Geochemical spectra as an integral characteristic of the concentration and dispersion of elements in soils, peats and natural waters

L.G. BOGATYREV[1], E.Y. POGOZHEV[2], E.A. POGOZHEVA[1] AND I.I. ANTONOVA[1]

1 Department of Soil Sience, Moscow State University, Russia (*correspondence: pogozhevaea@mail.ru)
2"Geoforum", Vernadsky avenue, 51, Moscow, Russia

Geochemical spectra are the useful tool for comparison of elements concentration or dispersion in the different components of the biosphere. In this work elements distribution patterns were studied in soil samples from Yakutia, West Siberia and European Russia. Geochemical spectra were also obtained for particle-size fractions and ortsteins isolated from some soils of taiga zone, as well as for natural waters.

Geochemical spectra depend largely on soil mineralogical composition. Investigation of the elemental composition of sand, silt and clay fractions showed clear divergence of their geochemical spectra. Geochemical spectra of iron-manganese nodules from different horizons of sod-podzolic soils were quite similar. This suggests that they were formed in single geochemical space from similar soil formation products and in presence of similar soil solutions. This supposition also seems to be true for mineral horizons of alluvial soils and underlying peats. Probably, geochemical spectra of elements for soils are inherited from the parent rock and represent some sort of the "genetic code" [1]. Preservation of this code is determined by the lifetime of the soil. soil geochemical spectra provides stable functioning of terrestrial ecosystems.

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[1] Bogatyrev et al. (2003) Eurasian Soil Sci. **36** 501-510.

Zircon from Mesoarchean enderbites of Volgo-Uralia: U-Pb age, REE, Hf- and O-isotope compositions

S.V. BOGDANOVA[1]*, E.A. BELOUSOVA[2], B. DE WAELE[3] AND A.V POSTNIKOV[4]

[1]Department of Geology, Lund Univ., SE-22362, Sweden (*correspondence: Svetlana.Bogdanova@geol.lu.se)
[2]GEMOC ARC National Key Centre, Macquarie Univ. Sydney, NSW 2109 Australia (elena.belousova@mq.edu.au)
[3] SRK Consulting, Level 1, 10 Richardson Street, West Perth WA 6005 (bdewaele@srk.com.au)
[4]Gubkin State University of Oil and Gas, Moscow, Russia (apostnikov@mtu-net.ru)

As shown by numerous drillings, Archean charnockitic rocks are common in most of the lower crust in southern Volgo-Uralia, which is one of the major crustal megablocks of the East European Craton [1]. They are mainly enderbites that form large bodies (e.g. the Kolyvan intrusion, this study). Zircon from the enderbites contains relics of inherited cores with magmatic oscillatory zoning. These are surrounded by CL black-and-bright alternating bands of curved metamorphic rims. The crystallization age of the cores is between 3140±7 Ma (SHRIMP) and 3127±46 Ma (LA-ICPMS), while the outmost CL-bright rims are ca. 1945 Ma. The ages in-between are interpreted as a result of different degrees of Pb-loss caused by the high grade metamorphism. The ingressive recrystallization of primary magmatic zircon correlates with depletion in REE, which is observed consistently in each studied core-rim pair. No differences in O-isotope composition are detected between the cores and rims; the δO^{18} values vary from ca. 5 to 6.5. The Hf-isotope compositions of magmatic cores (-3 to -9 εHf) and metamorphic rims (-14 to -28 εHf), and their similar crustal model ages from 3.42 to 3.86 Ga, imply Eo- to Paleoarchean crustal sources for the charnockitic magmas and very little, if any, juvenile additions during the metamorphic event at ca. 1945 Ma. The dated Kolyvan enderbites belong to calc-alkaline, meta- to peraluminous, mainly ferroan series, also indicating substantial participation of crust in charnockitic melt sources relevant to a continental arc setting at 3.1 Ga. We reported similar results on rocks from the Bakaly block to the northeast of the Kolyvan region [1] confirming widespread Early Archean crust in Volgo-Uralia.

[1]Bogdanova *et al*., 2010, Am.J.Sc. **110**, 1345-1383.

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