

Carbon and oxygen isotopic variation in marble lenses from the Proterozoic Rio Capibaribe terrane, NE Brazil

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The studied marble lenses are part of a metasedimentary sequence (garnet biotite schists and biotite gneisses) of the Surubim Complex, in the Proterozoic Rio Capibaribe terrane, NE Brazil, whose precise age is still uncertain. The marbles are dolomitic to calcitic in composition, containing sillimanite, amphibole, and quartz, which are restricted to the dolomitic bands, and graphite, which is restricted to organic material-rich lenses. Whole-rock $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ values of stratigraphically collected marble samples are highly variable, $\delta^{13}\text{C}$ varying from 0 to +12‰_{PDB} and $\delta^{18}\text{O}$ from -11 to -4‰_{PDB}. Chemostratigraphic profiles show that $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ are not covariant.

The $\delta^{13}\text{C}$ secular variation curve for the Neoproterozoic (e.g. Hoffman et al., 1998) shows strong positive to negative oscillations from 1.1 Ga to 0.5 Ga. In the 1.1 to 0.8 Ga age interval, however, $\delta^{13}\text{C}$ values although variable, are always positive. The strong, but positive isotopic variations observed for the studied marbles, are then, compatible with world variation for this age interval. It can be inferred that the deposition of the studied carbonate occurred either at the end of the Mesoproterozoic, during the Cariris Velhos orogeny or at the Early Neoproterozoic. The observed isotopic variations may be due to periods of local variations in organic vs. inorganic carbon reservoirs.