

UNCOMMON METACARBONATE ROCKS IN THE NOVA LIMA GROUP, IRON QUADRANGLE, MINAS GERAIS

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ABSTRACT: AngloGoldAshanti Córrego do Sítio Mineração Ltda. started in 2009 an exploration program near the inactive underground São Bento gold mine (total production of 1.8 MOz@10-12gAu/t), Iron Quadrangle-MG. In this area, the 2.85-2.61 Ga Nova Lima Group, basal unit of the Archean Rio das Velhas greenstone belt, is represented by four interlayered packages, two essentially made of metaturbidites and the other ones of chemical rocks. The chemical packages are essentially comprised of carbonaceous phyllites, metacherts, BIFs and, rarely, metacarbonate rocks. These packages are deeply meteorized, resulting in highly friable rocks down to depths of 400m or more at the Anomalia 1. The drilled targets are aligned in a northeast direction, and are called Sangue de Boi, Shaft, Santana, Barra Feliz, Anomalia 1 and 2 and Jambeiro, totaling about 5.7 km in length x 300 m in width. Gold mineralization is structurally rather than lithologically controlled, despite the fact to maintain a certain affinity to metacherts, iron formation-BIFs and quartz veins. Although rarely preserved, pyrite and arsenopyrite occur in fine crystals, banded and disseminated, associated or not with hydrothermal zones, such as quartz, carbonate, sericite and sulfide alteration, both in the mineralized and barren rocks. At the Anomalia 1 target about 16 drillholes intercepted fresh metacarbonate rocks, which width can reach about 40 meters. These rocks can occur as laminated, banded, foliated or brecciated, locally with disseminated pyrrhotite and pyrite, and make contacts with metaturbidites, phyllites, metacherts, BIFs and intrusive mafic rocks. According to some authors, the scarcity of metacarbonate Archean rocks results from the fact that thin crust of Archean time produced no extensive stable shelf, which were important sites for carbonate deposition during the Proterozoic and Phanerozoic. These authors suggested that carbonate deposition during the Archean took place largely in deep ocean basins, and that the mechanism for precipitation may have been photosynthetic reactions by algae living near the surface of the oceans. Due to be a very uncommon rock in the Archean, an interesting geological question that requires further academic research is how those carbonates were formed in a tectonically active Eoarchean basin of the Nova Lima Group associated with chemical rocks like metacherts and BIFs, considering that carbonate rocks are, in general terms, typically generated in shallow, calm and clean marine waters, above the CCD-Carbonate Compensation Depth. Are we dealing with microbial carbonates precipitated in 100 to 200 meters-deep waters, not necessarily in abyssal depth, as the microbes would not have stand the ultraviolet exposure for a longer period? Or are these metacarbonate rocks carbonate metaturbidites?

PALAVRAS-CHAVE: CARBONATES; ARCHAEOAN; IRON QUADRANGLE