

### **Synchronous Carbonate-Base Metal Gold and Skarn Copper-Gold Mineralization New York-Wellington Area, Ok Tedi District, PNG: Implications for Genetic Models**

**Peter Pollard**<sup>1</sup>, Holly Stein<sup>2</sup>, C. Mark Fanning<sup>3</sup>, Peter Olubas<sup>4</sup>, Benjamin Peni<sup>4</sup>, Moss Batap<sup>4</sup>, Mike Erceg<sup>5</sup>

<sup>1</sup>Pollard Geological Services Pty. Ltd., The Gap, Australia, <sup>2</sup>AIRIE, Fort Collins, USA, <sup>3</sup>Arise Geosciences Pty. Ltd., Canberra, Australia, <sup>4</sup>Ok Tedi Mining Limited, Tabubil, Papua New Guinea, <sup>5</sup>Canterbury Resources Limited, Pyrmont, Australia

The New York-Wellington area, approximately 1 km northeast of the Ok Tedi Cu-Au mine contains Jurassic to Neogene sediments intruded by Pleistocene monzodiorites. This area hosts several different styles of copper and gold mineralization that formed in the period 1.54-1.41 Ma, prior to mineralization at Ok Tedi. The main intrusions in this area include the New York, Wellington and East Cheam Monzodiorites which have SHRIMP U-Pb zircon ages of  $1.535 \pm 0.073$  Ma,  $1.551 \pm 0.080$  Ma and  $1.359 \pm 0.068$  Ma respectively.

Sparse porphyry-style D veins in the New York Monzodiorite have a Re-Os molybdenite age of  $1.5403 \pm 0.0048$  Ma, while B veins in the New York and Wellington Monzodiorites have Re-Os molybdenite ages of  $1.5055 \pm 0.0031$  Ma to  $1.4956 \pm 0.0042$  Ma (n=4). The monzodiorite- and siltstone-hosted New York Breccia consists of early magmatic breccia overprinted by carbonate-base metal gold mineralization which has an age of  $1.412 \pm 0.047$  Ma based on the U-Pb zircon age of an inter-mineral dyke. This is contemporaneous with the Wellington Cu-Au skarn and underlying calc-silicate breccia with Re-Os molybdenite ages of  $1.413 \pm 0.003$  Ma and  $1.418 \pm 0.005$  Ma respectively. Late gold-rich intermediate-sulphidation epithermal veins with quartz-rhodochrosite-sphalerite-galena have not yet been dated.

Stratigraphic reconstruction and the lack of a high-sulphidation lithocap at Ok Tedi suggests 1-2 km of erosion since formation of porphyry and skarn mineralization at 1.32-1.14 Ma. The pre-mining elevation of Mt Fubilan was 2084 m compared to 1500 m for the top of the Wellington skarn and 1400 m for the New York Breccia. The New York Breccia has been drilled to a depth of >1200 m without any sign of transitioning to porphyry-style mineralization, suggesting that carbonate-base metal gold mineralization formed 3-4 km below the paleosurface and at considerably deeper levels than the later porphyry and skarn Cu-Au mineralization at Ok Tedi.