Goldschmidt 2025 Abstract
https://doi.org/10.7185/gold2025.28562

Carbonate sulfur and uranium isotopes record the ocean redox change across the Ediacaran-Cambrian transition in the Central Iberian Zone, Spain

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The Ediacaran-Cambrian transition was characterised by extreme environmental instability, the near disappearance of the Ediacaran biota, and the emergence of metazoan diversification [1]. This transition was also marked by strong perturbations to the global carbon cycle, including the basal Cambrian carbon isotope excursion (BACE). However, the causes for biological innovations and negative $\delta^{13}C$ excursions during the Ediacaran-Cambrian transition interval remain controversial, particularly the relationship between ocean oxygenation and early animal evolution. Here, we present new carbonate carbon ($\delta^{13}C$), sulfur ($\delta^{34}S$) and uranium ($\delta^{238}U$) isotope data from two fossiliferous sections (Majada de Andaluz and Arrocampo) of the Central Iberian Zone (CIZ), Spain. Both sections expose the Villarta Formation, and potentially preserve the BACE excursion. A negative $\delta^{13}C$ excursion was found to precede the first appearance of *Treptichnus pedum* at the Arrocampo section, and to follow the last occurrence of *Cloudina* in the lower limestone unit at the Majada section [2],[3]. The new $\delta^{13}C$, $\delta^{34}S$ and $\delta^{238}U$ data help us to further constrain chemostratigraphic correlation of the Ediacaran-Cambrian boundary in the CIZ, and also facilitate a detailed assessment of the ocean redox state and the coupled C-S biogeochemical cycles during this significant period of Earth history.

References

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