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Source of magma for Elet-Ozero pluton (NE Baltic Shield) – subduction or plume-related material?

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Eletozero pluton is located in the northeastern part of the Karelian Craton, it covers an area of about 100 km2 and cuts through Archaean granite-gneisses. The complex has a concentric zoned structure, the peripheral part being composed of a layered gabbro series; the central area is occupied by nepheline syenites.
Mafic and ultramafic rocks in this intrusion often contain potassium feldspar (olivine monzonites and monzonites). Gabbroids are characterized by rhythmic layering expressed in the alternation of leucocratic layers predominantly composed of plagioclase and melanocratic layers with pyroxenes, olivine, titanomagnetite and ilmenite.
The rocks of the pluton are enriched in highly incompatible elements by comparison with moderately incompatible elements: average primitive mantle normalized La/Lu ratio is 18.3. At the same time, all the rocks from Elet-Ozero massif including the most primitive ones (high Mg-numbers and high Ni contents) exhibit distinct positive Ba anomaly: mean chondrite normalized Ba/Th ratio is 15.3 (both elements have similar incompatibility-[1]). Enrichment of parent magma in Ba is also confirmed by the presence of high-Ba feldspars and micas in some samples of gabbroids. The most Ba-rich feldspar contains 75% of celsian component: K0.09Na0.04Ca0.008Sr0.04Ba0.75Al1.73Fe0.14Si2.20O8.
Ba is a fluid mobile incompatible lithophile element that is probably the most sensitive indicator of subduction fluid addition to the mantle wedge. Thus, positive Ba anomaly suggests input of subduction related component into the source of Elet-Ozero magma. The presence of subduction related material in the lithosphere of Karelian craton has been proposed on the basis of Os isotope studies of mantle xenoliths from Finnish kimberlites [2]. The age of this subduction event is similar to the age of Elet-Ozero pluton.
On the other hand, there are certain arguments in favor of connection of Elet-Ozero intrusive complex with mantle plume activity. In particular it is confirmed by the presence of carbonatites in Elet-Ozero and neighboring Tiksh-Ozero massifs. Manifestations of carbonatitic magmatism is in the majority of cases related to plume activity [3]. The contribution of material from ascending mantle plume as well as components introduced from subduction zones into parent magmas of these intrusions may not be excluded. Similar situation was analyzed in details for the Lau Basin, SW Pacific [4].
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