Paper Number: 4085

Regional framework for the distribution of LCT and NYF signatures in Zambezian pegmatites, Mozambique

Leal Gomes, C.[1], Moiana, M.[1], Marques, J.M.[2]

[1]Minho University, School of Sciences, Gualtar, 4710-057 BRAGA, PORTUGAL, caal.gomes@gmail.com
[2]Gondwana - Exploration and Mining Consultants Ltd, P.O. Box-832, MAPUTO, MOZAMBIQUE

In the Pan-African network of orogenic belts in Africa, resulting from closure of major Neoproterozoic oceans, the deformation and metamorphism of the Mozambique Metamorphic Province is viewed as originating during the amalgamation of Gondwana.

During this process a major stage of overthrust and nappe overcoming was responsible not only for the polydeformed high-grade character of the observed metamorphic assemblages, suggested by the actual exposure of middle to lower crustal levels, but also for the seriation of geochemical types of pegmatites, grading from: 1 - early NYF-types related to older alkaline magmatism trapped in reworked protoliths; 2 - middle, barren to LCT-types of S to hybrid affiliation; and 3 - late-NYF minor bodies with a more defined A-type, granite parentage. Deep migmatisation and anatexis and upper extensional collapse and lithospheric delamination allowed the emplacement of distinctive, granite to pegmatite sequences, with contrasting metallogenic signatures, which, afterwards, were tectonically transported to almost the same structural level. Here, late shear Pan-African episodes controlled the latest hydrothermal assemblages.

As a result, the structure of the Zambezian Pegmatite Province shows lineaments of pegmatite-fields and pegmatite-body elongations, which are sub-concordant to the regional foliations, considered to be Pan-African [1]. Also, the regional distribution of distinctive types of pegmatites suggests a conspicuous aureolar arrangement (Fig. 1) in response to the Pan-African evolution.

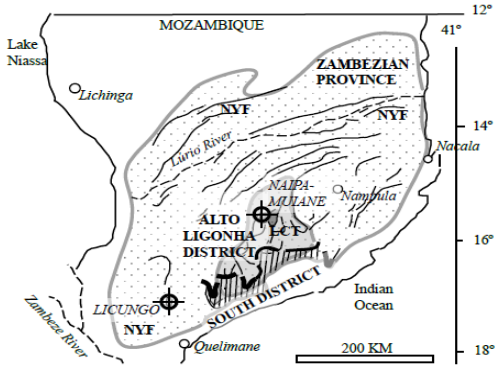

Figure 1: Pan-African lineaments contouring the main domains of Zambezian Pegmatite Province in Northern Mozambique.

The Alto Ligonha District, in Central Zambézia, hosts LCT pegmatites with extensive hydrothermal replacement holding gemstones, Li-micas and Ta-rich mineral ores. For the contiguous South District, recent studies revealed several pegmatite fields with LCT primary paragenesis still preserved, with petalite and spodumene as high temperature remnants and tapiolite > tantalite > microlite dominant ores [1]. This suggests a proximal and sub-autochthonous emplacement of its pegmatite bodies, located in tangential ruptures under tectonic slices of Mamala Gneiss to Molócuè Group of the Nampula Complex. Around that central portion of the orogenic complex, a rimming belt of pegmatite-fields belonging to the NYF family, encompass several differentiated subclasses of strongly deformed lensoid pegmatite-bodies. Those are enriched in beryl, columbite, and present, occasionally, amazonite K-feldspar and REE – Y – Sc – U – Th – Ti- minerals.

Chronological data for Zambezian pegmatites are scarce, especially in what concerns age determinations in individual crystals of suitable mineral species such as zircon or monazite. The age for monazite assemblages from Licungo NYF pegmatites (Fig. 1) is 476±12 Ma, agreeing with a late positioning in the Pan-African Orogenic time span. Similar ages were found for typical Alto Ligonha LCT pegmatites such as Muiane and Naípa (Fig. 1) - 427 Ma (K- Ar) and 482±6Ma in zircon (SHRIMP), respectively.

References:

[1] Dias P et al. (2008) Caracterização estrutural e paragenética do Campo Pegmatítico do Licungo (Mocuba, Moçambique) - Identificação de recursos base associados.