

The Dabaoshan porphyry Mo-W deposit in the northern Guangdong triggered by deep fault activities in an intracontinental setting

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Porphyry deposits worldwide occur mainly at subduction and continental collision zones^[1,2]. The Dabaoshan porphyry Mo-W deposit in the northern Guangdong province is located in the interior of the South China Block, which is more than 1500 km away from the present oceanic trench.

The Dabaoshan porphyry Mo-W deposit is the largest one of the three porphyry Mo deposits located along the Wuchuan-Sihui deep fault zone (WSZ) in the northwestern Guangdong province. The Dabaoshan porphyry is made up of monzogranite porphyry and granite porphyry with zircon LA-ICP-MS U-Pb ages of 166.3 ± 2.0 Ma. The porphyry is characterized by low $\epsilon_{Nd}(t)$ (-8.20 ~ -6.6) and low zircon $\epsilon_{Hf}(t)$ values (-13.21 to -7.51), which is similar to the ranges of Cathaysia Proterozoic crust. The Dabaoshan porphyry has T_{DM2} ages ranging from 1.7 to 2.0 Ga and its Th/U ratios (averaging at 5.0) and Nb/Ta ratios (averaging at 11.8) are similar to those of the Cathaysia Proterozoic basement.

The above geochemical features suggest that the Dabaoshan porphyry result from the partial melting of the Proterozoic basement without contribution of mantle sources. Based on this conclusion, together with that the porphyry Mo deposits distributed along the WSZ and are more than 1500 km off the present oceanic trench, the following model is proposed for the formation of the Dabaoshan porphyry deposit: (1) local low pressure and wet domains modified by H₂O rich fluids released from metamorphic dehydration or crustal thickened were formed along the WSZ in compressional environment during the Caledonian or the Indosinian, (2) the Dabaoshan magma was formed by partial melting of the wet domains of the Proterozoic basement triggered by the activities of the WSZ during the Yanshanian, which resulting in upwelling of asthenospheric mantle.

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[1] Richards JP (2003) *Econ Geol*, 98, 1515-1533

[2] Hou ZQ et al. (2015) *Geology*, 43, 247-50