The Capsize porphyry prospect, NE Queensland, Australia: A Paleozoic linked porphyry-lithocap system

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The Capsize porphyry Cu prospect is located in the northern Bowen Basin, 150 km south of Townsville, Queensland, Australia. It is hosted in the early Permian Lizzie Creek Volcanics (LCV) lying on a granite basement (~294-297 Ma). LCV shows calc-alkaline character with typical volcanic arc signature.

So far the Capsize porphyry has been drilled with 8 diamond holes. There are 3 rhyodacitic porphyries, named P1 (red), P2 (red) and P3 (pink), with P1 being pre-/syn-mineralisation and P2-P3 late-mineralisation. P1 is ~10-40m wide and was only intercepted in a few holes. In P1 and surrounding granite, andesite porphyry and andesitic-dacitic volcaniclastic rocks there are ahundant (>50%) quartz veins with the hightest grades. P2 and P3 are much wider and contain only minor sulfide veins. Post-mineralisation basaltic dykes cut alteraion and mineralisaiton. The earliest grey quartz and/or magnetite veins (Stage 1) are cut by Stage 2 lavender to grey quartz ± hematite vein that in turn is cut by Stage 3 sulfide-rich (pyrite-chalcopyrite with minor molybdenite and trace galena) veins and breccia with some anhydrite and quartz. In P1 Stage 1 and 2 veins have narrow red halo. In wall rocks alteration is dominated by green hematite-chlorite-sericite alteration associated with State 2 veins; halo of Stages 1 veins are totally overprinted. Stage 3 veins have white sericite halo. P2 was dated at 283±4 Ma and 285±5 Ma (zircon U-Pb) and molybdenite (Stage 3) in P2 285.7 ± 1.2 Ma (Re-Os).

Scarce outcrops are andesite and rhyodacite with advanced argillic alteration, composed of vuggy quartz with anhydrite casts, quartz-alunite-dickite-pyrite, or quartz-dickite –kaolinite assemblages, and propylitic alteration (epidote-chlorite-montmorrilonite). Several alunite 1480nm peak position measurements have a trend towards the south of the drilled area.

The known major causative intrusion (P1) is very small, no bornite is present, and the chalcopyrite: pyrite ratio is low, which indicates that the current drilled area may be the distal part of the porphyry system. This is consistent with the alunite spectral trend.