

DOLOMITIZATION AND ISOTOPE STRATIGRAPHY OF THE VAZANTE FORMATION, SÃO FRANCISCO BASIN, BRAZIL.

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The Neoproterozoic Vazante Formation consists of approximately 1700 m of mainly algal mats and stromatolitic reefal lenses that were deposited on shallow marine platform and have been entirely dolomitized during early burial stages. This may suggest a possible preservation of some of the primary isotopic signals. Based on petrography and geochemistry, four dolomite generations (I to IV) were recognized, ranging in crystal size between ~ 4 μm and 3 mm and occurring as both replacements and cements. The Sr/Ca molar ratio, calculated for the dolomitizing fluid (≤ 0.006) is lower than that of modern seawater suggesting a contribution from a meteoric water component. The $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ values vary from -0.1 to -14.3 ‰ (PDB) and 0.2 to -2.3 ‰ (PDB), respectively. Results from a fluid-inclusion study indicate that the dolomitization must have started at a temperature ≤ 50 °C. A mixing-zone model of dolomitization for Dolomites I to III fits the results from elemental chemistry, $\delta^{18}\text{O}$ signals, $^{87}\text{Sr}/^{86}\text{Sr}$ ratios and fluid inclusions. The petrographic and chemical criteria of the latest Dolomite (IV) reflect deep burial conditions at temperature above 120 to 130 °C. The $\delta^{13}\text{C}$ signals show a significant negative plunge (~ 3 ‰) in the uppermost part of the formation that is tentatively correlated with a global glacial episode. The $^{87}\text{Sr}/^{86}\text{Sr}$ values range between 0.70614 and 0.73160, but the best preserved (lowest) signals are between 0.706 and 0.7075, comparable to the proposed Sr-isotope signature for the Vendian seawater.