

Carbon and oxygen isotope stratigraphy of the Paleoproterozoic (ca. 2.4 Ga) carbonates in the Quadrilátero Ferrífero region, eastern Brazil

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The metasedimentary package of the Minas Supergroup in the Quadrilátero Ferrífero region, eastern Brazil, bears important Lake Superior-type iron formations up to 400 m thick in the Cauê Formation, superposed by dolomitic carbonates of the Gandarela Formation, deposited ca. 2.4 Ga ago – and thus probably registering the Great Oxygenation Event (GOE) of the Paleoproterozoic. However, up to now, registers of a global Paleoproterozoic glaciation were not described, such as those recognized in South Africa (Transvaal Sg.), Canada (Huronian Sg.) and USA (Snowy Pass Sg.).

In order to shed light in the chemistry of the hydrosphere and sedimentary processes during iron formation – carbonate deposition, we present lithostratigraphic and C and O isotopic data from a 480 meter deep drill hole core in the Segredo Mine.

The Cauê Formation is marked by the intercalation of dolomite and dolomitic iron formation (itabirite) which are deformed and reach up to 132 m thick. $\delta^{13}\text{C}_{\text{VPDB}}$ values vary between -2.40 and -0.17‰ (n=31) and $\delta^{18}\text{O}_{\text{VPDB}}$ from -17.81 to -11.30‰ (n=31). The upper contact is gradual with the occurrence of a breccia with carbonatic and iron-rich matrix, which grades to a diamictite layer with carbonate, quartz and hematite clasts in a dominantly dolomitic matrix, reaching up to 74 m thick. Clasts are mostly millimetric, but with sporadic fragments up to 5 cm long. A 7 cm thick green phyllite layer is superposed, and followed by the dolomitic rocks of the Gandarela Formation, with $\delta^{13}\text{C}_{\text{VPDB}}$ = -0.74 to 0.53‰ (n=22) and $\delta^{18}\text{O}_{\text{VPDB}}$ between -10.87 and -4.47‰ (n=22). The obtained results could demonstrate the action of post-depositional fluids in the rock system, a possibility which will be assessed by further studies. However, those results are similar to other Paleoproterozoic marine carbonates.