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Elements in Geochemical Tracers in Earth System Science

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SELENIUM ISOTOPE PALEOBIOGEOCHEMISTRY

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Selenium Isotope Paleobiogeochemistry

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Abstract: The attraction of selenium isotopes as a paleoenvironmental tracer lies in the high redox potential of selenium oxyanions (Se^{IV} and Se^{VI}), the two dominant species in the modern ocean. The largest isotopic fractionations occur during oxyanion reduction, which makes selenium isotopes a sensitive proxy for the redox evolution of our planet. As a case study we review existing data from the Neoproterozoic and Paleoproterozoic, which show that significant isotopic fractionations are absent until 2.5 Ga, and prolonged isotopic deviations only appear around 2.3 Ga. Selenium isotopes have thus begun to reveal complex spatiotemporal redox patterns not reflected in other proxies.

Keywords: selenium isotopes, redox proxy, Earth evolution

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