

The identification of porphyry-skarn ore system in the Yichun Area, NE China: evidence from U-Pb and Re-Os geochronology

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The Yichun area is located in the east part of the Central Asian-Mongolian orogenic belt, Heilongjiang, NE China. It is well known for hosting a great deal of epithermal gold deposits and porphyry molybdenum deposits of Yanshanian in the Xiaoxing'anling-Zhangguangcailing metallogenic belt. Recently, a Permo-Triassic porphyry-skarn ore system was identified based on U-Pb and Re-Os dating of two adjacent deposits at the northwest margin of the Meifeng volcanic basin in our study. The Gaogangshan deposit is a newly discovered medium-sized porphyry Mo deposit hosted mainly by S-type granitic rocks. LA-ICP-MS U-Pb dates of zircon in mineralized granitic porphyry yielded a weighted average age of 259.9 ± 2.0 Ma. Re-Os dating of molybdenum ore gave an isochron age of 250.2 ± 1.4 Ma and a weighted average age of 247 ± 6 Ma, which slightly postdate the emplacement of the granite. The Baoshan Cu-Mo-W deposit, located at ~5 km to the north of the Gaogangshan deposit, is a typical skarn deposit. Orebodies occur at the contact zone between granitoid rocks and carbonate rocks of the Cambrian Qianshan Formation. LA-ICP-MS U-Pb zircon analyses yield a concordia age of 248.4 ± 2.1 Ma for ore-related granodiorite. Re-Os dating of molybdenum ore gave an isochron age of 242.0 ± 0.98 Ma and a weighted average age of 241.9 ± 1.7 Ma. The consistent ages of magmatism and mineralization at Gaogangshan and Baoshan coincide with collisional to post-collisional tectonism in the region, resulting from the interaction between the Jiamusi-Mongolia block and the northeastern part of the Sino-Korean Plate. Both of them belong to a porphyry-skarn mineralization system related to the Permo-Triassic magmatism. The recognition of this Indosinian mineralization system has significance to the regional ore-prospecting and co-exploration in NE China.

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