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THE Au-PGE MINERALIZATIONS OF THE SERRA PELADA DEPOSIT, SERRA DOS CARAJÁS (PARÁ STATE, BRAZIL): A STABLE ISOTOPE RECONNAISSANCE STUDY

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ABSTRACT

Oxygen, carbon and hydrogene isotopic compositions were determined on samples of marble, metasandstones, metasiltstones and "hidrotermalito" from the Serra Pelada Au-PGE deposit. The dolomitic marble exhibits a linear covariance of $\delta^{18}O$ and $\delta^{13}C$ ratios, which may be explained by decarbonation reactions and combined fluid infiltration, and devolatization during metassomatism or mixing of H_2O and enriched CO_2 from decarbonation. The observed negative shift on the metasandstones and "hidrotermalito" may reflect a partial isotopic equilibrium of $\delta^{13}C$ depleted organic C and aqueous hydrothermal C species. The high $\delta^{13}C$ carbonate values could also indicate a high positive carbon isotope excursion. The mineralized metasandstones and "hidrotermalito" show δD and $\delta^{18}O$ values in the range of δD -79 ‰ to -60 ‰, and the $\delta^{18}O$ values of the altered and mineralized rocks are in the range of +13,2 ‰ to +16,5‰. This narrow range of $\delta^{18}O$ values reflects an isotopic homogeneization due to the hydrothermal alteration. All the altered and mineralized samples tend to show higher $\delta^{18}O$ values, i.e. closer to the weathering line, also suggesting that the "supergene" isotopic imprint due to aggressive meteoric solutions overprinting primary Au and PGE mineralization, during a long-lasting lateritisation, is dominant.