Iron oxide copper gold (IOCG) deposits, which were first formally defined by Hitzman et al. (1992), comprise a broad and ill-defined clan of mineralization styles. IOCG deposits contain abundant (>10%) iron oxides (magnetite and/or hematite) and economic grades of copper and/or gold (Williams et al., 2005). Besides the copper and by-product gold, IOCG deposits may also contain appreciable amounts of cobalt, zinc, molybdenum, silver, rare earth elements, uranium, and other elements.

The Anqing ore-cluster field is situated at the middle range of the famous Middle-Lower Yangtze Metallogenic Belt in east-central China, belonging to the Anqing-Guichi ore deposit area, and locates in the east of the Yangtze Block. In Anqing ore field, more than 90% Cu-Fe-Au-Mo-U-(Pb-Zn) ore deposits are hosted in diorite intrusive rocks and their contract zone with the Early Triassic limestone and dolomite rocks (Zhou et al., 2005). The hydrothermal uranium ore deposit at Dalongshan in the Anqing ore-cluster field is associated with granite intrusions (Zhao et al., 2004). There are several polymetallic ore deposits with different scales, variable compositions and dissimilar ore types in Yueshan Ore Field. Major ore deposits are characterized by skarn copper deposit, vein-type hydrothermal deposit, some small lead-zinc deposits, and uranium deposits (Zhang et al., 2011).

Skarn deposits are mainly located in the contact zones between dioritic plutons and the Middle-Late Triassic Yueshan and Lanlinghu formations (e.g., Anqing copper deposit). Some skarn deposits are in the form of xenoliths of sedimentary rocks in diorite plutons (e.g., Longmenshan and Tiepuling copper deposit). Vein deposits provide major metal resources in the Anqing ore-cluster field in Yueshan. Vein deposits mostly are situated at contract zones between plutons and sedimentary rocks or inside plutons. And there is a hydrothermal uranium deposit in Yueshan Ore Field, the Dalongshan uranium deposit. Mineralization of this uranium deposit occurred in the contact zone between Dalongshan pluton and Jurassic sandstone.

Most deposits in Anqing ore-cluster field have their mineralization ages between 130-140 Ma in early Cretaceous, Mesozoic (Chang et al. 1991; Sun et al., 2003; Zhou et al. 2005; Mao et al., 2004). The Dalongshan uranium deposit was mineralized rather late at 106.4±2.9 Ma, still in early Cretaceous, Mesozoic, whereas the hydrothermal mineralization of the Dalongshan uranium deposit has related to the Dalongshan granite pluton.

We compared Anqing ore-cluster field with IOCG deposits in the Central Andes, and found several aspects in common, which may be valuable enough to be discussed. The most significant basis is the form that these metal exist in deposits. They both have elevated magnetite and/or hematite contents, with economic grade of copper and/or gold in iron oxides. IOCG deposits in Central Andes have hydrothermal mineralizations of the Dalongshan uranium deposit has related to the Dalongshan granite pluton.
Anqing ore-cluster field. Alteration like sodic, calcie, and potassic occurred in these deposits (Sillitoe 2003). In the Anqing ore-cluster field, complexes with same geochemistry properties were also associated with deposits’ mineralization in Yueshan area, Anqing. Plutonic complexes of mantle-derived parentage in both places may provide abundant metal in a same way, probably through hydrothermal fluid.

Central Andean IOCG-related mineralization was associated with the high-angle subduction of the Phoenix plate (Chen et al., 2013). However, the tectonic settings in Middle-Lower Yangtze Metallogenic Belt is rather controversial. But an extensional environment in this area seems to be quite well established (Zhou et al. 2007, Ling et al. 2009, Zhang et al. 2011). Groves and Bierlein (2007) suggested that in temporal–spatial, IOCG deposits are associated with non-orogenic granite and A-type granite, subduction of plate or sub-continental lithosphere mantle’s partial melting caused by plumes. While specialized to Middle-Lower Yangtze Metallogenic Belt, there are several tectonic settings in common with suggestions mentioned above.

4 Conclusions

The Anqing ore-cluster field keeps several aspects in common with IOCG deposits, such as mineralization, associated complexes, alteration, hydrothermal type, and tectonic settings. We suggest that the Anqing ore-cluster field in Yueshan can be regarded as IOCG (-U) mineralization in further research and exploration.

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References


