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**Petrographic and geochemical characterization of the Lower Transvaal Supergroup
stromatolitic dolostones (Kanye Basin, Botswana)**

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ABSTRACT

The 2.5 Ga stromatolitic dolostones from the Lower Transvaal Supergroup in the Kanye Basin (Botswana) pre-dates the first iron deposits, recording conditions before the great oxidation event (GOE). These dolostones have been deposited within a shallow marine carbonate platform extending from Zimbabwe to South Africa. The Lower Transvaal Supergroup carbonates of the Kanye Basin have been affected by the circulation of metasomatic fluids related to emplacement of the Moshaneng Dolerites (1.9-2.1 Ga).

Here, geochemical and petrographic characterization of the Lower Transvaal Supergroup stromatolites is presented to shed light onto i) the effect of metasomatic fluids on the geochemistry of ancient carbonates, and ii) the environmental conditions prevailing before the onset of the GOE in the epeiric seas along the western margins of the Kaapvaal Craton.

The dolomites show high Fe and Mn contents (average 2000 ppm and 3500 ppm, respectively) and very low Na contents. The overall rare earth elements (REE) pattern of dolomite varies consistently across the different dolomite facies with a sensible increase of Σ REE in the altered dolomites. The overall REE pattern lacks La, Ce and Gd anomalies (average 1, 0.91, 1.05 respectively) and shows an overall chondritic Y/Ho ratio. The Eu anomaly is slightly negative or absent in most of unaltered samples. A positive Eu anomaly (average 1.28) and an overall Σ REE enrichment have been detected in samples altered by metasomatic fluids.

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