WALL ROCKS AND HYDROTHERMAL ALTERATION ASSOCIATED WITH THE POJUCA AND FURNAS DEPOSITS, CARAJÁS MINERAL PROVINCE

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ABSTRACT: The Pojuca Cu-Zn deposit (58Mt@0.87%Cu and 0.9%Zn), located in the northern part of the Carajás Province, has been considered since its discovery as a VMS deposit of Archean age, metamorphosed to amphibolite facies. Late veins or remobilization ascribed to the Pojuca Granite intrusion or to the superimposition of an IOCG system to the syngenetic mineralization have been admitted. The main reasons for classifying the Pojuca ore in the VMS model include its association with metavolcanic-sedimentary rocks of the Itacaiúnas Supergroup, the strata-bound nature and the Cu-Zn zoning of the ore, as well as the presence of alteration zones that are typical of volcanogenic deposits.The study of drill cores of Pojuca (Corpo Quatro) and of the Furnas Cu-Au deposit (800 Mt@0.6%Cu and 0.28g/tAu), situated in the northeastern part of Carajás, indicates significant similarities between these two deposits. In both the volcanic-sedimentary pile is steeply-dipping, metamorphosed and tectonically inverted. The stratigraphic footwall to the ore comprises alteration rocks derived in their majority from ancient basalts, composed of amphiboles, chlorite, quartz, ilmenite and garnet, which locally develop cordierite-cummingtonite-anthophyllite assemblages. At Pojuca this alteration constitutes authentic dalmatianites, made up of large rounded cordierite crystals. At Furnas the cordierite-cummingtonite-anthophyllite alteration extends for more than 100 m below the mineralized zone constituting strongly foliated and crenulated schists with lens-like cordierite porphyroblasts. In several VMS deposits worldwide the cordierite-anthophyllite-cummingtonite alteration typically occurs below the ore bodies and is interpreted as the amphibolite facies equivalent of chloritic alteration.Another feature shared by the Pojuca and Furnas deposits is the presence of metaexhalites associated with the mineralized horizons. Exhalites are finely-banded, generally iron-rich chemical sedimentary rocks, including BIF, chert, tourmalinite and garnetite, which occur in the immediate vicinity of VMS mineralization and typically lie above, below, within or along strike from exhalative ore deposits. They have been interpreted as direct precipitates from submarine hydrothermal fluids deposited on the seafloor with a variable contribution of clastic/volcaniclastic material. In the Pojuca deposit the ore is associated with iron-rich metacherts composed of quartz bands intercalated with layers containing chalcopyrite, magnetite, pyrrhotite, sphalerite and actinolite. Distinctly-banded actinolite metacherts overlie the mineralized horizon. In the Furnas deposit most of the ore is associated with a thick BIF horizon made up of grunerite, almandine, magnetite and quartz, with disseminated chalcopyrite, pyrrhotite, pyrite, bornite, chalcocite and molybdenite. Stratigraphically above this horizon lies a package of laminated metaexhalites consisting of alternate beds of chert, tourmaline and garnet which grades into an impure metachert and from this on into dominantly clastic metasedimentary rocks. The clastic metasediments incorporate chert fragments and are quite rich in garnet and porphyroblastic andalusite containing staurolite, sillimanite, biotite and quartz as well, suggesting that they were affected by a strong aluminous alteration, perhaps of the advanced argillic type. This kind of alteration has been recognized in auriferous volcanogenic deposits, possibly produced from strongly acidic hydrothermal fluids.The above-exposed characteristics show that, despite being affected by late mineralizing events, the Pojuca and Furnas deposits preserve features indicating that they evolved from primitive volcanogenic systems.

KEY WORDS: METAMORPHOSED HYDROTHERMAL ALTERATION, METAEXHALITES, POJUCA AND FURNAS DEPOSITS, CARAJÁS.