Porphyry copper deposits in China: Spatial – temporal distribution and their tectonic settings

Corresponding author: Jingwen Mao, Institute of Mineral Resources, Chinese Academy of Geological Sciences, jingwenmao@263.net

Co-authors: Guiqing Xie, Chao Duan, Hongying Li, Yanbo Cheng

In past ten years copper resource has dramatically increased, up to 80 Mt, totally, in China. All of them are porphyry and/or porphyry-skarn deposits. Cenozoic porphyry copper deposits are distributed along the Ailaoshan - Honghe (or Jinhajiang) belt and the Gangdise belt, connecting west to Carpathians – Balkan through Pakistan, Afghanistan, Iran and Turkey. Beside the Cenozoic there are some Jurassic and Cretaceous porphyry copper in the Gangdise belt. The Cretaceous Bangonghu – Nujiang belt north to the Gangdise belt in Tibet is one of the best potential region for porphyry copper prospecting.

Middle Jurassic to Early Cretaceous porphyry copper deposits in East China developed along several paralleling NEE-striking belts. Although those copper has been mined for thousand years there are some new discoveries through each grassroots prospecting or deep exploration and periphery prospecting.

Triassic copper deposits in Kunlun Mt, north margin of the Tibet plateau also show good potential, and they usually coexist with orogenic gold and MVT Pb-Zn in space. The other Triassic copper ores are dispersedly distributed in the northeastern Three River belts, Southwest China, and North Daxingan region, Northeast China.

Carboniferous to Permian, and rare Ordovician-Devonian porphyry copper deposits developed in Inner Mongolia and North Xinjiang, extending west to Kazakhstan and Kirgizstan.

The Tongkuangyu is sole Mesoproterozoic porphyry copper deposit located in the south margin of the North China craton.

All those porphyry copper deposits occur either along the sutures or active continental margins. The granitoids associated with the copper deposits are pyroxene diorite, quartz diorite, granodiorite, adamellite, and monzonitic granite, with High-K characteristics. Many porphyry copper deposits developed either in postcollisonal ages or are located in the pull apart basins of strike-slip fault zones but their source signatures reflect that their related magma were remelt from the stagnant subducted oceanic slab and incorporated with some crust components during ascent. On the whole, the porphyry copper orebodies and related granitic plutons in the orogenic belts usually have been strongly deformed and metamorphosed in some extent. The varied porphyry copper systems during geological history have similar but different geological settings.