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Oral presentation

Differences in the behaviour of trace and rare-earth elements in oxidizing and reducing soil environments: Case study of Terra Rossa soils and Cretaceous palaeosols from the Istrian peninsula, Croatia

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This study compares the differences between the distribution of trace elements and rare-earth elements (REEs) formed under reducing and oxidizing soil conditions during pedogenesis on carbonate bedrock. Terra rossa (TR) soils, representing pedogenesis under oxic conditions, and Cretaceous palaeosols (CP), representing pedogenesis under reducing conditions, were sampled on the Istrian peninsula. They were studied by ICP-MS, ICP-OES, XRF, XRD, sequential extraction and statistical analyses. The differences in trace-element behaviour between the TR and CP stem from different redox conditions, but the most remarkable difference was observed in the behaviour of the REEs. Statistical analyses revealed that in TR soils all the REEs showed a very positive correlation, while in CPs the light REEs and heavy REEs showed an internal, very positive correlation. TR soils have almost twice as much REEs as CPs. This difference is pedogenetic, as both materials have a very similar amount of REEs in the residual fraction. While TR soils have the same amount of REEs in fractions other than the residual fraction, CPs have almost no REEs in these fractions. Different REE patterns obtained from sequential extraction, such as a middle-REE enrichment and a positive Ce anomaly in TR soils and light-REE depletion, heavy-REE enrichment, positive Ce and Eu anomalies in CPs, contributed to an understanding of the redox and pedogenetic processes. This study successfully emphasized the influence of different redox conditions on the behaviour of trace and rareearth elements during pedogenesis on a carbonate bedrock and the ability of the REEs to track pedogenetic processes.