The epithermal-porphyry gold mineralization system and related magmatism in the Yichun Area, Heilongjiang, NE China

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The Yichun area is located in the east part of the Central Asian-Mongolian orogenic belt, Heilongjiang, NE China, where gold deposits formed coinciding with magmatism during Mesozoic. The Dong'an gold deposit is hosted by Jurassic I-type alkali-feldspar granite and Cretaceous volcanic rocks, with LA-ICP-MS zircon U-Pb ages of 183.2±1.3~183.3±2.4 Ma and 109.1±1.2 Ma, respectively. The Ar-Ar age of adularia associated with gold-bearing quartz is 107.2±0.2 Ma (Zhang et al., 2010). The Gaosongshan gold deposit is hosted by Cretaceous volcanic rocks with U-Pb age of 102.2±1.7 Ma. Both deposits are controlled by faults, with main wall-rock alterations of silicification, pyritization, sericitization, adularization and fluoritization. Their ore-forming fluids are nearly neutral, medium to low temperature (180~280 ℃), low salinity (<5.0 wt%) and are mainly derived from meteoric water. Geological and geochemical features indicate that the Dong'an and Gaogagnshan deposits are low-sulfidation epithermal gold deposits. The porphyry-type Au deposit at Tuanjiegou is hosted by Putaogou S-type granitic porphyry and associated volcanic rocks, with U-Pb ages of 103.9±0.3~104.2±1.4 Ma and 103.9±1.4 Ma, respectively. The ore bodies mainly occur as veins and lenses within the prophyrite and its contact zones with schist of the Proterozoic Heilongjiang Group. The alteration is characterized by silification-sericitization, argillization and propylitization zones outward from the prophyrite. The ore-forming fluid is mainly of medium-high temperature (190~350 ℃) and variable salinity (0.4～5.4 wt%, 30.6～58.5 wt%) of magmatic origin. The Dong'an, Gaosongshan and Tuanjiegou gold deposits constitute a porphyry-epithermal mineralization system related to the early Cretaceous magmatism. The recognition of this mineralization system has significance to the regional ore-prospecting and co-exploration in NE China.

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