

Bonfim and Itajubatiba Gold Deposits, NE Brazil: C, O and Sr isotope evidence for skarn origin.

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Calc-silicate rocks hosting tungsten and gold mineralizations have long been known to exist in NE Brazil. These mineralizations have not always been recognized as skarn deposits. This contribution reports isotope (C, O and Sr) data obtained for gold-bearing calc-silicate rocks, in two deposits in NE Brazil: Bonfim (W-Au-Bi-Te) and Itajubatiba (Au-Fe-Cu). These deposits are located in the Seridó meta-pelitic belt, which consists of an Archean to Paleoproterozoic basement, a meta-sedimentary sequence (marble, quartzite and schist) of Mesoproterozoic to Neoproterozoic age and, orthoderived migmatites and igneous rocks of Neoproterozoic age.

Carbon and oxygen isotopes reveal that calcites from metasomatic marbles, skarns and veins are significantly depleted in ¹⁸O and ¹³C isotopes, compared to the original marbles. The depletion trend cannot be caused by decarbonation reactions. This heavy-isotope depletion is due to an interaction between low- $\delta^{18}\text{O}$ magmatic fluid and ¹⁸O-enriched marbles. This suggests that the studied rocks formed by fluids predominantly magmatic in origin.

Strontium isotopes suggest that the Sr and Ca, present in the metasomatic fluids responsible for the skarn formation, are derived from a mixing of a Sr-rich and less radiogenic end-member, with a Sr-poor and radiogenic one. These end-members are constituted of the meta-pelitic rocks (marble and schist) and the magmatic fluid from granitoid intrusions, respectively.

This study confirms that the studied calc-silicate rocks are, actually, skarns in the genetic sense of the word. The results allow to establish a genetic model, which could have an important impact when searching for and exploring gold skarn deposits in NE Brazil.