The origin and dynamics of mantle sources beneath the Cameroon volcanic line

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The Cameroon volcanic line (CVL) consists of a linear array of Cenozoic volcanoes developed on both the Atlantic ocean floor and the continental crust of the African plate making it an ideal location to study the influence of lithosphere on the genesis of alkaline magmas. Here, a new set of major and trace element abundances and high precision Sr, Nd, Hf, and Pb isotope data from oceanic and continent-oceanic boundary (COB) lavas of the CVL are presented. The variation in radiogenic isotopes is well pronounced among geographic locations, which suggests local heterogeneity in the source region demonstrating the complex nature of the mantle components involved in each volcanic center. There exist two distinct high $^{206}Pb/^{204}Pb$ end-member components which are identified on the extension lines of oceanic sector and COB volcanoes, respectively, from the common low $^{206}Pb/^{204}Pb$ (FOZO-like) component that has not been identified in previous studies [1,2]. The high $^{206}Pb/^{204}Pb$ oceanic sector groups (São Tomé and Príncipe) generally display high $^{176}Hf/^{177}Hf$ (0.28292-0.28299) and $^{143}Nd/^{144}Nd$ (0.51287-0.51301) whereas the high $^{206}Pb/^{204}Pb$ COB groups (Etinde and Mt. Cameroon) display low $^{176}Hf/^{177}Hf$ (0.28288-0.28293) and $^{143}Nd/^{144}Nd$ (0.51276-0.51285). Annobón lavas display isotopic peculiarity in $^{176}Hf/^{177}Hf$ (0.28280-0.28301) and $^{87}Sr/^{86}Sr$ (0.70320-0.70428). The obtained geochemical features imply the formation of the high $^{206}Pb/^{204}Pb$ oceanic basalts to be attributed to recycling of oceanic lithosphere. However, the features pronounced in high $^{206}Pb/^{204}Pb$ COB lavas imply magma generation related to melt-lithospheric interaction by the convection of sub-Atlantic mantle at the margin of cold and deeply rooted Congo craton. Tectonically controlled mantle convection would play an important role to form magma from fusible part of the source mantle near the oceanic-continental boundary.

[1] Halliday, A.N. et al. (1988) *Journal of Petrology* **29**, 181-211. [2] Halliday, A.N. et al. (1990) *Nature* **347**, 523-528.