

# Mixing, mingling and metasomatism: Late-stage HFSE mobility and carbothermal alteration in the Nejoio alkaline silicate complex, Angola

ANOUK M BORST<sup>1</sup>, ADRIAN A FINCH<sup>2</sup>, PETER ROY  
SIEGFRIED<sup>3</sup> AND AURORA BAMBI<sup>4</sup>

<sup>1</sup>Royal Museum for Central Africa

<sup>2</sup>University of St. Andrews

<sup>3</sup>Camborne School of Mines, University of Exeter

<sup>4</sup>Universidade Agostinho Neto

Presenting Author: anouk.borst@kuleuven.be

Angola is one of the least explored regions in Africa and hosts a series of Meso- and Cenozoic alkaline-carbonatite complexes that were emplaced along a NW-SE trending structural lineament known as the Lucapa Belt (Moçamedes Arch). This belt lies parallel to crustal lineaments in Namibia, both of which extend into Brazil and Paraguay. This magmatic province hosts significant critical metal deposits (i.e. Nb, rare earth elements (REE), P, fluorite) and suggests the economic potential of the Angolan complexes requires further evaluation.

We present field and petrographic data for the Nejoio alkaline complex in southwestern Angola. Nejoio forms a small subvolcanic ring complex of ijolites and feldspathoidal syenites, surrounded by a 200 m wide fenite zone [1]. The complex comprises an inner zone of amphibole and pyroxene ijolite mixed with more syenitic varieties. The rocks are composed of pyroxene, sodalite, nepheline and feldspar within a fine-grained matrix of aegirine-augite, biotite, titanite, apatite and minor feldspar, fluorite, cancrinite and zircon. Field evidence of mixing and mingling between ijolitic and syenitic magmas includes pronounced layering (Fig 1) and rounded, flow aligned ijolitic enclaves (1 to 10 cm) within the hybridized ijolite/syenite.

The outer zone nepheline syenites contain abundant feldspar, nepheline, sodalite and cancrinite, with minor pyroxene, magnetite, pyrochlore and pyrophanite-ilmenite series, as well as numerous accessory minerals including zircon, sphalerite and rutile. Agpaitic Na-Zr-Ti-Nb silicates (rosenbuschite), occur in crosscutting veins, which have subsequently been altered to catapleiite and Yb-rich fluorite (Fig 2). Pyroxenes in both units record an evolutionary trend from diopside-hedenbergite to aegirine, with most pyroxenes being partially to completely replaced by late-stage aegirine. The outer zone syenites display intense metasomatism, locally forming a carbonatite-like assemblage comprising calcite, dolomite, dawsonite, pyrite, magnetite and REE-Sr-carbonates (carbocernaite/burbankite).

This complex records a transition from peralkaline to agpaitic assemblages, with HFSE-REE minerals formed at the late hydrothermal stage. These are too localized to be of immediate economic interest. Additional carbothermal alteration assemblages and carbonate-fluorite veins in the outer zone may, however, indicate a carbonatite at depth.

[1] Rodrigues, B. 1978. *Bol Museo e Lab Min e Geol*,

