

## **The Metallogenic Evolution of the Greater Antilles**

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### **Abstract**

The Greater Antilles host some of the world's most important deposits of bauxite and lateritic nickel, and significant resources of gold and silver, copper, zinc, manganese, cobalt and chromium. Beginning in Jurassic time, sedimentary exhalative base metal deposits accumulated in marine sedimentary rift basins as North and South America drifted apart. With the onset of intraoceanic subduction during the Early Cretaceous, a primitive (tholeiitic) island arc formed above a southwesterly-dipping subduction zone. Podiform chromite deposits formed in the mantle portion of the supra-subduction zone, directly above subducted Proto-Caribbean oceanic lithosphere. Bimodal-mafic volcanogenic massive sulfide (VMS) deposits formed in the nascent island arc; mafic VMS deposits formed in back-arc basins. The Pueblo Viejo gold district, with five million ounces in production and twenty million ounces in mineable reserves, formed at 108-112 Ma, in an apical rift or back-arc setting. By Late Cretaceous time, calc-alkaline volcanism was well established along the entire length of the Greater Antilles. Volcanogenic massive sulfide and shallow submarine VMS deposits characteristic of the primitive island arc gave way to porphyry copper and epithermal precious metal deposits typical of the mature island arc. Oblique collision of the Greater Antilles with North America began in the Late Cretaceous in Cuba and migrated eastward. Orogenic gold and tungsten deposits that formed during the collision event are preserved in ophiolites and in metamorphic core complexes. Since the Eocene, regional tectonism has been dominated by strike-slip motion as the North American continent pushes westward relative to the Caribbean Plate. Large deposits of lateritic nickel-cobalt formed during Eocene and younger weathering and supergene enrichment of ultramafic rocks. Bauxite deposits formed by mobilisation and precipitation of aluminium derived from volcanic intervals within a carbonate platform of Eocene to Miocene age.