excursion of the $\delta^{13}\text{C}_{carb}$ isotopic curve and on microfacies analyses the boundary interval is placed near the transition of the two formations.

Palynofacies of the boundary interval is dominated by terrestrial components. The few marine organic particles indicate a very shallow marine depositional environment. The palynomorph assemblage of the Fatra Formation is characterised by numerous specimens of *Ricciisporites tuberculatus*. The marine fraction of the lower part of the section is dominated by the dinoflagellate cyst *Rhaetogonyaulax rhaetica*. The microflora of the Upper Fatra Formation is very similar to the *Ricciisporites tuberculatus* Zone of the Polish zonation and the *Ricciisporites-Polypodiisporites* Zone of the SE North Sea Basin, both indicating a Mid to Late Rhaetian age.

The palynomorph assemblage of the Kopieniec Formation is characterised by a significant increase of trilete laevigate spores, mainly *Deltoidospora* spp. and *Concavisorites* spp., interpreted as a signal of increasing humidity. The dinoflagellate cyst *Dapcodinium priscum* replaces *Rhaetogonyaulax rhaetica* in the marine fraction.

Semi-quantitative clay mineral analyses document palaeoclimatic, palaeogeographic and post-sedimentary changes within the boundary interval. Mixed-layer illite/smectite (I/S) constitutes about 80 % of the clay fraction. The low content of smectite layers in I/S (10-20 %) indicates a relatively high diagenetic overprint of the claystones of the Fatra and Kopianec formations, corresponding to a burial temperature of 150°C. Varying content of detrital illite, chlorite and kaolinite is used to detect climatic changes in the hinterland and for interpretation of the depositional conditions. Rhaetian sediments are characterised by illite+chlorite dominance. Increasing humidity during earliest Jurassic is indicated by a relatively high amount of kaolinite. A kaolinite peak at the base of the Kopianec Formation indicates different sources and a strong terrestrial input into the proximal part of a deltaic plain.