THE ROLE OF CONTINENTAL CRUST AND LITHOSPHERIC MANTLE IN THE GENESIS OF CAMEROON VOLCANIC LINE LAVAS: CONSTRAINTS FROM ISOTOPIC VARIATIONS IN LAVAS AND MEGACRYSTS FROM THE BIU AND JOS PLATEAU

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Magmas erupted along the Cameroon Volcanic Line (CVL) are heterogeneous in combined Sr, Nd, Pb and Os isotope space. In order to constrain the extent to which this heterogeneity is due to melt interaction with the SCLM and/or the continental crust, we have examined melts and genetically related mantle-derived megacrysts from the Biu and Jos Plateau, northern CVL. The lavas show two diverging contamination trends connected by a component common to all lavas with $^{87}$Sr/$^{86}$Sr $\sim$0.70290, $\varepsilon_{Nd}$ $\sim$7.0, $^{206}$Pb/$^{204}$Pb $\sim$19.82, $\Delta$7/4 Pb $\sim$0, $\Delta$8/4 Pb $\sim$0 and $^{187}$Os/$^{188}$Os $\sim$0.128. One trend of the lavas extends towards radiogenic $^{206}$Pb/$^{204}$Pb (up to 20.33) and $^{87}$Sr/$^{86}$Sr (up to 0.70310), but unradiogenic $\varepsilon_{Nd}$ (down to 6.0), while maintaining generally unradiogenic $^{187}$Os/$^{188}$Os. Isotopic compositions (Sr, Nd, Pb) of associated megacrysts overlap this trend and extend to even more enriched compositions. Because the megacrysts grew within the mantle, we argue that this contamination trend is caused by interaction of the primary melt with enriched subcontinental lithospheric mantle (SCLM). The second contamination trend, characterized by decreasing $^{206}$Pb/$^{204}$Pb (down to 19.03), $\varepsilon_{Nd}$ (down to 4.6), but increasing $^{87}$Sr/$^{86}$Sr (up to 0.70359) and $^{187}$Os/$^{188}$Os (up to 0.24), is not sampled by megacryst isotope compositions and therefore has to be imprinted on the magmas after formation of the
megacrysts, i.e. at shallower depth. Increasing $^{187}$Os/$^{188}$Os and $\Delta 7/4$ Pb with decreasing $^{206}$Pb/$^{204}$Pb strongly argues for addition of continental crust as opposed to material derived from the SCLM. Quantitative modeling consistently suggests addition of up to 7% bulk crustal material to explain the isotope systematics of the most contaminated lavas from both the Biu and Jos Plateau. The same trends towards higher $^{87}$Sr/$^{86}$Sr and $\Delta 7/4$ Pb with decreasing $^{206}$Pb/$^{204}$Pb are also seen in lavas from the oceanic sector of the CVL and have historically been interpreted as involvement of an EM or LOMU component in the source of CVL magmas. However, several recent studies have suggested that continental material may have been dispersed throughout the Atlantic basin during the breakup of Gondwana. Given the similarity of isotopic variations in the oceanic CVL with continental CVL lavas affected by crustal assimilation, we propose that the oceanic sector might also be affected by shallow contamination of crustal material.