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**Influence of the geological setting on the REE geochemistry of estuarine sediments: a case study of the Zrmanja River estuary (eastern Adriatic coast)**

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**Abstract**

Increasing use of rare earth elements (REE) in many new technologies results in their increasing presence in the environment and consequently in natural water systems. The Zrmanja River estuary represents a small, semi-closed system located in a karstic landscape of the eastern Adriatic coast characterised by the prevailing red soil (*terra rossa*) cover, numerous bauxite pits and the proximity of a decommissioned alumina plant, i.e. sources of geomaterials enriched in rare earth elements. To study the influence of such a substrate on estuarine sediment geochemistry, distribution of REEs in the surface sediments of the Zrmanja River estuary and surrounding soils were investigated. Both sediment and soil samples displayed significant variation in terms of REE concentrations as well as their normalised patterns, with overall highest REE levels measured in bauxitic soils ( $\Sigma\text{REE}$  333-596 mg kg<sup>-1</sup>); up to an order of magnitude higher than in other samples. In estuarine

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