1 Introduction and Geological Background

There are a large number of copper-iron deposits, which are characterized by large scale and associated with polymetallic mineralization, in the precambrian stratigraphic units in southwestern Yangtze Block. Research on Lala, Dahongshan deposits have an important theoretical significance and practical value, for their large scale-typical ore deposits and association with Au-Ag-Co-Mo-REE-U polymetallic mineralization, which define a major IOCG metallogenic province (Greentree, 2007; Zhao et al., 2011; Song, 2014).

Based on research of these typical deposits, such as the Lala in Huili, Dahongshan in Xinping, Yinachang in Wuding, Chehe in Yuanjiang, etc., this work has studied the continental geodynamics, the age of magmatic rocks and metallogenic epoch, the coupling relationship between polymetallic elements, the source of ore-forming fluid and the coupling relationship between magma evolution and polymetallic mineralization. With systematical study on the fluid inclusions, the stable and rare gas isotopes and the geochemistry of the trace and rare earth elements, the source of metals and ore-forming fluid are identified on basis of the study on the geological features of these deposits. The relationships between the marine volcanism, the magmatism, the late hydrothermal superimposition and polymetallic mineralization have been discussed. The ore-forming process can be divided into pre-enrichment, two major mineralization, and several minor mineralization events.

2 Major Conclusions

The metallogenic model of these typical ore deposits are established. From the view of regional evolution, the response of the mineralization and the major geological events were studied. Evolution history including the Columbia supercontinent breakup, the Grenville orogenic event, the breakup and reconstruction of Rodinia in the study area are summarized and studied. The formation of iron and copper deposits is related to the breakup of Columbia supercontinent, while Cu polymetallic deposits are controlled by the Grenville orogenic event and the reconstruction of Rodinia. Paleoproterozoic is the pre-enrichment period of Fe-Cu polymetallic deposits. The hosting rock of ore deposits and the source beds were formed by the marine volcanic eruption-depositional cycle at the end of the Paleoproterozoic.

The ore-forming process can be divided into pre-enrichment, two major mineralization, and several minor mineralization events. ① Volcanic sedimentation at the end of Paleoproterozoic, formed in 1647±23Ma of the anorogenic extension environment—the intraplate rift setting, which is related to the breakup of Columbia supercontinent. From the view of regional evolution characteristics, Paleoproterozoic is the pre-enrichment stage of these Fe-Cu polymetallic deposits. ② In several superimposed mineralization events, 1.4~1.2 Ga and 1.1~1.0Ga are two necessary and important metallogenic epochs for copper polymetallic mineralization. The main IOCG deposits in the research area, such as the Lala and Dahongshan deposits, formed in 1.1~1.0 Ga after several Mesoproterozoic superimposed mineralization events. The metamorphic reconstruction type ore and rich ore-bearing layer in Lala and Dahongshan deposits were formed in 1.4~1.2 Ga, which are mainly stratoid, dense massive, disseminated ore. ③ The Cu polymetallic deposits are controlled by the Grenville orogenic event and the reconstruction of Rodinia. ④ ~0.8Ga is uranium mineralization stage in the main IOCG deposits. The ~0.8Ga is identified as the age of uranium by the electron microprobe dating method on uraninite in Lala and Dahongshan deposit, the same geological period with the
regional large amount of the felsic intrusive and the metamorphic rock.

By various mineralization superimposition, the typical IOCG deposit are formed after the formation of the original source beds and the later complex superposition. Thus, the metal combination of Fe-Cu-Au-U-Mo-Co-REE are formed by the multiple superimposed mineralization, which are significant for the Lala and Dahongshan copper-iron polymetallic deposits.

**Acknowledgements**

This work was supported financially by China Geological Survey (Grants No. 12120113095500) and the Foundation of China Nuclear Geology (Grants No. 201148).

**References**

Greentree, M.R., 2007. Tectonstratigraphic Analysis of the Proterozoic Kangdian Iron Oxide-Copper Province, Southwest China, University of Western Australia, 284 pp.


Song Hao. Precambrian Copper-iron-gold-uranium polymetallic deposits and their regional metallogeny in Southwestern margin of Yangtze Block[D]. Chengdu: Chengdu University of Technology, 2014.