Redefinition of the Permian–Triassic Boundary in Velebit Mt., Croatia: New geochemical and isotope data

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New biogeochemical data redefined the position of the Permian–Triassic boundary (PTB) in the Velebit Mt., Croatia, previously positioned at the lithological boundary, and indicate two stress events. Pronounced enrichment in REE concentrations, negative Ce anomaly, negative shift in $\delta^{13}C_{ker}$ values and disappearance of microfossils coincide with the occurrence of ooids, marking the first stress event, most probably the Late Permian regression. The second event is the PTB, with the well known negative shift in $\delta^{13}C_{carb}$ from +1.4 to −0.6‰ (VPDB; P: −0.8 to +2‰; Tr: −1.3 to +0.9‰) and biota impoverishment. The $\delta^{13}C_{ker}$ values at PTB are ~−27.1‰, P: −27.3 to −24.4‰, and Tr: −29.1 to −26.4‰. The $\delta^{15}N_{ker}$ values show a preferential marine influence during the Late Permian (~7‰) before the regression phase, and enhanced terrestrial influence towards the PTB with presence of cyanobacteria (−2 to +4‰), which seems to be the only surviving taxa. Long chained *n*-alkanes (C_{17}–C_{31}, max. C_{26}), with even/odd predominance are probably derived from the freshwater green microalga *Botryococcus braunii*, indicating lagoonal-type environment. The C_{17}/C_{18} ratios show a stronger algal influence during Early Triassic. Prystane and phytane are present in most samples and they can be derived from chlorophyll in algae and cyanobacteria. The distribution of *n*-alkylcyclohexanes (C_{17}–C_{24}, max. C_{21}) with even/odd predominance indicate a bacterial biomass contribution. Values of Pr/Ph ratio are mostly <1, probably indicating anoxic conditions. Hopanes, the prokaryota biomarkers, have been identified in almost all samples (C_{29} to C_{32}), while steranes, biomarkers of eukaryotic organisms, have been found mostly in small abundances, in the range dia-C_{27} to ste-C_{29}, usually maximizing at ste-C_{27}, indicating marine input.

Mercury and other elements distribution along in a soil profile over diabase, in São Paulo, Brazil

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The fate of mercury through weathering processes remains poorly understood despite its importance in present and past environmental cycling of mercury. Here, the geochemistry of an oxisoil profile developed over diabase in Paulinia (São Paulo, Brazil) is assessed, in order to investigate element mobilization and re-distribution during weathering. Samples of fresh rock and 6 m of soil above it were collected during the dry season. The soil samples contain mainly kaolinite, goethite, hematite and also residual primary minerals, identified by XRD. Measured Hg concentrations were between 1 (rock) and 37 μg kg^{-1} (max in soil), comprising all soil samples. Hg concentrations increase upwards in the profile, reaching a peak in the B horizon. In the upper A horizon Hg concentrations decrease. Losses through emission to atmosphere may explain this behaviour, however other characteristics of the A horizon such as its weathering index (that of Parker, WIP) suggest that this horizon is allocthonous. Intriguingly, the order of elemental immobility in the profile is Hg>Th>Zr>Pb>REE>Nb>Ga>Al>Ti>Y>V. Concerning the specific environmental conditions of the soil profile, the affinity of Hg to the solid phase is remarkable. The pH of the soil (4.2-5.5) and TOC (0.2-6.2 g dm^{-3}) together with some experimental work by other authors suggest that Hg is probably sorbed on goethite and kaolinite as an inner sphere complex.