

Evolution of lithospheric mantle beneath mobile belt between two cratons: An example of the Oku Massif, Cameroon Volcanic Line (W Africa)

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Cameroon Volcanic Line (CVL) is a linear chain of volcanoes stretching from the Gulf of Guinea to the Biu Plateau in NE Nigeria (Fig. 1). The lavas of composition ranging from basanite to hypersthene-normative basalt occur in all of them. Locally they contain peridotite xenoliths. CVL is settled on the Central African Orogenic Belt, located between the Congo and West Africa Cratons.

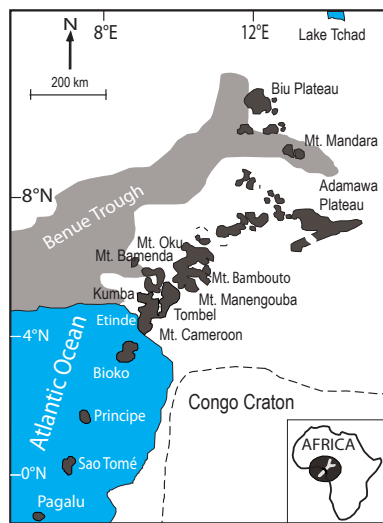


Fig. 1. Geological setting of the Cameroon Volcanic Line

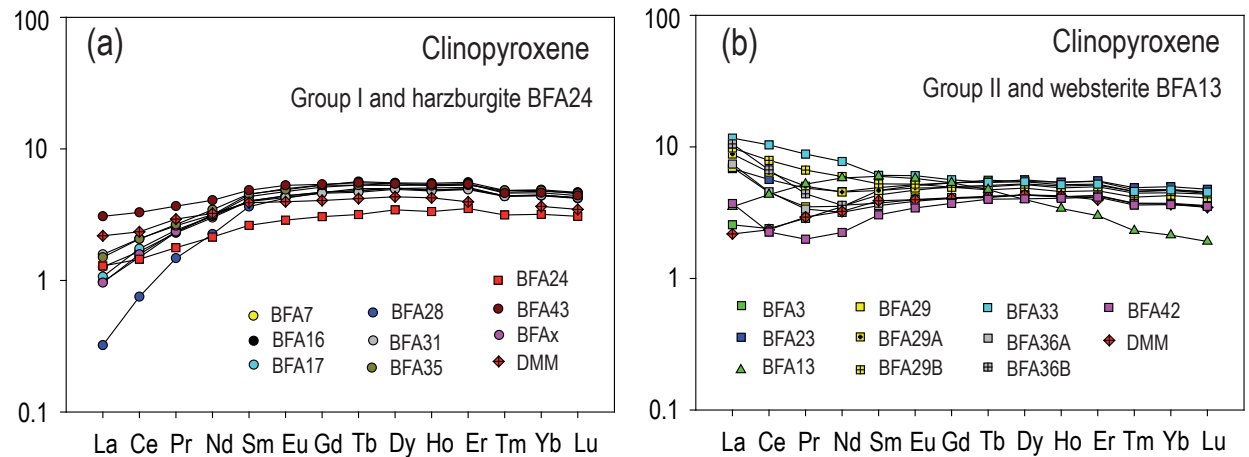


Fig. 2. REE patterns of clinopyroxene from the Befang lherzolites

We studied the peridotite xenolith suite from Befang cone (< 1 Ma) in the Oku Volcanic Group. Xenoliths show that lithospheric mantle beneath Oku is lherzolitic and is fertile in terms of major element composition of minerals. REE patterns of clinopyroxene define LREE-depleted and LREE-enriched xenolith groups (Fig. 2).

The study of crystal preferred orientation (by EBSD) shows that:

- (1) olivine and orthopyroxene in lherzolites containing LREE-depleted clinopyroxene record the same high-temperature deformation, but clinopyroxene is post-deformational;
- (2) all silicate minerals in lherzolites containing LREE-enriched clinopyroxene record the same high-temperature deformation.

We interpret these observations as indicating that LREE-depleted clinopyroxene originated due to reactive percolation of silicate melt derived from low degrees of melting of DMM (Depleted MORB Mantle)-like source. The xenoliths with LREE-enriched clinopyroxene were the protolith.

Reference

Tefonkenfack S.S.T., Puziewicz J., Aulbach S., Ntaflos T., Kaczmarek M.-A., Matusiak-Małek M., Kukuła A., Ziobro M. (2021): Lithospheric mantle refertilization by DMM-derived melts beneath the Cameroon Volcanic Line – a case study of the Befang xenolith suite (Oku Volcanic Group, Cameroon). *Contributions to Mineralogy and Petrology* 176: 37 (Open Access, <https://link.springer.com/article/10.1007/s00410-021-01796-3>)