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The ore body model and reserves estimation of the Tiegelongnan deposit ,northern Tibet

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The Tiegelongnan Cu (Au, Ag) deposit was discovered recently in the Duobuza magmatic arc belt. This belt is also an important porphyry Cu–Au concentrating area in southwestern Qiangtang, including Duobuza, Bolong, Naruo super large scale Cu-Au deposits. The mineralization-related porphyry arose from the northward subduction of Bangong-Nujiang ocean.

The Cu-As-S, Cu-S, Cu-Fe-S mineral assemblages were identified in Tiegelongnan deposit, where enargite, tennantite, chalcocite, covellite and chalcocite, representing Cu-As-S and Cu-S minerals seires, developed above the shallow range of -700 m ~ -650 m level. This shallow alteration features are in accordance with that of the typical high sulfidation epithermal deposits[1]. On the other hand, bornite and chalcopyrite, representative of Cu-Fe-S minerals series, generally appear below -700 m ~ -650 m level, with phyllic alteration and biotitic potassium-alteration, consistent with mineral and alteration characteristics in the porphyry deposits[2]. More than 800 m thickness orebodies were buried beneath the andesite, although the deposit experienced some erosion. Based on the statistics of mineral assemblages distribution, several alteration zones have been identified in vertical. we believe that porphyry orebody and epithermal orebody coexist in Tiegelongnan, involving two fluid environments.

The Tiegelongnan deposit is a concealed deposit covered by Meiriqiecuo Group volcanics. The advanced argillic lithocaps impinge on the upper parts of porphyry stocks in the Tiegelongnan Cu (Au, Ag) deposit, but the high-sulfur type Au ± Ag ± Cu orebody has been eroded. The weathering paleocrust were recognized between andesite and the telescoping of high sulphidation and porphyry Cu-Au orebody.

The audio-frequency magnetotellurics has been used to detected the deep electrical characteristics of the orebodies and the R fault. The results indicate that the orebody extends over 1200 meters, which exceeds the current drilling controled greatly. More importantly, the low resistivity anomaly body consistent with the main ore body is detected in the footwall of the R fault. It proves the R fault is a normal fault which cut off the original ore body. We established a three-dimensional model for orebodies using the Micromine software based on large amounts of drill holes. The reserve estimation was done based on this orebody model by geological ore block method, geological section method, and geological statistics method. The results show that the amount of Cu resources Tiegelongnan deposits over 10 million tons, and copper prospect resources will more than 15 million tons.

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