

Fertility Signals in the Jurassic Metallogenic Belts of Ecuador

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The Zamora Intrusive Complex is located in southeastern Ecuador within the Subandean zone and is considered the plutonic expression of a Jurassic subduction-related continental magmatic arc developed along the western margin of the Amazonian craton (Chiaradia, 2008). This extensive intrusive complex, spanning approximately 200 km × 50 km, predominantly comprises I-type, calc-alkaline granodiorites to tonalites (SiO₂ = 60–74 wt.%), intruding Triassic volcanosedimentary rocks (Litherland et al., 1994; Quispesivana, 1996; Villares, 2014). The region hosts major ore deposits such as Fruta del Norte, Mirador, Warintza, and Chinapintza, highlighting its metallogenic significance.

Previous studies have focused on geochronological constraints (K–Ar, Rb–Sr, and U–Pb) and general geochemical characterization, establishing emplacement ages between ~190 and 150 Ma (Aspden et al., 1992; Litherland et al., 1994; Chiaradia et al., 2004, 2009) and confirming its subduction-related affinity. However, despite its importance, the magmatic fertility of the Zamora Batholith remains poorly constrained.

This study aims to evaluate fertility signals within the Jurassic magmatic system using whole-rock and trace-element geochemical proxies. The methodology consists of compiling existing geochemical datasets from key areas, including Centro Shaima, Guayzimi, Paquisha, Los Encuentros, and El Pangui, and applying Sr/Y, V/Sc, Dy/Yb, Zr/Y, and (EuN/Eu)/YbN ratios to assess fertility. Based on previous studies (Richards, 2011; Loucks, 2014; Chiaradia & Caricchi, 2017), elevated values of these proxies are associated with adakite-like, hydrous magmas formed under high-pressure conditions, which are commonly linked to porphyry Cu fertility.

These findings will provide new insights into the controls on metallogenic fertility in Jurassic arcs of the northern Andes and contribute to refining exploration models in Ecuador.