

## Primary calcite-dolomite cycles in the rhythmite part of Neoproterozoic cap carbonate and Snowball Earth, Otavi Group, Namibia

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Carbonates that cover Neoproterozoic glacial deposits are called cap carbonate and regarded as important key in understanding the Neoproterozoic glacial event. Neoproterozoic glacial deposits distribute in global, and palomagnetic data suggest that widespread continental glaciers were formed within a few degrees of the equator. The low-latitude glaciations, close association of the cap carbonates and diamictites, negative excursions of  $\delta^{13}\text{C}$ , and some occurrences of banded-iron formations within the diamictites, all suggest that these deposits record global climatic events and provide evidence of Earth's most extreme ice ages, and 'Snowball Earth' hypothesis is proposed based on these evidences. Neoproterozoic succession contains more than two glacial intervals, as many as five successive ice ages have been proposed. Global correlation of cap carbonates provides an important restriction about the number of extreme ice events in Neoproterozoic. The radio age data and the characters of cap carbonate are useful for such correlations. In the Neoproterozoic Namibia sequence the glacial deposits and cap carbonates occur twice. We found useful character for global correlation in the lower cap carbonate (Rasthof formation).

In the Neoproterozoic sequence of the Otavi Group, northwest Namibia, the glacial deposits and cap carbonates occur twice. The lower cap carbonates (Rasthof formation) has 220m thick at the sampling point and the parallel laminating part (rhythmite) occupies the basal 14.2 m. The transition from the rhythmite unit to overlying stromatolitic unit was rather sudden in the outcrop. We collected a 14.2 m thick, continuous series of samples from the entire rhythmite unit. The collected samples were embedded in plastic case with chert grains and epoxy resin to make polished slabs of 400X200X30 mm in size. The number of the polished slab was 36. They were analyzed with Scanning X-ray Analytical Microscope (SXAM). The data show cyclic fluctuations in Ca and Mn. These fluctuations reflects the cyclic change of the carbonate contents, clay rich layer, calcite rich layer, dolomite rich layer. The number of such cycles is about 20. Dolomite is controversial mineral in the diagenetic formation, so we can't conclude that the cycles reflect cyclicity of primary environmental change with only these data. However, we traced Rasthof formation in lateral.

The columns of the rhythmite part of the Rasthof formation show well correlations of turbidites, thin clay layers, and the cycles. Further more we found slump deposits. The slump deposits contain blocks of clay rich layer and calcite rich layer with fine laminations in the dolomitic matrix. These observations suggests that the calcite-dolomite cycles reflects primary environmental changes. The number of bands for one cyclicity in calcite-dolomite cycle is about 2000. If the lamination is verve, the oceanic environmental fluctuation had about 2000 years cyclicity. Such environmental change after Neoproterozoic glacial event will provide not only important key of the global correlation of cap carbonates, but also the test of 'Snowball Earth' hypothesis.