Age and Mo mineralisation in the Phnom Baseth granite, Cambodia

J. WOODARD[1]*, K. SUNDBLAD[2], S. KONG[3] AND K. LOHKOV[4]

[1]*University of KwaZulu Natal, Westville (Durban), X5 4001, SOUTH AFRICA; *jwoodard23@hotmail.com*
[2]*University of Turku, 20014 Turku, FINLAND*
[3]*Institute of Technology, Cambodia, PO Box 80 Phnom Penh, CAMBODIA*
[4]*St. Petersburg State University, St. Petersburg, 199034, RUSSIAN FEDERATION*

Granitic magmatism in the Indochina Craton is largely related to tectonic activity during the Indosinian Orogen (Late Permian - Early Jurassic, ~260-190 Ma). While granitoids in the marginal areas of the craton are quite well-studied, less work has been done on granites in the interior. At Phnom Baseth, ~20km NW of Phnom Penh, Cambodia, is a small granite intrusion with 2-5 cm microcline-plagioclase-quartz phenocrysts set in a medium to fine grained (0,5-1 mm) groundmass of quartz, plagioclase, microcline, biotite and amphibole. The granite is cut by a network of 1-2 mm wide quartz veins, indicative of WNW-trending brittle fracture with a conjugate N-S fracture direction. A ~100 m wide zone of intense hydrothermal alteration, also showing a WNW-trend, extends for at least 500 m along strike. 1-5 mm wide quartz-molybdenite-chalcopyrite-pyrite veins occur with a frequency of about one per metre within this alteration zone. Geochronological data from the granite intrusion (U-Pb zircon; Ar-Ar biotite) and the mineralisation (Re-Os molybdenite) are presented and discussed in a regional tectonic context.

SIMS U-Pb zircon analyses result in a crystallisation age of 194.6 ± 1.2 Ma for the Phnom Baseth granite. Ar-Ar biotite analysis of two samples resulted in plateau ages of 184.7 ± 0.4 Ma and 188.3 ± 0.4 Ma. These slightly younger ages likely represent cooling of the pluton through ~300-400°C. Re-Os analysis of four molybdenite fractions resulted in an isochron age of 95.1 ± 3.2 Ma. This indicates that the quartz veining and associated mineralisation is not co-magmatic.

The U-Pb crystallisation age correlates well with the latest, post-collisional stage of the Indosinian Orogen, during which the regional tectonic environment shifted from compressional to weakly extensional. Intrusion may have been controlled by strike-slip movement in the Tonle Sap region, likely reflecting an extension of the Mae Ping (Wang Chao) shear zone. Mineralising fluids infiltrated the Phnom Baseth granite during reactivation of this shear zone, caused by the collision of India with Asia during the Late Cretaceous.