Goldschmidt 2022 Abstract
https://doi.org/10.46427/gold2022.11032

Can U-Pb dating on carbonates add to improved time constraints on the Ediacaran metazoan ecosystem in the Nama Group, Namibia?

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The sedimentary rocks of the Nama Group in Namibia offer important insights into the rise and dispersal of early complex life during the Ediacaran, the final stage of the Proterozoic. Alternating sequences of siliciclastic and carbonate rocks in three sedimentary subbasins record the final stage of the Ediacaran soft-bodied fauna, as well as the beginning of the rapid development of the vast and diverse Cambrian organisms. The sparce ash beds, especially at the base of the Nama group, preclude accurate and precise constrains on the onset of the Ediacaran biota in Nama group and correlation with chemo stratigraphic record in other sections worldwide.

To improve the Ediacaran age constraints in the Nama Group we apply U-Pb dating of carbonate rocks from various stratigraphic sections combining the spatial resolution of LA-ICP-MS and the high-precision ID-TIMS U-Pb dating. To relate these results to the petrological characteristics of the dated carbonates we use a combination of mineralogical and geochemical proxies ($\delta^{13}C$, $\delta^{18}O$, XRD, SEM, μXRF, QEMSCAN) and are able to identify different carbonate phases in our sample material.

With this proposed workflow we aim to: i) improve carbonate U-Pb dating through the distinction of early and late diagenetic carbonate phases and reduction of the matrix effect from different carbonate compositions, both resulting in more accurate age results; ii) contribute to a more robust stratigraphic age model for pre-Cambrian marine carbonates in the Nama Group; and iii) constrain the early development of the Ediacaran metazoan ecosystems at the base of the Nama Group.