

# Ubendian Mineralisation in the Lupa Goldfields, south-western Tanzania: New Discoveries and Geochronology

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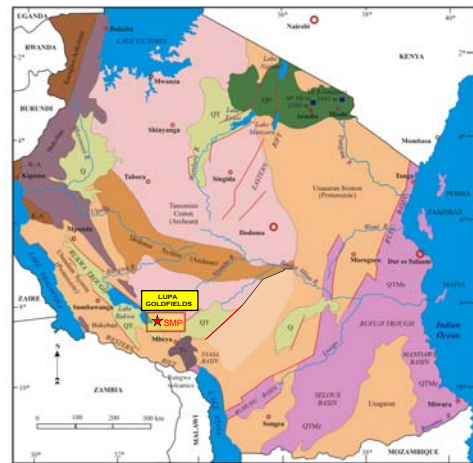
The Lupa Goldfield of south-western Tanzania produced over 23 tonnes of gold during colonial times, and an unrecorded amount since independence. The New Saza Mine was the second largest pre-Independence gold producer in the country after the Geita Mine. Despite that, and unlike the Archaean granite-greenstone terrain of the Lake Victoria Goldfields, the Lupa Goldfield has not received significant modern exploration. This is mainly due to a perception that high-T metamorphism during the Ubendian Orogeny meant the Lupa Goldfield was only prospective for narrow, high-grade gold vein mineralisation (e.g. see de Klerk, 2001). However recent exploration by Helio indicates this perception is false. Re-evaluation of the timing and genetic relationships of the gold mineralisation in the area indicates that good potential does exist in the Lupa Goldfield for a world-class gold deposit.

## Ubendian and Usagaran Belts:

- Amphibolite- to granulite-facies lithologies
- Large-scale ductile shears trending NW-SE in the Ubendian belt, NE-SW to E-W in the Usagaran Belt.
- Ubendian deformation constrained between peak regional metamorphism and ductile shearing (2,100 Ma), and late-kinematic granitoids (1,850Ma; Lenoir et al., 1994).
- Reactivation during Meso- and Neo-proterozoic orogenies, and Phanerozoic rifting.

## Lupa Goldfields:

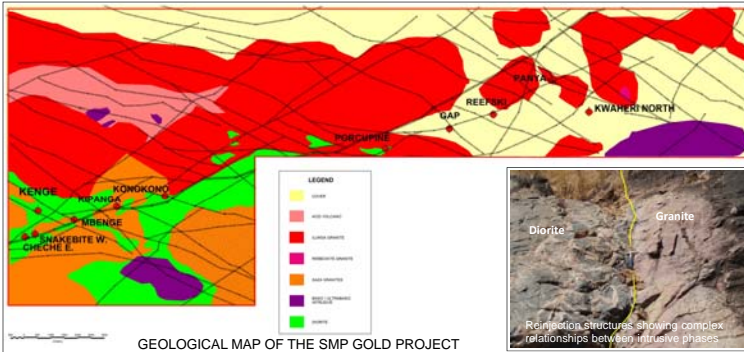
- Triangular fault-bounded Palaeoproterozoic horst block
- Eastern margin of the Ubendian belt.
- Bounded by the Archaean Tanzanian Craton to N and Palaeoproterozoic Usagaran Belt to E.
- Separated from the Tanzanian Craton by ca 1,800 Ma granite (Schlüter, 1997).



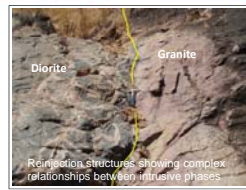
GENERAL GEOLOGICAL MAP OF TANZANIA (after Mineral Opportunities of Tanzania, 1994)

## The Saza-Makongolosi gold project (SMP):

- Located on the eastern margin of the Lupa Goldfield.
- Bimodal Igneous Suite, minor volcanics
- Dominant granite / tonalite and diorite / gabbro.
- Primary igneous fabrics preserved
- Greenschist facies metamorphism
- Little evidence for a major regional thermal event.



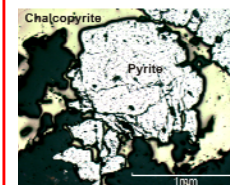
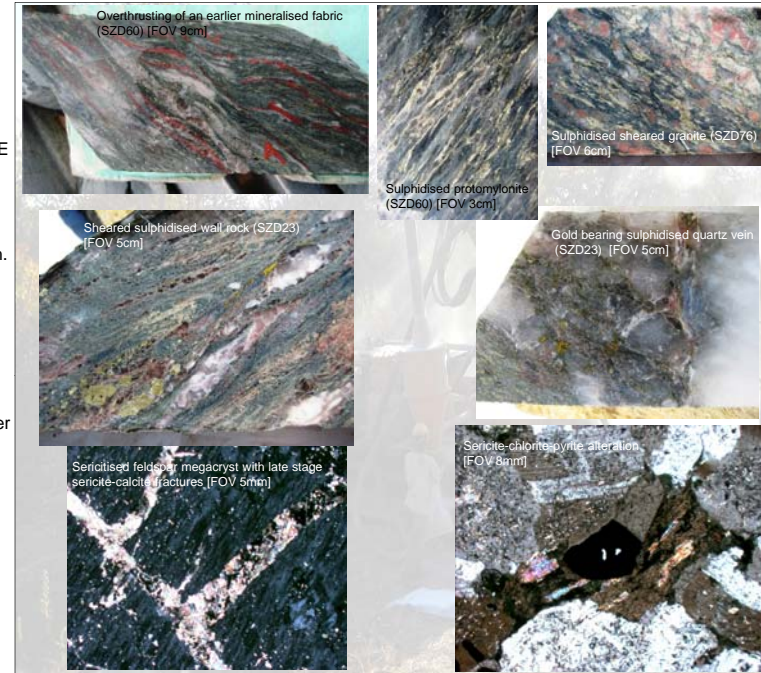
GEOLOGICAL MAP OF THE SMP GOLD PROJECT



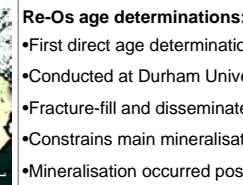
Reactivation structures showing complex relationships between intrusive phases

## Gold mineralisation:

- Widespread within the SMP
- Orogenic or intrusion related?
- Associated with E-W and NW-SE trending shear zones (parallel to Ubendian and Usagaran Belts).
- Focussed along master shear zone adjacent to granite batholith.
- Gold occurs in pyrite-bearing quartz veins and sulphidised sericite-schist wallrock
- Quartz veins up to 10m thick
- Mineralised shear structures over 40m wide.
- Gold (80-92 at% Au) associated with dominant pyrite
- Minor chalcopyrite and rare molybdenite
- Alteration dominant sericite-chlorite-carbonate, characteristic of low-T hydrothermal systems



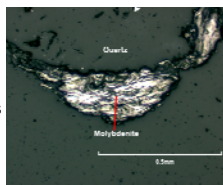
Chalcopyrite



Pyrite

## Re-Os age determinations:

- First direct age determinations for mineralisation in the Lupa Goldfields
- Conducted at Durham University
- Fracture-fill and disseminated molybdenite from auriferous quartz veins
- Constrains main mineralisation at ~1,937 Ma.
- Mineralisation occurred post-peak greenschist facies



Quartz

Molybdenite

Further work is ongoing, focussed on geochronology of the various intrusive-structural events and their relationship to mineralisation

## REFERENCES:

- de Klerk, S-L (2001) *Gold Deposits in the SADC Region*, Mineral Resources Survey Programme No. 4, SADC Mining Sector Coordinating Unit, Council for Geoscience, 126pp.
- Schlüter, T. (1997) *Geology of East Africa. Beiträge zur Regionale Geologie der Erde, Band 27*, Gebrüder Borntraeger, Verlagsbuchhandlung, 484pp.
- Lenoir, J.-L., Liegeois, J.-P., Theunissen, K. and Klerk, J. (1994) *The Palaeoproterozoic Ubendian shear belt in Tanzania: Geochronology and Structure*. Journal of African Earth Sciences, v. 19, pp 169-184.

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