Compositional diversity in Mt. Cameroon eruptions

F. M. VAN DER ZWAN[12]*, C. E. SUH[3], T. H. HANSTEEN[2], M. GERAMI-MANESCH[4], D. GARBE-SCHÖNBERG[1], C. W. DEVEY[2], F. V. EMBUI[3], E. E. B. TIBANG[3] AND A. TABOKO[3]

[1]Institute of Geosciences, Christian Albrechts University Kiel, DE (*correspondence: fvdz@gpi.uni-kiel.de)
[2]GEOMAR Helmholtz Centre for Ocean Research Kiel, DE
[3]Department of Geology, University of Buea, CM
[4]Institute of Mineralogy, Leibniz University of Hannover, DE

The West-African Cameroon Volcanic Line (CVL) displays alkaline volcanic activity since 40 Ma and represents with a length of 1600 km the largest presently active continental intraplate volcanic province. Its largest volcano, Mount Cameroon, rises to more than 4000 m height and is one of the most active subaerial volcanoes worldwide, having erupted 7 times within the 20th century. With almost half a million people living on or around Mount Cameroon, and the volcano lying close to both Cameroon´s only oil refinery and its deep water harbour, knowledge of eruption styles and trigger mechanisms is of both scientific and societal relevance.

The cause for magmatism along the CVL is poorly constrained, and hypotheses vary between hotspot volcanism, lateral flow of Afar plume material, the presence of a 'hotline', decompression melting due to extension or shear-zone reactivation and/or lithosphere instabilities at craton or ocean-continent boundaries [see overviews in 1, 2]. Nevertheless none of the previously proposed models that all focus on decompression or heating as a main cause, can convincingly explain all the unique characteristics - e.g. lack of age progression, volcanoes built on structural highs, occurrence across a continent-ocean divide - of the CVL [2].

Therefore, we investigate if CVL magmatism can be related to the chemistry of the mantle source by studying the volcanics and their melt inclusions. Mt. Cameroon displays a wide range of lava compositions from picrite to basalt to basanite [e.g. 3], but the cinder cones and lava flows have not been systematically sampled. In this study, we systematically collected samples from all cinder cones and lava flows of the 1959, 1982, 1999 and 2000 eruptions, as well as from several older lavas and cones. In addition to chemical variation between the lavas we see further variations between different cones of one eruption. With the help of melt inclusions we study the relationships between these compositions and try to constrain compositions of the primitive magmas.

[1] Milelli *et al*. (2012), *Earth Plan. Sci. Let*. **335-336**, 80-87. [2] Njome & de Wit (2014), *Earth-Sci. Rev*. **139**, 168-194. [3] Suh *et al*. (2008), *J. Volcanol. Geotherm. Res*. **169**, 1-33.