

Petrology, Geochemistry, and Metallogenic Potential of the Parguaza Granite in Eastern Colombia

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The Parguaza Granite is located in eastern Colombia and is Mesoproterozoic in age, with a rapakivi texture (rapakivi granite) with granular plagioclase and potassic feldspar. Skeletal quartz can be confused with myrmekitic textures but corresponds to different crystallization times after reaching the eutectic temperature in the quartz-plagioclase system. Mafic minerals are altered, forming magnetite, ilmenite, and rutile associated with monazite. Sillimanite may indicate a mixed magma from charnockitic and deep magmas.

Whole-rock and soil samples were analyzed, suggesting that the body may be classified as an anorogenic granite. Rare earth elements (REE) show lanthanides have correlations, whereas Nb and Ta do not correlate.

There are no typical quartz veins with pegmatite texture. Fluid inclusion microthermometry indicates homogenization temperatures between 260° and 300°C and NaCl, Na₂CO₃, and FeCl₂ in the veins. Some quartz veins have fluid inclusions indicating the presence of NaCl, K, Fe and Ca chloride.

Alluvial deposits of the Orinoco River have REE enrichments (Ce: 263 ppm, La: 136 ppm, Ga: 22 ppm, Nd: 121 ppm, Nb: 27 ppm, Ta: 7 ppm), similar to the Pitinga mine in Brazil (Ce: 333 ppm, La: 183 ppm, Ga: 25 ppm, Nd: 121 ppm, Nb: 32 ppm, Ta: 3 ppm). Panned concentrates of monazite contain Ce and La, corroborating the presence of REE and trace elements such as Gd, Nd, Lu, Y, Zr, and Ti in various parts of the study area as a result of the constant weathering of granitic material (concentrates taken less than 250 m from source rock).