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Metallogenic Characteristics of the Gangdese and the Bangonghu Copper Metallogenic Belt, Tibet, China

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Since the beginning of this century, two remarkable copper metallogenic belts, the Gangdise and the Bangonghu in Tibet have found, both of their identified copper resources are greater than 20Mt after preliminary exploration. In the Gangdise metallogenic belt, the deposits with Cu resources more than 2Mt include Qulong (Cu_7.60Mt@0.5%), Jiama Cu-polymetallic (Cu 6.15Mt@1.04%), Xiongacun (Cu-Au) (Cu_2.44Mt@0.40~0.83 x 10⁻², Au 247t@0.22~3.9 x 10⁻⁶). Other important copper deposits in the Gangdise include Bangpu (Cu-Mo), Tinggong, Juno, Chongjiang, Gangjiang etc. In Bangonghu metallogenic belt, the deposits with Cu resources more than 2Mt include Tiegelong (Cu-Au) (Cu_10.98Mt@0.53 x 10⁻²) and Duobuza (Cu_2.74Mt@0.7 x 10⁻²; Au_50t@0.12 x 10⁻⁶), Bolong (Cu_3.70Mt@0.6 x 10⁻²), Gaerqiong Cu-Au deposit.

Gangdise metallogenic belt is located on the north side of the suture between the Indian plate and the Eurasian plate, developed in the Middle Jurassic-Early Cretaceous magmatic arc and late porphyry system. The mineralization is mainly divided into two stages: the Middle Jurassic magmatic arc period, developed mainly porphyry Cu-Au metallogenic system. for instance, in Xiongacun deposit (mineralization age 173-161Ma), ore-bearing rock is hornblende-quartz diorite porphyrite; the more important metallogenic period is during relaxation phase (20-12Ma)[1] after the continent-continent collision, developed the mineralization porphyry system, mainly including monzonitic granite porphyry, quartz-mica diorite porphyry, quartz monzonitic porphyry. Large scale of skarn mineralization occurred in some deposits, forming porphyry –skarn system, such as Jiama copper polymetallic deposit [2]. In addition, during the continent-continent collision period (51-31ma), some small porphyry and skarn copper deposits also were found.

Two metallogenic period have been identified in Bangonghu metallogenic belt: the main period is the late Early Cretaceous (119-115 ma) [3], forming several large porphyry Cu-Au deposits in the continental margin arc. Ore-bearing rocks are mainly granite diorite porphyry (116 Ma) and quartz diorite porphyrite (119-120 ma). In Tiegelong, alunite, dickite, kaolinite, anhydrite, barite, pyrophyllite and diaspore occur in Cu-Au ores, indicating the transition characteristics between porphyry systems and hydrothermal system. Another metallogenic period occurred after the Bangonghu ocean closing, formed some skarn Cu-Au deposits, such as Gaerqing Cu-Au deposit (86.8 Ma), with composition characteristics of IOCG deposits.

The tectonic setting of the Bangonghu metallogenic belt is similar to that of the Andean metallogenic belt[4]. But the tectonic setting of Gangdese metallogenic belt is obvious different from the Andean Cu metallogenic belt.

References:

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