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Enhanced Chemical Weathering and Early Biomineralization in the late Ediacaran Nama Group, Namibia.

ERIC M ELIAS[1], GUSTAVO M. PAULA-SANTOS[1], FRED T BOWYER[2], ANETTE MEIXNER[1], LUCA CERRI[1] AND SIMONE A. KASEMANN[1]

[1]Faculty of Geosciences and MARUM – Center for Marine Environmental Sciences, University of Bremen
[2]University of Leeds

Continental weathering regulates climate, alters seawater chemistry, and supplies nutrients to the ocean, thereby modifying biochemical records through riverine input. The late Ediacaran witnessed the emergence of complex organisms, including the first biomineralizers between ca. 555 Ma and ca. 545 Ma. The innovation of biomineralization, in particular, may have been linked to increased carbonate supersaturation and shallow-marine oxygenation. This study investigates the evolution of the weathering regime in the Nama Basin of southern Namibia and its influence on early biomineralization through interrogation of lithium and strontium isotope chemostratigraphy of carbonate rocks. We focus on data from the Kuibis Subgroup (ca. 551–549 Ma), which records the lowest occurrence of the early skeletal animal *Cloudina*, from samples of ICDP GRIND-ECT core 1G. Our data show secular variations in δ^7Li and $^{87}Sr/^{86}Sr$ values across Member boundaries. These trends stratigraphically precede and coincide with the oldest recorded *Cloudina*, and may support the hypothesis that enhanced chemical weathering contributed to nutrient and ion fluxes, promoted carbonate supersaturation and facilitated the widespread co-option of calcium carbonate as a biomineral. This study enhances our understanding of the relationship between continental weathering, seawater chemistry, and the evolution of biomineralization during the late Ediacaran.