

Potential mineral, zones and epochs involved in the metallogenic map of Ecuador

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Ecuador is located in the transition of the Central Andes of Peru and the Northern Andes of Colombia. In this location, it shares the geodynamic and geological evolution and characteristics with the neighboring countries. The metallogenic map of Ecuador is based on the geological map of Ecuador from which the lithological assemblages have been extracted based on their age and nature. Once the environments have been recognized, the mineral potential has been evaluated on a theoretical basis or from prospects found and proven mineral deposits.

Variably metamorphosed Paleozoic rocks are located in the Subandean Zone (SZ), in the Cordillera Real (CR) and in the Amotape Tahuín Block (BAT). The assemblages are essentially marine sedimentary and would have been deposited in intracratonic basins. Although no indications of mineral deposits have been reported, the environment is highly favorable for sedimentary-type stratiform ore deposits.

Lithologic sets from the Triassic to Lower Jurassic of the SZ, CR and BAT represent the aulacogen zone related to the opening of the Tethys. S-type granitoids, basic to intermediate volcanic and volcanosedimentary rocks related to a syn-post-rift are favorable for the occurrence of granophile deposits for U, W, Sn. Also Sedex and Carbonate Replacement type deposits for Pb-Zn, Cu, Ag-Au could be present. Of course, those sedimentary assemblies are favorable as hosts of the mineralizations of the subsequent Jurassic continental arc event, producing large epithermal gold deposits hosted in skarn.

Assemblages of magmatic and volcanic calco-alkaline rocks from the Middle to Upper Jurassic continental arc are widely exposed in the southeast SZ. Deposits of porphyry type for Cu, Cu-Mo and Cu-Au have been discovered in the region. Also epithermal deposits for Au (Ag) and base metals have actually significant prospects. At the same time, to the west of the CR, the Alao island arc was developed, showing prospects of Volcanogenic Massive Sulphides. Local occurrences of PGM deposits are favorable in this environment.

Accreted oceanic terranes of the Upper Cretaceous form part of the Western Cordillera (CW) and the Alamor-Lancones basin (CAL). The lithological assemblages are of oceanic crust and plateau environment, insular arc and forearc basins. All Volcanogenic Massive Sulphides, Sedex and PGM types of deposits are favorable in these domains.

The Cenozoic continental arc is superimposed over the oldest lithological assemblages in the CR and CW. Since it is the latest geodynamic process, with this are related most of prospects and deposits found in the country. The prospects and proven deposits are in fact numerous of porphyry type, high and low epithermal deposits and a wide range of hydrothermal veins.

The recent discoveries of large Cu-Au porphyries and Au epithermal deposits confirms Ecuador's mineral potential that can be considered comparable with neighboring Peru and Colombia.