

Geochronology of the Ruwai Fe-Zn-Pb-Ag skarn deposit, Indonesia: evidence of Cretaceous mineralization in the Central Borneo metallogenic belt

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The Ruwai skarn deposit is the largest polymetallic skarn deposit in Borneo and is located in the Schwaner Mountains. Yet its age is unknown, and its genesis has not been studied in detail. This study provides U-Pb garnet and titanite ages and trace elements compositional data, as well as Re-Os ages of sulfides and magnetite in combination with U-Pb zircon ages from associated intrusions to constrain the mineralization age and its relationship to regional tectonic events.

The marble from the Jurassic Ketapang Complex, which was intruded by Cretaceous Sukadana Granitoids, is where the ore deposits and skarns are found. Titanite and garnet from the retrograde stage gave U-Pb dates of approximately 97.0-94.2 Ma and 96.0-95.0 Ma, respectively. These dates agree with Re-Os ages found in magnetite (99.3 ± 3.6 Ma) and sulphides (96.0 ± 2.3 Ma). The Early Cretaceous magmatism at Ruwai (ca. 145.7 and 106.7-105.7 Ma; andesite-dacite), Late Cretaceous (ca. 99.7-97.1 Ma; diorite-granodiorite), and Late Miocene phases are all discernible from the U-Pb zircon ages (ca. 10.94-9.51 Ma; diorite-dolerite). According to our geochemical and multiple isotopic data (C-O-S), the Ruwai skarn deposit was generated by oxidised hydrothermal fluids with temperatures of around 162 to 673 °C, and the ore-forming fluids and metals were mostly of magmatic

This work demonstrates that the Late Cretaceous formation of the Ruwai skarn deposit was linked to the subduction of the Paleo-Pacific plate beneath Sundaland following the accretion of the SW Borneo block. Within the Central Borneo metallogenic belt, the Ruwai skarn deposit is the first evidence of Cretaceous mineralization.