

The Salobo iron oxide Cu (-Au) deposit, Carajas, Brazil: evidences of hydrothermal alkali metasomatism in the host amphibolites

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Hydrothermal alteration effects on host amphibolites of the Salobo iron oxide Cu (-Au) deposit, Carajás Mineral Province, northern Brazil, have been investigated. The studied amphibolites occur as lenses or layers close to the contact with the gneissic basement or included in metagraywackes of the Archean Salobo Sequence. Trace element chemistry of these rocks indicates that they are subalkaline basalts with tholeiitic affinity. Based on the K_2O content, three alteration groups have been defined and informally named "less altered", "medium altered" and "very altered" types. They characterize rocks affected by different degrees of alkali metasomatism, resulting in major compositional changes. The lower part of the Salobo Sequence, which consists of metagraywackes and amphibolite lenses or layers, hosts the iron oxide Cu (-Au) mineralization. At the top, quartzites dominate, with subordinate banded iron formations. The ore contains large amounts of iron oxides (magnetite>hematite), with dissemination of chalcopyrite, bornite and chalcocite. The iron oxide Cu (-Au) ores show relatively elevated LREE, U, F, Ag and Mo values, whereas the banded iron formation is depleted in these elements. The spatial association of "very altered" rocks with the main ore zone suggests a relationship between alkali metasomatism and mineralization. Similarities in the hydrothermal alteration assemblages combined with the ore mineralogy and chemistry suggest that the Salobo iron oxide Cu (-Au) deposit belongs to the class of iron oxide (Cu-U-Au-REE) deposits.