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The alteration, mineralization and structural evolution of the Zijinshan high sulfidation epithermal deposit, Fujian Province, China

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The Zijinshan ore field in southwest Fujian province, is currently the largest Cu and Au producer in southeast China. The Zijinshan high-sulfidation deposit in the middle of the ore field contains 305 t Au and 1.9 Mt Cu (Jiang et al., 2013). The deposit is hosted in the Zijinshan lithocap, which developed primarily within the Zijinshan granite complex (157-165 Ma; Jiang et al., 2013). High sulfidation Cu-Au mineralization is Cretaceous (103.3 ± 1.5 Ma; Zhong, 2014) and associated with dacite porphyry dykes (104 Ma ± 1 Ma; Jiang et al., 2013).

Seven alteration zones have been determined at Zijinshan, including vuggy quartz, vuggy quartz + dickite, massive quartz, massive quartz-dickite, massive quartz-dickite-minor alunite, disseminated quartz-alunite ± dickite and disseminated quartz-dickite-muscovite zones. Geochemical analyses have revealed systematic mass gains and loss of major and trace elements in different alteration zones. To be noted, the advanced argillic zone is associated with enrichment in Al and Cu. In the massive quartz alteration zone, the relative mass gains of S is significant.

A NE-striking fault system predated alteration and mineralization at Zijinshan, which lack clear kinematic indicators. The syn-mineralization faults are dominantly NW-striking and dip at moderate angles to NE. Most of them are normal or sinistral strike-slip faults, and typically have hydrothermal mineral fibres that preserve evidence of displacement. Sinistral strike-slip movement post-dated normal fault movements, because the horizontal mineral fibres have overprinted the oblique fibres on individual fault surfaces.

Post-mineralization E-trending dextral strike slip faults dip steeply to the NW at Zijinshan. They truncated and disrupted mineralized veins and breccias. Strike-slip senses of displacement have been recorded by hematite, jarosite and minor goethite mineral fibres.

Stereonet™and FaultKin™softwares and the Multiple Inverse Method has been used for kinematic and dynamic analyses of fault movements (Allmendinger et al., 2012). Results indicate that the stress regime was dominated by NNE-directed extension during mineralization. It changed from an extensional regime to a short-lived strike slip regime after mineralization, based on data from the post-mineralization faults. These results are consistent throughout the Zijinshan district and southeast China (Piquer et al., 2016; Lai and Qi, 2014). Demonstrating that the deformation was widespread, and probably related to the geodynamic evolution of the Pacific margin of SE China during the Cretaceous. This area transited from compression to extension from the Jurassic to Cretaceous and with an extensional regime well established during the late Cretaceous (Zhou et al., 2006). It may be that the extensional environment was associated with a change in the subduction direction of the Paleo-Pacific plate from oblique to parallel to the continental margin (Mao et al., 2013). Others have proposed that the trench retreated, caused slab roll-back and back-arc opening, in order to create the extensional regime (Zhou et al., 2006). The

first model ~~one~~ is more consistent with the formation and temporal distribution of the wide range of porphyry Cu-Mo deposits and epithermal Cu-Au-Ag deposits in SE China (Pirajno and Bagas, 2002)