

Trace and Rare Earth Element geochemistry of the Paleoproterozoic Bajna Formation, Bijawar basin, Bundelkhand craton, Central India: Implications for depositional conditions

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The depositional conditions during carbonate precipitation, such as water column redox and alkalinity, can be inferred from REY patterns and elemental concentrations. Here, we infer the shallow-marine redox conditions on a carbonate platform during the Lomagundi Excursion using the geochemistry of the Paleoproterozoic Bajna Formation dolostones of the Bijawar Group, Bundelkhand craton, Central India. Massive and stromatolitic dolostones are the two lithofacies of the Bajna Formation. We earlier reported ¹³C-enrichment in these Paleoproterozoic dolostones corresponding to the Lomagundi Excursion [1]. Acetic acid-leached carbonate phases have been analyzed for trace element and REE concentration using ICP-MS. Low concentrations (<20 ppm) of detrital elements, i.e., Th, Sc, Hf, Ti, and Zr, indicate preservation of the pristine REE+Y signatures related to seawater from which the Bajna Formation dolostones precipitated.

The low concentrations of Rb and \sum REE indicate that dolostones contain low amounts of detrital components. The well-preserved spheroidal and domal stromatolites indicate shallow-marine, subtidal to intertidal environment of deposition with variable wave activity influence. The Post-Archean Australian Shale (PAAS) normalized REE patterns show LREE depletion and HREE enrichment, positive Gd anomalies, and superchondritic Y/Ho values, suggesting a marine environment of deposition [2]. Negative Eu anomaly of the studied dolostones might be due to a small contamination with clays derived from weathering of the underlying basement granite. Negative Ce anomalies in the studied dolostones support oxygenated subtidal to intertidal shallow-marine depositional conditions for the Paleoproterozoic Bajna Formation dolostones.

References:

[1] Sangita, P. S. et al. *Goldschmidt 2023 Conference*. GOLDSCHMIDT, 2023.

[2] Zhao, Y., et al. (2022) *Palaeogeography, Palaeoclimatology, Palaeoecology* 586, 110765.