

# **Fe-Cu Mineralization in the Paleozoic Aqishan-Yamansu Belt, Eastern Tianshan, China: Comparison to the Mesozoic Central Andean IOCG Mineralization and Chilean Iron Belt**

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Iron oxide copper-gold (IOCG) deposits have been discovered through the Archean to the Mesozoic in the Earth's history, with a concentration in the Precambrian; however, no Paleozoic example has been identified so far, although Mesozoic IOCG deposits in the Central Andes have been known for a decade.

The newly defined Aqishan-Yamansu Fe-Cu mineralization belt located in the Eastern Tianshan, NW China, is well known in China due to recent exploration progress on numerous Fe, Fe-Cu, and Ag-Pb-Zn deposits. These deposits were mainly formed in the Late Paleozoic during inversion of the Aqishan-Yamansu back (intra)-arc basin. Geological evidence shows that this basin developed on the continental (Tarim craton) margin between 350 and 320 Ma with accumulation of thick marine volcanic rocks, but with very few mineralization occurrences. From 320 to 300 Ma, the basin started to be closed due to the final collision between the Junggar and Tarim cratons, accompanied by intensive Fe-Cu and other polymetallic mineralization associated with regional emplacement of granitoids. Among these deposits, the Heijianshan Fe-Cu deposit shows many similarities to Central Andean IOCG deposits such as Mina Justa and Mantoverde, and so could be the first identified Paleozoic IOCG deposit to date. Similar deposits include Shuangqing, indicating the possibility that a Paleozoic IOCG belt exists in the Eastern Tianshan. Fe deposits are also commonly distributed in this belt and show some similarities to deposits in the Chilean Iron Belt, although they have been grouped into "marine volcanics-hosted Fe deposits" by Chinese geologists.

Compared to the Mesozoic Central Andean IOCG and Chilean Iron Belt, the Paleozoic Aqishan-Yamansu Fe-Cu mineralization belt shares abundant similarities and, together, they show that the intensive Fe-Cu mineralization occurred during the inversion of a previous back (intra)-arc basin developed in the continental margin. This indicates that a possible genetic and exploration model for IOCG and related deposits in the continental margin could be established based on a comparative study between these two important mineralization belts.