

# SEG 2022 Conference: Minerals For Our Future

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## **Characterization of the Gold Deposits Associated with the Aurumina Granitic Suite and Ticunzal Formation in Northeastern Goias State, Central Brazil**

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The studied region is situated in the northeast portion of the Goias State, central Brazil, where there are several gold occurrences sporadically exploited since the XVIII century. The region is located in the northern part of the Brasilia fold belt, in its exposed Paleoproterozoic basement rocks. The gold mineralizations are related to Paleoproterozoic peraluminous, syn-tectonic granites of the Aurumina Suite, and the metasedimentary, graphite-bearing country rocks of the Ticunzal Formation. The goal of this work is to characterize the mineralizations and their controls and discuss the roles of the granitic and country rocks as sources of metals and fluids. The ore is hosted in quartz veins associated with hydrothermally altered muscovite-quartz mylonites and phyllonites in shear zones near the contact between the 2.15 Ga biotite-muscovite granite of the Aurumina Suite and the graphite-bearing paragneiss and schist of the Ticunzal Formation. The mineralization is synchronous with the granitic intrusion, with syn-emplacement shearing and hydrothermal alteration. Hydrothermal alteration resulted in intense silicification close to the contact between the veins and the host rock, as well as the crystallization of hydrothermal muscovite, chlorite, and carbonate. Primary sulfides in the ore include galena, pyrite, chalcopyrite, arsenopyrite, and pyrrhotite, along with secondary copper minerals. Gold occurs along fractures on quartz, as fine inclusions on arsenopyrite and disseminated in the quartz veins. Data from arsenopyrite geothermometer and sulfur isotopes indicate temperatures in the range of 200°C to 300°C for the gold mineralization. Despite having similarities with orogenic gold deposits, the mineralization has some essential features more consistent with the intrusion-related gold deposit model. Such features include its cordilleran hinterland tectonic environment, a regional association with tin and tungsten mineralizations, and a strong association between the ore and the granitic pluton, with structures active during emplacement and cooling.