

## **Paleozoic Fe-Cu mineralization in the Eastern Tianshan and Chinese Altay Mountains, NW China**

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Are there any Paleozoic IOCG deposits in the world? Although IOCG deposits have been discovered in Archean to Mesozoic rocks and are most abundant in the Precambrian, there are no known Paleozoic examples. The recent IOCG discoveries in the Paleozoic Central Asia Orogenic Belt may be the first known Paleozoic examples.

These newly-defined deposits are mainly from two major mineralization belts, i.e., the Aqishan-Yamansu Fe-Cu belt located in Eastern Tianshan and the Eastern Junggar Fe-Cu belt in the southernmost Altay mountains, which are both located in the NW China. The Aqishan-Yamansu belt is well-known 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 during 350-320 Ma with accumulation of thick marine volcanic rocks but with only very few mineralization occurrence. During 320-300 Ma, the basin started to be closed with the final collision between Junggar and Tarim cratons, accompanied by intensive Fe-Cu and other polymetallic mineralization associated with regional emplacement of granitoids, including Heijianshan, Duotoushan, Shaquanzi Fe-Cu deposits, whose ore deposit geology and ore-forming fluids all show similarities to typical IOCG deposits. The major Fe-Cu deposits in East Junggar (such as Qiaoxiahala and Laoshankou) are mainly hosted in the Middle Devonian Beitashan Formation volcanic and sedimentary rocks. These deposits formed in the transition from coastal-shallow marine (Beitashan Formation) to paralic continental sedimentary units, which may suggest the marine regression and intra-(or back-) arc basin inversion in the Middle Devonian. Paragenetic sequence and ore-forming fluids in the Qiaoxiahala and Laoshankou Fe-Cu (-Au) deposits also show similarities to those examples in the Aqishan-Yamansu belt.

These Paleozoic IOCG or IOCG-like deposits defined in the Central Asia Orogenic Belt all exhibit common features to the Mesozoic IOCG deposits in the Central Andes, which are considered to be formed during basin inversion in the continental margin, indicating a possible sub-type of the IOCG deposit clan.