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# Geochemical data of Early Mesozoic lamprophyres and associated syenites (SE Altay-NW Mongolia

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The early Mesozoic alkaline-basic volcano-plutonic complex is located in SE Altay-NW Mongolia. Structurally it linked with the large long-live Terekta-Tolbonur and Kurai-Kobda shear zones. The complex in, South Chuya and Yustyd. South-Chuya area includes lamprophyre dikes and monzodiorite-granosyenite Tarkhata massive. Dikes of the South Chuya in Terekta-Tolbonur fault zone of NW strike cut Vendian-Early Paleozoic (V-) flyschoid strata. Ar-Ar dating of phlogopite phenocrysts, and U-Pb (SHRIMP-II) dating of zircons show two stages of the complex formation: 236–234 and 250–242 Ma. Close age was received for the rocks of the Tarkhata massif (243-247 Ma) [1]. Geochemically all rocks are similar: (1) low $SiO_2$ (40-59wt%); (2) high alkalies ($K_2O$+$Na_2O$)=5÷11wt%; ($K_2O$/$Na_2O$)=2÷45); and (3) high P, F. Lamprophyres show linear correlations for $SiO_2$ and, MgO, FeO, CaO $Al_2O_3$, $P_2O_5$. Lamprophyres characterized by high LREE level and domination $La/Yb_n$ >20 suggesting low degree melting (>0.5%) of enriched source in garnet mantle facie. The inflection in Eu due to tetrad effect the enrichment in U and especially Th is similar to some carbonatitic rocks. Distinct negative anomalies of HFSE (Nb, Ta, Ti) and Sr, suggest ilmenites and possibly apatite and alkali feldspar fractionation. The REE rock patterns (and concentrations) coincide in both areas (Tarkhata included). Isotopic data show lateral variability of rocks isotopic characteristics occurring in Sr-Nd diagram near EM1 shifting slightly toward EM2. Points belonging to different areas in this diagram compile independent fields. All rocks of the South-Chuya area (lamprophyres and syenites) are characterized by higher ratio of $^{87}Sr/^{86}Sr$ and $\varepsilon Nd$ then the same for the Yustyd lamprophyres.

Our suggestion is that the rocks are the result of melting of specific Pyroxenites and metasomatites – Mica- Cpx-having the mixed crust - mantle signatures. Comparatively low $SiO_2$, high magnesium number suggests that most Mg-rich varieties (#Mg=63-57) has mantle origin. But the Fe–rich varieties are differentiated according AFC process dissolving the Fe-rich metasomatics. The additional precipitation of ilmenites decreases Ti, Nb, Ta and apatites or alkali feldspar (Sr).

The model suggests the collision and submerging or subduction of the thick crust in to the weekend by fluid flow mantle. The fluids having the low and upper crust signatures essentially enriched in LILE (especially K) produced mantle metasomatism. The relatively low temperature conditions produced mainly low degree partial melts with the admixed carbonatitic signature. The later possible delamination of slab and crust formed the upwelling of weekend lithosphere and creation of alkali syenites. Another explanation is melting of tectonic crust – mantle selvages in the base of very thick mountain lithosphere keel (possibly under plume influence).

Obtained data suggest similar origin of lamprophyres in the Early Mesozoic time under the vast territory of modern SE Altai – NW Mongolia correlated with the active tectonics and thickening of the crust. produced the polychronal complex of alkaline-basic rocks.

1. E.A. Vasyukova, A.E. Izokh, A.S. Borisenko, G.G. Pavlova, V.P. Sukhorukov, Tran Tuan Anh. Early Mesozoic lamprophyres in Gorny Altai: petrology and age boundaries. Russian Geology and Geophysics – V. 52, Issue 12, 2011, P. 1574–1591.