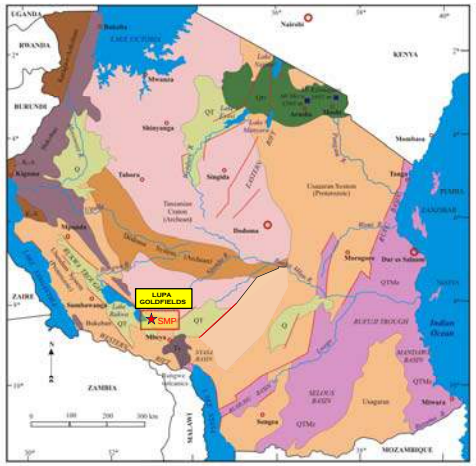
Ubendian Mineralisation in the Lupa Goldfields, south-western Tanzania: New Discoveries and Geochronology

Chris MacKenzie[1], Ronald Sheets[1], John Moore[2], David Selby[3]

1) Helio Resource Corp. 580-625 Howe Street, Vancouver, V6C 2T6, Canada chris@helioresource.com .
2) Exploration Geology Department, Rhodes University, PO Box 94, Grahamstown, 6140, South Africa.
3) Department of Earth Sciences, Science Labs, Durham University, Durham, DH1 3E, United Kingdom

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.



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

Ubendian and Usagaran Belts:

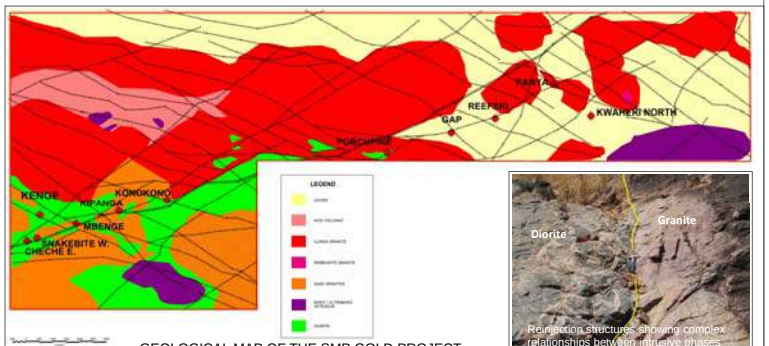
- Amphibolite- to granulite-facies lithologies
- Large-scale ductile shears trending NW-SE in the Ubendian belt, NE-SW to E-W in the Usagaran Belt.
- Ubendian deformation constrained between peak regional metamorphism and ductile shearing (2,100 Ma), and late-kinematic granitoids (1,850Ma; Lenoir et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

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.

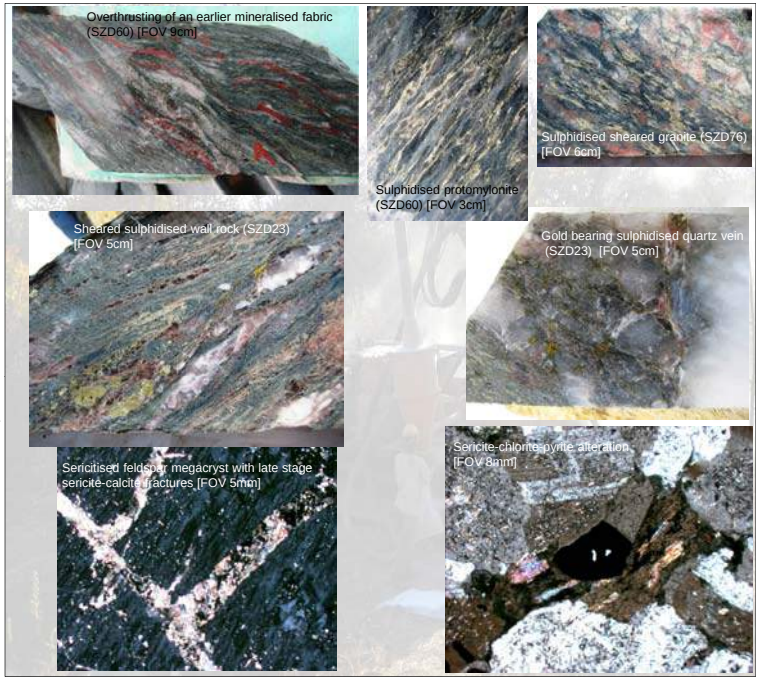


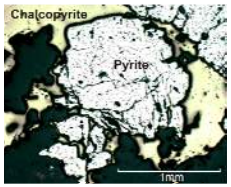
GEOLOGICAL MAP OF THE SMP GOLD PROJECT

Reinjection structures showing complex relationships between intrusive phases

Gold mineralisation:

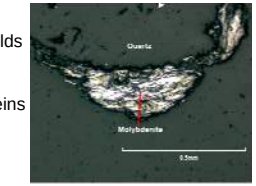
- Widespread within the SMP
- Orogenic or intrusion related?
- Associated with E-W and NW-SE trending shear zones (parallel to Ubendian and Usagaran Belts).
- Focussed along master shear zone adjacent to granite batholith.
- Gold occurs in pyrite-bearing quartz veins and sulphidised sericite-schist wallrock
- 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





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



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

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