SEG-MJD 2016 Conference

Review of the Geology of Porphyry Ore Deposits in the Tethyan Orogenic Belt—a Case Study of the Bangpu Mo-Cu Porphyry Ore Deposits, Tibet, China

Hafizullah Abba Ahmed,[1,]* Hafizullah Abba Ahmed,[2] Lianxun Wang,[1] Mukhtar Habib,[3] and Mohammed M. Abdallsamed Ishag[1]

[1]China University of Geosciences, Faculty of Earth Sciences, Department of Geology, Wuhan, P.R. China
[2]Modibbo Adama University of Technology, Department of Geology, Yola, Nigeria
[3]China University of Geosciences, Faculty of Earth Resources, Key Laboratory of Tectonics and Petroleum Resources, Wuhan, P.R. China

*Corresponding author: e-mail, hifzullahahmed@yahoo.com

The occurrence of the postcollisional Bangpu Mo-Cu porphyry ore deposits has been reviewed. The Cenozoic deposit is located in the Gangdese porphyry copper belt in Tibet, part of the Himalayan (Tethyan) orogenic belt, with an estimated resource of more than 800,000 and 200,000 tons of Mo and Cu, respectively, and approximate grades of 0.089% Mo and 0.32% Cu. Anomalous concentration of the ore covers a total area of about 3.77 km^2, making it the first largest porphyry deposit to be found in the region and accounting for about 60% of the known molybdenum reserve in Tibet. The mineralization is hosted by mid-Miocene porphyritic monzogranites in the area and is controlled by extensional structures and distributed along E-W fault and fracture zones. Isotopic and fluid inclusion analyses suggest that the ore fluids might have been derived from degassed mafic magmas that originate from an upwelling asthenospheric mantle. The redox state of the magma could be viewed as an important factor in the formation of Mo richness and Cu paucity in the study area. The Bangpu Mo-Cu deposit is unique compared to other porphyry copper deposits in the area, in that it is associated with skarn Pb-Zn mineralization, which makes the origin still a subject of debate. Several studies have indicated that the Bangpu porphyry Mo-Cu deposit was generated by postcollisional crustal extension that took place during the Indo-Asian collision that started at 65 Ma. In future, rigorous fluid-rock interaction studies and determination of redox state of magma in the region would give a better understanding of the genetic model that resulted in the formation of Mo-Cu deposits in the area and, perhaps, a great potential for discovery of additional new deposits in the Tibetan sector of the Tethyan orogenic belt.