

## **Timing of Ore Mineralization at the Golpu and Nambonga North Porphyry Copper-Gold Deposits, Papua New Guinea: Insights from Re-Os Ages**

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In this study, researchers present new Re-Os ages of the Golpu and Nambonga North porphyry Cu-Au deposits in the Wafi-Golpu mineral district, Papua New Guinea. The Golpu porphyry deposit consists of three chemically distinct porphyries, Main Golpu, Golpu North, and Golpu West, and has a closely related high sulfidation epithermal Au system termed Wafi. The Nambonga North deposit, a separate porphyry center, is located 2.5 km northwest of the Golpu porphyry deposit. Both porphyry deposits are localized by NNE-trending structure and comprise subduction-related I-type, magnetite-series intrusions of calc-alkaline composition.

Two pulps with greater than 50 ppm Mo from the Main Golpu porphyry have Re-Os ages of 9.30 Ma (late Miocene) and 2.90 Ma (late Pliocene). Three pulps and 10 molybdenite separates from Golpu North yield Re-Os ages of  $16.30\text{--}9.17 \pm 0.55$  Ma (early-late Miocene) and 2.90 Ma (late Pliocene). Three pulps and 15 molybdenite separates from the Golpu West porphyry have Re-Os ages of  $11.30\text{--}4.90$  Ma (late Miocene-early Pliocene). Ore deposition commenced at the Golpu North porphyry in early Miocene, progressively followed by mineralizing fluids from the Golpu West and Main Golpu porphyries. Three pulps with greater than 50 ppm Mo from the Nambonga North deposit have ages that range from  $9.24 \pm 0.08$  to 7.70 Ma (late Miocene) and 2.90 Ma (late Pliocene). Ore mineralization is later than Main Golpu and Golpu North, and is most probably contemporaneous with Golpu West.

The Re-Os age data show that the earliest ore mineralization commenced at the Golpu porphyry deposit (i.e., Golpu North), 7.0 m.y. earlier than the emplacement of the Nambonga North porphyry. The latest ore mineralization of 2.90 Ma occurred at Main Golpu, Golpu North, and Nambonga North. The main mineralization event is interpreted to have occurred during subduction of Solomon Sea plate beneath the northeastern margin of continental Indo-Australian plate in Middle-Late Miocene, followed by post-subduction mineralization in Late Pliocene.