

The Copper Deposits of the Curaçá Valley, Bahia State, Northeastern Brazil

P Garcia¹, A Misi¹, J Haroldo Sá¹, G Olivo²,

¹Departamento de Geologia, Universidade Federal da Bahia, Salvador, Bahia (Brazil);

²Department of Geological Sciences, Queens University, Kingston, Ontario

The Curaçá Valley Copper District hosts four copper mines, including the Caraíba mine in operation since 1980, the oldest copper mine in Brazil. The copper orebodies are associated with metasomatized mafic-ultramafic rocks (mainly pyroxenite and norite) emplaced in granulitic orthogneisses and paragneisses of the Paleoproterozoic Itabuna-Salvador-Curaçá Orogen. The mafic-ultramafic rocks and mineralization are controlled by N-S shear zones related to the E-W shortening of the Orosirian-Rhyacian Orogeny. U-Pb SHRIMP ages revealed that the protoliths of the surrounding gneisses are 2695 ± 12 Ma old, the norite units are 2580 ± 10 Ma old. The granulitic metamorphic peak was dated as old as 2103 ± 23 Ma, and late granitic intrusions at 2044 ± 2.5 Ma. The average copper grade in the various deposits is between 1.0% and 1.4%, with gold and silver grades varying from 0.2 to 17.2 ppm and 2 to 35.1 ppm, respectively. The chalcopyrite-bornite-magnetite mineralization occurs as disseminations in least altered mafic-ultramafic rocks, and as veins, pockets and breccias in the most hydrothermally altered rocks. The proximal hydrothermal alteration is characterized by the occurrence of biotite, which can comprise up to 85% of the most altered rocks and higher grade zones, minor sericite, quartz and low-Ti, -V magnetite. Outer alteration halos are composed mainly of K-feldspar and minor epidote and chlorite. Plagioclase and quartz-rich alteration, and diopside-carbonate bearing-rocks are described in some deposits but are not related to copper sulfide mineralization. Barite and actinolite-rich zones are observed only locally in the northern part of the district. The genesis of copper deposits in the Curaçá Valley district involves various stages of mineralization including magmatic sulfides formed during the emplacement of the ultramafic rocks at 2.58 Ga and subsequent mineralization and/or remobilization associated with potassic metasomatism, which overprinted the granulite facies rocks during the Paleoproterozoic event (~ 2.04 Ga).