Geochemistry, *in-situ* Sr-Nd-Hf-O isotopes and mineralogical constraints on origin and magmatic-hydrothermal evolution of the Tibet Yulong porphyry Cu-Mo deposit

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The Yulong porphyry Cu-Mo deposit in eastern Tibet is the third largest Cu deposit in China, containing proven Cu resource of 6.5 Mt. Ore-related Yulong intrusion has high SiO_2 and Al_2O_3 contents and La/Yb and Sr/Y ratios. They are enriched in large ion lithophile elements (LILEs) and depletion in high field strength elements (HFSEs), and show listric REE patterns. *In-situ* apatite Sr-Nd isotopes show limited variations, which plot on the mixing line between Paleo-Tethys MORB and the ancient crust in eastern Tibet. Zircon crystals have mostly positive yet variable εHf(t) values and young Hf model ages that overlap those of the Paleo-Tethys ocean-related arc magmas. The Sr-Nd-Hf isotopes, together with the elevated zircon $\delta^{18}O$ values (6.4 to 9.3‰) and arc-like trace element patterns, collectively suggest that the Yulong intrusion may have originated from partial melting of juvenile lower arc crust related to the subduction of the Paleo-Tethys ocean, with incorporation of a small amount (~10 %) of ancient crustal materials.

Textural and compositional features of plagioclase and amphibole phenocrysts show that the magma chamber beneath Yulong (7.1–12.5 km in depth) might have been recharged by a mafic magma, and was saturated in magmatic fluids at the time of emplacement of the Yulong intrusion (4.0–5.6 km in depth). The oxidation states are relatively high, and increase through magma evolution. This temporal variation of oxidation states allows the metals to be enriched in the magma during magma evolution, and to be deposited in the hydrothermal alteration stage.