SHRIMP ZIRCON U-PB GEOCHRONOLOGY AND GEOCHEMISTRY OF THE CHOMA – KALOMO BLOCK GRANITOIDS (ZAMBIA): GEOLOGICAL IMPLICATIONS

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The Choma–Kalomo Block is a Mesoproterozoic terrane exposed in southern Zambia, south of the Pan-African Zambezi Belt. It includes a large plutonic complex in the central part, surrounded by supracrustal metasedimentary assemblages. The plutonic complex represents a set of intrusive bodies that yielded TIMS U-Pb zircon dates between c. 1345 and 1200Ma (Hanson et al., 1988). Two deformation events were recorded in this terrane: D_1 is presumably coeval with the emplacement of the c. 1345 Ma granitoids (converted into orthogneisses) and D_2 coeval with emplacement of c. 1200 Ma granitoids.

Because of its location between the Mesoproterozoic Irumide Belt of Zambia and the Ngamiland province of Botswana, the Choma-Kalomo Block is a critical terrane in the reconstruction of the late-Mesoproterozoic (Kibaran) orogenic system of central and southern Africa.

To better understand the evolution of the Choma-Kalomo Block, zircons extracted from five granitoid samples were investigated using the U-Pb SHRIMP technique and yielded the following results: CK4: medium-grained two mica granite: 1174±27 Ma; CK10: foliated medium- to coarse-grained biotite granite: 1188±11 Ma; CK12: gneiss containing mica-rich restites: 1177±70 Ma; CK25: foliated, medium- to coarse-grained biotite granite: 1181±9 Ma; CK13: augen (ortho) gneiss: 1368±10 Ma. Laser Ablation ICP-MS Lu-Hf isotopic data on the dated zircons yielded $\varepsilon_{Hf}(T)$ values of : CK4: -3.3; CK10: -5.1; CK12: -11.0 and CK25: -3.5, indicating a slightly reworked nature of D_2 magmatism.

The new SHRIMP ages support the existence of two major magmatic events in the Choma-Kalomo Block at c.1.37 and 1.18 Ga. Neither of these magmatic events are reported from the Irumide Belt (De Waele and Mapani, 2002; De Waele et al., 2003) or the Ngamiland province (Kampunzu et al., 1999), which does not support the correlation of the Choma-Kalomo Block with these two provinces as suggested by Hanson et al. (1988) and Singletary et al. (2002). In contrast, 1.38-1.37 Ga large granitoids batholiths dated at are widespread in the Kibaran Belt in SE and eastern Congo (Kokonyangi et al., 2001), Rwanda and Burundi (Tack et al., 2002; Wingate and De Waele, pers. comm.). In both, the Kibaran and Choma-Kalomo terrains, the 1.37-1.38 granitoids occur as large batholiths made of several discrete intrusions and exhibit two deformational fabrics. In addition younger magmatic events described from the Kibaran Belt include granitoids emplaced between 1.25-1.00 Ga (Kokonyangi et al., 2004), similar to those recorded in the Choma-Kalomo Block. Basaltic and rhyolitic volcanics intruding the Nzilo Group in the Kibaran Belt, and exhibiting only D_2 Kibaran fabrics, could also be part of this 1.25-1.00 Ga Kibaran magmatic activity (Kokonyangi and Bulambo, unpubl. data). Furthermore, the 1.37 Ga orthogneisses in the Choma-Kalomo Block chemically resemble coeval orthogneisses described throughout the Kibaran Belt, (Tack et al., 2002; Kokonyangi et al., 2004). These field occurrences, geochemical and geochronological similarities between these two Mesoproterozoic terrains raise the interesting possibility that the Choma-Kalomo Block may have been detached from the Kibaran Belt during a rift-drift stage of the Katangan basin. Upon closure of the Damara-Lufilian-Zambezi Ocean during the assembly of Gondwana, the rigid Choma-Kalomo microcontinent could have acted as an indentor, as it got caught up in between the Kalahari and Congo cratons. It's presence within the collision zone changed the geometry of compression and thrusting, resulting in the arcuate shape of the Lufilian Belt.

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