Origin of Cameroon Line basanites from metasomatized lithosphere

A. MARZOLI[1]*, F.T AKA[2], M. CHIARADIA[3], L. REISBERG[4] AND R. MERLE[1]

[1]University of Padua, Italy (renaud.merle@unipd.it) (*correspondence: andrea.marzoli@unipd.it)
[2]IRGM-ARGV, Ekona, Cameroon (akatongwa@yahoo.com)
[3]Université de Genève, Switzerland (Massimo.Chiaradia@unige.ch)
[4]CRPG (CNRS UPR2300), Université de Lorraine, France (reisberg@crpg.cnrs-nancy.fr)

The Cameroon Line is located above a zone where a sharp gradient in lithospheric thickness occurs north of the Congo Craton keel [1]. This zone was the site of magmatic activity since (at least) the beginning of the Cenozoic until the Present. Here we investigate the Miocene basic-ultrabasic magmatism of Mt. Bambouto volcano (Western Cameroon). Its 20 to 15 Ma old basanitic flows and alkali-basaltic dykes are characterized by extreme enrichments in Sr (up to 2200 ppm), Ba, and P and by generally high TiO_2 (up to 4.6 wt%). The other alkali basaltic flows from Mt. Bambouto lack such extreme compositions and resemble other typical continetal and oceanic Cameroon Line basalts. Compared to the alkali basaltic flows, the Mt. Bambouto basanites yield also slightly higher initial $^{87}Sr/^{86}Sr$ (0.7034-0.7036 vs 0.7030-0.7033) and $^{143}Nd/^{144}Nd$ (0.51290-0.51285 vs 0.51285-0.51283) and lower $^{206}Pb/^{204}Pb$ (19.4-19.6 vs 19.6-19.9). Moreover, basanites are characterized by higher initial $^{187}Os/^{188}Os$ (0.191-0.220) than the only analyzed alkali basalt ($^{187}Os/^{188}Os$ = 0.127). The high Os isotopic compositions of basanites would seem to suggest a significant amount of crustal assimilation (ca. 25 or 35% of silicic upper or mafic lower crust, respectively). However such an interpretation is not easy to reconcile with their OIB-like Sr-Nd-Pb isotopic compositions, their little evolved whole-rock compositions (e.g. MgO 9-11 wt%, Cr 350-550 ppm) and their mineralogy (high-Mg olivines: Fo_{80-88}, high pressure clinopyroxenes: crystallized at ca. 10 kbar [2]). Alternatvely, we suggest that basanites derived from mafic material entrapped within the mantle, which would also be compatible with their major and trace element compositions. In particular, we propose that these mafic veins may have metasomatically pervaded the continental lithosphere during the early stages of Cameroon Line magmatism and developed relatively high $^{187}Os/^{188}Os$ prior to the Mt. Bambouto volcanism.

[1] Reusch *et al*. (2010) *G-3* **11**, Q10W07. [2] Putirka (2008) *Rev. Mineral. Geochem.* **69**, 61–120.

Magnetic anisotropy of artificial deposits

A.V. MASHUKOV*, A.E. MASHUKOVA AND S.A. SIMINCHUK

Siberian Federal Univ., Krashoyarskiy Rabochiy, 95, Krasnoyarsk, 660025, Russia (*correspondence: avmashukov@sfu-kras.ru)

There was studied the influence of the sizes of grains of Fe_3O_4 in the artificial deposits, precipitating in the Earth magnetic field, on magnetic characteristics of the samples. To obtain most of the information, for the same samples, there was used a complex of investigations of research of same samples was used for obtaining more information.

The dependences of uniaxial anisotropy constant (K), maximum losses from the rotator hysteresis (W_m), the value of the alternating magnetic field, half reducing residual magnetization ($\tilde{H}_{1/2}$) on grain size, are shown in table 1.

Grain size Fe_3O_4, mcm	K, Joule /m^3	W_m, Joule /m^3	$\tilde{H}_{1/2}$, Oe	Intensity
0 < d ≤ 8	410,0	1020,0	320,0	1,9
8 < d ≤ 16	305,0	820,0	280,0	1,8
16 < d ≤ 32	180,0	500,0	200,0	1,5
32 < d ≤ 44	130,0	410,0	120,0	1,3
44 < d ≤ 64	115,0	225,0	110,0	1,2
64 < d ≤ 100	105,0	160,0	105,0	1,1
100 < d ≤ 150	105,0	160,0	100,0	1,1

Table 1: Dependences of magnetic characteristics on grain size

The X-ray technique of straight pole figures (intensity in table 1) shows anisotropic distribution of axes for particles d > 40 mcm.

Thus, the magnetic characteristics of rocks are controlled by ferrimagnetic particle size as well as its crystallographic ordering.