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Geological characteristics of the Iron Oxide-Copper-Gold (IOCG) deposits in the Kangdian region, SW China

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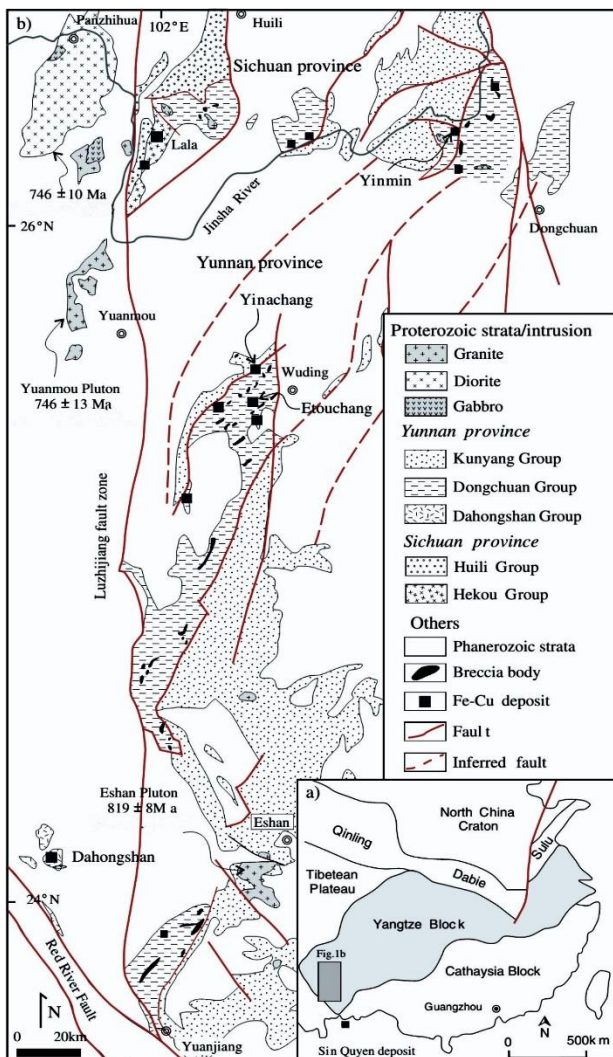
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There are a series of Cu-Fe deposits located in the southwestern margin of the Yangtze Block, SW China, which contains Central Yunnan and Southern Sichuan provinces (Fig.1a), known as Kangdian region, and has been an important Fe and Cu resource base.

These Cu-Fe deposits are hosted in Precambrian meta-volcanic-sedimentary successions (Fig.1b), and previously considered to be volcanogenic massive sulfide (VMS) deposits, with late metamorphic reconstruction [1]. However, in recent years, studies increasingly showed that most of them have many similarities to typical IOCG deposits [2], which defined by Hitzman (2000), Williams et al. (2005) and Groves et al. (2010). They can be attribute to a kind of IOCG type deposit with the geological characteristics as follows.

(1). Cu deposits with abundant low Ti iron oxides (>20%), lack Pb–Zn sulphides, usually associated Au, Ag, Co and U as by-product, e.g. the Dahongshan deposit contains about 450 Mt (metal) Fe and more than 1.5 Mt (metal) Cu (grade: 0.3 ~ 1.2wt%), and associated 16 tons (metal) Au, 141 tons (metal) Ag, and 1.8 tons (metal) Co, with $TiO_2 < 1.6\%$;



(2). Hosted in Precambrian meta-volcanic rocks, e.g. mica schist, Na-rich meta-volcanic lava and meta-tuff, usually with massive magnetite ores. Lack footwall stringer zones and a hydrothermal vent complex [2]; (3). Controlled structurally by faults or fractures, late hydrothermal characteristics widespread, commonly with breccia rocks at the edge of ore bodies; (4). Extensive Na - Ca or/and K alteration in the country rocks and Fe-oxide ores, e.g. in the Dahongshan deposit, albite is widespread in the country rocks; the ore-hosted felsic volcanic rocks are extensively metasomatized and recrystallized to form albitites; (5). Formed in Proterozoic extensional rift, consistent with the peak of global large copper polymetallic mineralization in Precambrian; (6). Generally experienced complex mineralizing of volcano-sedimentary mineralization and later hydrothermal mineralization. The research is supported by the National Natural Science Foundation of China (NO. 41103026 and NO. 41373050).

*Fig.1 a) Simplified tectonic map showing the study area in the Yangtze Block;
b) Geological map of the Kangdian region, SW China, (modified from References [2])*

References:

[1] K. Sun et al. (1991) In: *Proterozoic iron–copper deposits in Central Yunnan Province*: China University of Geoscience Press, Wuhan.

[2] X. F. Zhao et al. (2011) *Miner Deposita* 46:731–747

