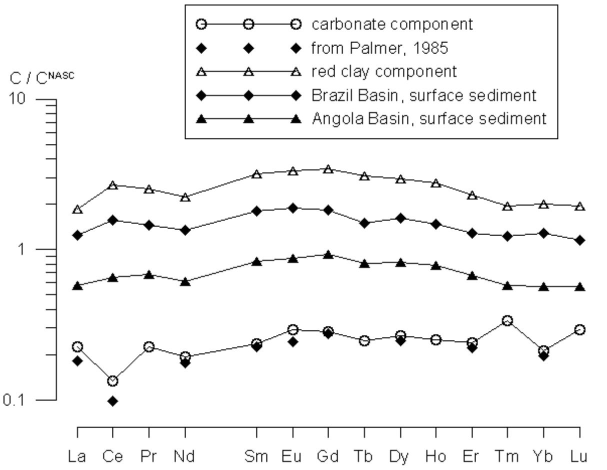
Trace and REE geochemistry of the Angola Basin sediments

E. KRIKUN, M. RIMSKAYA-KORSAKOVA AND A. DUBININ

P.P. Shirshov Institute of Oceanology RAS, Moscow, Russia (evgenia.krikun@gmail.com)

We studied chemical composition of sediment core samples collected from the Angola Basin (23°30´S, 4°17´W, 4990 m depth). Oxidized pelagic foraminifera oozes (60-98 wt% carbonate) represent the recovered core (length 210 cm). Mn and reactive Fe concentrations range from 0.1 to 0.3 % and decrease with $CaCO_3$ increase. The contents of Co, Ni, Mo and U along the core correlate with Mn concentrations due to scavenging on Mn-oxyhydroxides. Concentrations of REE decrease with $CaCO_3$ content increase. The values of Ce-anomaly range from negative in carbonate- rich sediments to positive in the carbonate-depleted layers. The concentrations of REE and Th correlate with reactive Fe content (r > 0.9). REE pattern indicates its hydrogenous origin.

Using negative correlation of each rare earth and carbonate concentration (r>-0.9), we calculated REE compositions in 100% $CaCO_3$. The latter is consistent with REEs in Atlantic ocean foraminifera from Palmer [1]. REE pattern of red clay component was obtained by extrapolation to 0% $CaCO_3$, and coincide with mean composition of pelagic red clays from Brazil Basin located symmetrically across the MAR. The REE are originated from the two main sources: biogenic carbonate and red clay component, and could be defined with variable content of these constituents. Biogenic carbonate is characterized with Ce depletion and low concentrations of REE, red clay component has positive Ce-anomaly and higher concentrations of trivalent REE.



[1] Palmer (1985) *Earth & Planet. Sci. Lett.* **73**, 285–298.

Volatiles in Siberian flood basalts: Melt inclusions study

N.A. KRIVOLUTSKAYA[1]*, A.V. SOBOLEV[1,2,3], N.M. SVIRSKAYA[1], I.K. NIKOGOSIAN[1], S.G. SIMAKIN[1] AND D.V. KUZMIN[3]

[1]Vernadsky Institute of Geochemistry, RAS, 119991 Moscow, Russia (*correspondence: nakriv@mail.ru)

[2]ISTerre, University J. Fourier BP 53, 38041 Grenoble Cedex 9, France (alexander.sobolev@ujf-grenoble.fr)

[3]Max Planck Institute for Chemistry, Postfach 3060, 55020 Mainz, Germany

We report major, trace and volatile elements (Cl, F, B, S, H_2O) contents in melt inclusions in clinopyroxene phenocrysts from the Southern Maslovsky intrusion (Norilsk region) studied by EPMA, SIMS and LA-ICPMS technics. Modelling by PETROLOG software [1, 2] suggests that melts were saturated by both olivine (Fo 76-68) and CPX (Mg#78-69) and crystallized at shallow depth (below 100 MPa pressure) in the temperature range 1130-1080ºC. Incompatible elements patterns of melts are similar to typical Siberian flood basalt (La/Sm_n=1.4, Nb/La_n=0.6, Gd/Yb_n=1.1).

Melts are undersaturated by sulphur and have S/Dy=200, (150-300), markedly lower than for MORBs and OIBs (250-300, [3]). Water contents are variable (H_2O=0.08-0.45wt%) suggesting low pressure degasing of melt. The highest concentrations yields H_2O/Ce over 160, close to the typical range of OIB and MORB [3]. Chlorine and boron show significant excesses yielding Cl/K= 0.29, (0.24-0.40); B/K= $0.9*10^{-3}$, ($0.6\text{-}1.2*10^{-3}$), which are few times higher than those for typical MORB and OIB [3]. Contents of fluorine F/Ti= 0.045 (0.021-0.056) and F/Nd= 29 (18-38) are also higher than commonly found in MORB and OIB [3].

The recovered accesses of Cl and B of SFB melt are very uncommon for intraplate mantle derived magmas. But they are similar to those of Gudchikhinskaya suit (one of the lower units of Norilsk volcanic section) parental melt, which was proposed as a pyroxenite-derived end-member component of SFB originated from recycled oceanic crust [4]. This may suggest that the recycled oceanic crust was one of the sources of excessive Cl and B in SFB in general. The other source could be the actual continental crust. Anyway, data suggest significant emission of Cl to atmosphere at the time close to P-T environmental crisis.

[1] Danyushevsky, L.V. *et al.* (2000) *CMP* **138**, 68–83. [2] Danyushevsky, L.V. *et al.* (1996) *Mineral. Petrol.* **57**, 185–204. [3] Koleszar, A.M. *et al.* (2009) *EPSL* **287**, 442–452. [4] Sobolev, A.V. *et al.* (2009) *Petrology* **17**, 253–286.