

Randomly mixed, angular fragments require high-energy explosive conditions. The Marble Hall diorite represents a new magma type of alkalic affinity associated with the Rustenburg Layered Suite. The magma was probably emplaced as a forerunner to the Rustenburg Layered Suite. Early alkalic magma activity is known from continental flood basalt provinces, such as the Karoo igneous event.

Geochemical and petrological characteristics of granitic rocks in the Serenje area, central Irumide Belt, Zambia

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The Irumide Belt of Zambia is characterised by widespread granite magmatism, spanning the entire period of its evolution. Geological mapping in the Serenje area (Mapani and Moore, *in press*) distinguished three main suites of granites. The Sasa Granite is a foliated, medium-grained felsic granite and forms part of the basement to all other granite types, as well as the supracrustals of the Muva Supergroup. The Sasa Granite is equivalent to the Mkushi Gneiss Basement Complex (MGBC), the age of which has been determined from the Mkushi Gneiss at Mtuga Mine as 2049 ± 6 Ma (SHRIMP dating of zircons: Armstrong, *pers.comm.*). A younger suite of granites, of presumed Mesoproterozoic age, consists of medium-grained, homogeneous leucocratic granite gneiss. The youngest type of granite is a porphyritic biotite granite, which shows a magmatic texture and intrusion of late melts of fine-grained felsic granite. Xenoliths of dark material indicate the intrusive character of the porphyritic granites. Preliminary dates of the suite of porphyritic granites, obtained through SHRIMP analysis of magmatic zircons, indicates an approximate igneous age of around 1020 Ma (Wingate, *pers.comm.*).

Geochemical data of major and minor trace elements largely confirms the different nature and geotectonic setting of the three granite suites in the Serenje area. The granites of the Serenje area have a peraluminous character and range from calc-alkaline to alkaline. The older Sasa Granite is an I-type

granitoid with calc-alkaline affinities having relatively high Na₂O, moderate contents of Rb, Ba and rare earth elements (REE) and low Rb/Ba and Rb/Sr ratios. It is distinguished from the two younger granite suites by the lack of an Eu anomaly, suggesting little plagioclase fractionation. Trace-element characteristics of the Sasa Granite suggest that it represents subduction related magmatism and thus corroborates models suggesting the existing of a volcanic arc of Palaeoproterozoic age, which forms most of the Bangweulu Block.

Irumide granites, *sensu stricto*, range from leucocratic granites to biotite granites. The leucocratic types belong mainly to the older, medium-grained granite suite, whereas biotite granites belong to the younger, porphyritic granite suite.

These granites have a relatively flat heavy REE and moderate- to steep-light REE pattern. This is characteristic of late- to post-orogenic granites. A moderate Eu anomaly in the REE patterns suggests plagioclase fractionation to be an important process in the genesis of both granite suites. Tectonic discrimination on the basis of trace element patterns, indicates that the older suite of leucocratic granites represents syncollisional magmatism, whilst the younger suite of porphyritic biotite granites was emplaced in a within-plate setting. The geochemical data presented on the two younger granite types compares well with the syn- to post-orogenic granites of the coeval Kibaran Belt to the west, although in the Irumide Belt, strongly alkaline A-type granites have not yet been recognised.

Reference

Mapani, B.S.E., Moore, T.A. *In press*. The geology of the Serenje area, explanation of degree sheet 1330, NW quarter. Geological Survey Zambia Report 51.

Leucoxene in marine placer deposits

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The term 'leucoxene' was introduced by Gumbel in the early 19th century to describe the white or yellow alteration products of ilmenite grains. More recently, the term leucoxene became broadened to include virtually all forms of altered ilmenite; however, it is not considered to represent a specific mineral species