Goldschmidt 2023 Abstract
https://doi.org/10.7185/gold2023.18255

Multi-isotope chemostratigraphy of the Kuibis Subgroup, Nama Basin

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The transition from the White Sea to the Nama biotic assemblage (~551 Ma) marks a decline in faunal diversity during the Ediacaran, for which the causes remain uncertain. Even with such a decrease in diversity, the Nama assemblage records the appearance of the first organisms capable of secreting calcium carbonate in Earth's history. We performed a multi-isotope chemostratigraphy in carbonate rocks that record the transitional interval in the immediate aftermath of the proposed White Sea extinction and preceding the lowest occurrence of biomineralizing animals, in order to better understand the changes in the Earth System across this critical interval. The target was the Kuibis Subgroup (~551- 547.36 Ma) in the Nama Basin, sampled from the core 1G retrieved during the ICDP project 'Geological Research through Integrated Neoproterozoic Drilling: The Ediacaran-Cambrian Transition' (GRIND-ECT) that focuses on the Ediacaran stratigraphy of the Witputs and Vioolsdrif sub-basins of southern Namibia. This core comprises ca. 200 m of carbonate rocks interbedded with subordinate siliciclastic rocks. High-resolution Carbon isotope data shows that the dolostones and limestones within the lowermost 100 m of the core are characterized by negative $d^{13}C$ values between -5 and 0 ‰. These values are consistent with correlative outcrop data elsewhere in the Nama Basin that define the Basal Nama Excursion (BANE). A negative shift of the $d^{18}O$ values from -5 to -15 ‰ is also characteristic of the BANE in the core. Gradual increases of the $d^{13}C$ values up to +5 ‰ and of the $d^{18}O$ values up to -10 ‰ are recorded in the uppermost 100 m of core 1G. We observe the 0 ‰ crossing point (carbon isotope value) at ~90 m depth, which is positioned below strata that mark the first appearance of biomineralizing animal fossils in this core. Magnesium and Lithium isotope data and biostratigraphy added to our high-resolution carbon isotope profile can unveil potential climatic and biotic changes leading to the life evolution chain of events at the terminal Ediacaran.