

## **Contrasting Porphyry-Skarn Copper, and Granite-Related W-Sn Deposits in South China: Spatial-Temporal Distribution and Geodynamic Settings**

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The extensive granite-related W and Sn deposits in South China are commonly believed to have formed in an intraplate setting since most of them formed 500–1000 km inward from the continental margins. Recent research has shown that there are three contrasting Mesozoic granite-related W-Sn deposit systems and coeval porphyry-skarn polymetallic copper deposit systems in South China, comprising (1) Middle-Low Yangtze River valley porphyry-skarn Cu-Au-Mo-Fe belt in the north and a parallel porphyry-skarn W(Mo) belt in the south, sharing an age range of 145–137 Ma; (2) Late Jurassic granite-related W-Sn deposits in the Nanling region with an age of 160–150 Ma, and in northern and western, neighboring Qin-Hang, a porphyry-skarn polymetallic copper belt with ages of 170–155 Ma; and (3) a Cretaceous porphyry-skarn Cu-Mo (or porphyry Cu-Mo-epithermal Cu-Au-Ag) ore system and a granite-related Sn-W deposit with an age range of 120–80 Ma, which developed within a series of extensional basins along the continental margins.

The porphyry-skarn copper deposits are related to I-type granitoids (or magnetite series) with some adakite features and are mainly derived from subduction-modified sub-continental lithospheric mantle (SCLM) or lower crustal hydrous cumulate zones that are remnants of previous arc magmatism. The Sn-W deposits and related granitoids are S-type (or ilmenite series), which are a remelt from the crust, with possibly some mantle input.

The question arises as to why mineral deposits from contrasting sources and related granitoids occurred in the same region at same time. After preliminary study we propose that these ore systems were controlled by the subduction of Izanagi or paleo-Pacific plate at a very low angle, possibly flat. Both the Middle-Lower Yangtze River Valley porphyry-skarn Cu-Au-Mo-Fe ore belt and Qin-Hang are located along the boundary of North China Craton and South China Block, and the Neoproterozoic suture separating the Yangtze Craton and Cathycian Block, along which the subducted slab, possibly was torn up. The magma remelt from the slab with a varied mixture of crustal substances formed the porphyry-skarn ore systems whereas the magma was derived from the crust with some input of mantle substances induced by upwelling asthenosphere. In the Nanling region there was very likely a slab window subsequent to the tearing up of the slab along the Qin-Hang Neoproterozoic suture. After 135 Ma the motion of the subducted plate changed from the oblique to parallel to the continental margin, causing several NNE-striking regional strike-slip fault zones and a many pull-apart basins. In this case, minerals from various sources and related granitoids developed in the same basins. Magmas were derived from the crust-formed granite-related Sn-W deposits, and magmas from the stagnant slab formed the porphyry-skarn polymetallic copper deposits.