Long-term history of Tikshe-Eletozero alkaline-ultramafic complex, Fennoscandian Shield, Russia: isotopic signatures

B.V. BELYATSKY[1]*, R.S. KRYMSKY[1], N.V. RODIONOV[1], O.V. PETROV[1], E.N. LEPEKHINA[1], A.V. ANTONOV[1], E.M. PRASOLOV[1], A.A. ARZAMASTSEV[2], S.S. SHEVCHENKO[1], S.A. SERGEEV[1]

[1]Karpinsky Geological Institute (VSEGEI), St.Petersburg, Russia (*correspondence: bbelyatsky@mail.ru)
[2]IPGG RAS, St.-Petersburg, Russia

The complex is made of ultrabasic and basic rocks (Eletozero) and adjacent Tiksheozero ultrabasic-alkaline carbonatite series [1]. Ar-He isotope signatures give evidence for 25% of the mantle matter in the early portions of ultrabasic magmas. The U-Pb system of baddeleyite, perovskite and apatite from olivinite, pyroxenite and melteigite indicates the earliest magmatic event at 2040-2010 Ma. The initial isotope characteristics of the whole-rocks (ε_{Nd} = + 1.5:+2.5, Sri = 0.7020-7037, $^{206}Pb/^{204}Pbi$ = 13.69, $^{207}Pb/^{204}Pbi$ = 14.79, ε_{Hf} = + 2, $^{187}Os/^{186}Osi$ = 0.18-0.20) demonstrate the predominant mantle source of ultrabsaic melts. Baddeleyite and zircon from carbonatites and foscorites of the Tiksheozero give the age of 1990-1998 Ma [2]. The mantle origin of carbonatites also exhibit mantle isotope characteristics: ε_{Nd} up to +3 ~ +4.5, Sr_i = 0.7016-0.7020; $^{206}Pb/^{204}Pbi$ ~ 15.56, $^{207}Pb/^{204}Pbi$~ 15.12. However, their He-Ar isotope signatures in the fluid inclusions trapped in carbonatites indicates only 5% of mantle matter.

Age determinations of rare-metal mineralization, which is related both to 1900 Ma pegmatites of the Eletozero part of the complex, and Tiksheozero carbonatites, was dated by U-Pb system of zircon, pyrochlore, titanite and apatite. Obtained ages show several stages of secondary enrichment and recrystallization of the ores at 1740, 1680-1660. The latest ore-metasomatic pulse in the complex is related to the Devonian mantle plume at 390-420 m.y. ago.

Thus, the Tiksheozero-Eletozero massif which was formed about 2000 m.y.ago, has a long-term postmagmatic history. Rare-metal mineralisation in this complex was strongly affected by several pulses of tectono-magmatic activity which lasted up to Devonian.

Financial support by state contract K41.2014.014 with Sevzapnedra and partially by RFBR (15-05-02116).

[1] Tichomirowa M *et al*. (2006) *Lithos*, 91, 229-249.
[2] Tichomirowa M *et al*. (2013) *ChemGeol*, 353, 173-198.