

Correlation of endogenic processes in the upper and lower crust of the Belomorian Belt of the Baltic Shield (Russia): data from xenoliths

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Xenoliths of the lower and upper crust have been studied in Devonian explosion pipes and dykes from the Kandalaksha graben, located in the northern part of the Belomorian Belt, NE Baltic Shield, Russia.

The lower crust xenoliths- garnet granulite, eclogite, pyroxenite, websterite, phlogopite- and amphibole-bearing rocks were formed during the Late Archean, Early Proterozoic and Palaeozoic events. The early protoliths of these rocks originated in the Late Archean time ($T_{Zr} \sim 2.75$ Ga, $T_{Nd} (DM) = 2.94-2.64$ Ga). The late protoliths were formed ~ 2.4 Ga ago (Pb-Pb method by plagioclase), $T_{Nd}(DM) = 2.4$ Ga, WR). The time of granulite metamorphism is estimated as ~ 1.8 Ga, and time of granitization- 1.73 ± 0.03 Ga. Phlogopite and amphibole formed along fault zones (1.85; 1.0 and 0.44-0.33 Ga) from mantle fluids with a higher ^3He content ($^3\text{He}/^4\text{He}$, $n \cdot 10^{-6}$, accordingly, 0.33; 0.76-0.81 and 0.3-1.7). The ages > 2.75 ; 2.73-2.67; 1.9-1.7 and 0.38 Ga were determined on zircon from granite and amphibolite xenoliths of the upper crust.

The obtained age data from upper and lower crust xenoliths are correlated with the time of main events of the upper crust of the Belomorian Belt: 3.2-2.9; 2.85; 2.8; 2.74-2.72; 2.7-2.6; 2.45; 1.95-1.75; 1.8; 1.1-0.9; 0.6; 0.4; 0.38-0.36 Ga.