

# A HIMU Signature beneath Mt. Oku, Cameroon Volcanic Line: Implications for plume–lithosphere interaction

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Volcanic rocks along the Cameroon Volcanic Line (CVL) show characteristics akin to OIB, HIMU, and MORB. Lavas with high radiogenic  $^{206}\text{Pb}/^{204}\text{Pb}$  ( $>19.5$ ) have been reported in the continent/ocean boundary (COB) and the Biu Plateau at the northern end of the chain. The localization of lavas with HIMU signature ( $^{206}\text{Pb}/^{204}\text{Pb} >19.5$ ) in particular areas of the CVL is highly contestable because of the lack of adequate Sr–Nd–Pb isotopic data in all the volcanic centres of the chain. Thirty five new mafic volcanic rock samples ( $\text{MgO} > 4$  wt.%) collected from Mt. Oku were analyzed for major (XRF) and trace elements (ICP–MS), and Sr–Nd–Pb isotopes (TIMS). Results indicate the coexistence of lavas with typical FOZO ( $^{87}\text{Sr}/^{86}\text{Sr} = 0.7030\text{--}0.7035$ ,  $^{143}\text{Nd}/^{144}\text{Nd} = 0.51286\text{--}0.51294$ ,  $^{206}\text{Pb}/^{204}\text{Pb} = 19.5\text{--}20.7$ ) and MORB ( $^{87}\text{Sr}/^{86}\text{Sr} = 0.7033\text{--}0.7036$ ,  $^{143}\text{Nd}/^{144}\text{Nd} = 0.51272\text{--}0.51290$ ,  $^{206}\text{Pb}/^{204}\text{Pb} = 17.9\text{--}19.45$ ) composition. We report the highest value of  $^{206}\text{Pb}/^{204}\text{Pb}$  (20.7) so far measured along the CVL. Like the COB and Biu Plateau lavas, the Mt. Oku high radiogenic  $^{206}\text{Pb}/^{204}\text{Pb}$  lavas show some similarities with the St. Helena HIMU lavas. Trace element characteristics indicate a recent ( $\sim 10^8$  years) intra-mantle metasomatic enrichment of the SCLM by small degree partial melts. This increases the (U, Th)/Pb ratios that decay to produce the HIMU signature in the lavas. Geochemical data suggest melting of the asthenospheric and SCLM mantle sources in the petrogenesis of the lavas. Contribution of DMM–HIMU–EM1 in different proportions can explain the isotope variations observed in the lavas. Modelled results using trace elements and isotopes indicate that lavas with  $^{206}\text{Pb}/^{204}\text{Pb} < 19.5$  could be derived from those with HIMU signature by addition of  $< 10\%$  EM1 component. Based on the new results, alongside result from the the Biu Plateau, we suggest that the HIMU signature is a common component in the COB and the continental CVL.