

Geochemical Composition of Dykes along the Cameroon Volcanic Line (CVL): Constrains on CVL magmatism and tectonism

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Mafic dykes along the Cameroon Volcanic Line (CVL) align in a general N 30° - N 70° direction. These alignments are consistent with the tectonic lineaments and the orientation of the CVL, indicative of a time and space relationship between the dykes and CVL lavas with the tectonic activities of the African plate. However, sub-alkaline volcanic rocks studied in some areas along the CVL are thought to be older than and not related to the CVL magmatism. Mafic dykes outcrop in the Oku Volcanic Group (OVG) but have not been studied. The aim of this study is to 1) characterize volcanic dykes in the OVG and Mt. Bambouto, 2) constrain the geochemical relationship between the dykes and CVL alkaline lavas, and 3) establish a tectonic history of emplacement of these dykes. Three dykes in the OVG and two along the Dschang-Santcho escarpment (flank of Mt. Bambouto) were systematically studied. An alkaline dyke is observed intruding a sub-alkaline dyke for the first time along the CVL, indicating a time and space relation between the two series. The dykes are weathered and show chemical evidence of crustal contamination. Contamination of less than 20 % for the alkaline dykes (BD2 and BDS alkaline) and 30 - 40% (BDS sub alkaline, BD3 and DS), can explain the varying degrees of crustal signatures in the samples. Geochemical characteristics suggest that the Batibo alkaline intrusions and the sub-alkaline intrusions were derived from a similar mantle source with OVG lavas. These characteristics are similar to those of the CVL alkaline lavas and OIBs. However, the differences in elemental concentrations and isotope composition of the sub alkaline dykes and the alkaline dykes in the OVG can be ascribed to varying degrees of weathering, assimilation of crustal components and different degrees of partial melting. The Low MgO, Ni, Cr, and V in the Batibo alkaline intrusion are due to the rapid rate of chemical weathering of olivine. The dykes in this study are related to the CVL magmatism in space and time. Fractures cutting through the basement rocks, but not the dykes suggest that the dykes are younger than the tectonic activities. The Sub-alkaline intrusion that is also intruded by the alkaline dyke in the BDS is older (43 - 422 Ma). This indicates that its emplacement was earlier than the surface expression of the alkaline CVL magmatism in the Tertiary (<31 Ma).

Keywords: Oku volcanic group, Dykes, Crustal contamination, Cameroon Volcanic Line, Magmatism, Tectonism