

### **Interrogating the Plutonic-Volcanic Connections for Economic Copper Deposit Potential Across the Sunda-Banda Arc**

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Copper is a critical metal that is vital for the transition towards clean and renewable energy. Given the rapidly worsening effects of climate change, there is strong motivation to meet global demands for copper by exploring for new deposits. Volcanic arcs have the potential to host significant copper porphyries, which is demonstrated by the recent discovery of the Onto porphyry in Sumbawa, Indonesia. Sumbawa is part of the Sunda-Banda Volcanic Arc, and the region hosts several porphyry copper deposits as well as numerous highly active volcanoes, including Tambora and Merapi. How and why the same volcanic arc can produce porphyry deposits and active volcanoes is still poorly understood. Hence, we will evaluate the copper accumulation potential of magmas along this arc by interrogating magmatic mineral records of several volcanoes and the Batu Hijau copper porphyry deposit for evidence of processes and geochemical fingerprints. Recent advances in micro-analytical techniques e.g. trace element mapping of magmatic phases using LA-ICP-MS, and thermodynamic modelling of storage conditions and volatile systematics, means we can track micro-scale magmatic histories relevant to volcanism vs. pluton/porphyry formation, and their roles in copper accumulation. We will also evaluate the geodynamic factors that can lead to the formation of porphyry deposits. Implications of our findings can advance understanding of the role of magmatism and crustal geodynamics in ore deposit formation.