ISOSTATIC GEODYNAMIC MODEL OF RAPAKIVI GRANITES AND RELATED ROCKS ORIGING

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Geophysical data indicate that rapakivi granites of Baltic shield have extensive and possible in the earth crust have exist earlier regional geological structures (fracture or boundary of stratum) favorable for forming of hypabissal subhorizontal magmatic chambers and magmaconducting fractures. Such regional structures might be earlier Svecofennian protoabduction or protosubduction zones, which have been reactivated in conditions of continental crust spreading in result of continental plates movements. We are suggest, that magma-conducting fractures have been shovel-like or listric forms and gently dipping in upper parts, steep dipping into lower parts of earth crust and continue in subhorizontal direction nearly Mocho boundary.

In the foot part of listric fracture zones (nearly upper mantle-lower crust boundary) temperature of lower crust rocks was increased (by means of friction's). In those conditions lower crust and upper mantle rocks were melted and was formed initial basalt magmas which intruded in upper part of fracture zones and forming earlier body's of gabbro-anorthozites.

Recent Nd- isotopic data indicate that rapakivi granite magmas of the Svecofennian belt were formed by partial melting of the Proterozoic (Wiborg massif) or Archean (Salma batholith) tonalitic basement lower parts of the crust. Many authors suggest, that mantle-derived mafic magmatism responsible for melting of lower crust rocks and forming of rapakivi granitic magmas. However, difficult imagine, that great volume of rapakivi granite magmas were formed by partial melting of water-undersaturated, full crystalline, lower heating, poor Qu, KFsp and K, Ba, Rb, Li, F and Cl of lower crust basic or tonalitic rocks only under action by heat of hypothetical mantle-derived magmatic diaphire.

Under spreading zones of listric fractures upper mantles rocks might were recrystallized in conditions of isostatic decompression.

In result of reduce pressure took place transformation of undepleted garnet lherzolites of dipping zones in to spinel lherzolites (undersaturated in K, Ba, Rb, Li, F, Cl) and was born hot residual fluids enriched in thus elements. Ascent of these fluids in listric fracture zones bring to metasomatic transformation of cataclased lower crust rocks and already crystallized gabbro-anorthozites. Alteration of basic or tonalitic rocks be expressed in new forming of metasomatic KFsp and Qu and increase of Si, K, Rb, Ba, Li, F, Cl, REE (excluding Eu) content. Qu and KFsp bearing metasomatic hybridic rocks (monzonite or monzosyenite in composition) were partial melted by heat of fluid stream and hybridic anatectic migmas with anchicotectic melt was formed.

Differentiation of monzonitic migmas lead to rapakivi granite magmas origin. In basic rocks unsaturated in Si normative olivine or nepheline bearing metasomatic alteration be expressed in new forming only Ab-saturated KFsp and poor in SiO_2 and rich in alkaline syenite magmas was been partial melted.

Thus, chief cause of rapakivi granites and related basic and alkaline rocks origin were continental plate movements and anorogenic continental crust spreading fractures, which lead to break of isostatic and physical-chemical equilibrium in upper mantels rocks.

ORBICULAR RAPAKIVI GRANITES FROM SALMA MASSIV

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The dike of orbicular granites cutting ovoid-bearing rapakivi granites of Salma batholith. Orbicules are commonly occurs as rounded forms (0.1 - 0.2 m in diameter) with nucleus of KFsp ovoids (2 5 sm.) sometimes mantled Pl. Mantles of orbicules are present of granit-aplite with microgranular granophyre structure of intergrowth Qu, Amf and Bt. The orbicular granites consist (80 - 90% volume) from tinghtly-spaced orbicules, with macrocrystalline pegmatitic matrix between them.

It have been established, that F/Cl ratio in amfphyboles and biotites from mantles of orbicules and pegmatitic matrix are higher (in 2 - 5 times) then in Amf and Bt from inclusions in KFsp of nucleus. It is possible that Amf and Bt mantles of orbicules and pegmatitic matrix were crystallized from melt in wich concentrate of F and to more degree Cl, were decreasing.

Widening fracture zone in shallow-lewel hot and hard rapakivi granites was filled by anchicotectic residual granitic melt from lower zones of crystallized intrusive. This melt had rare xenocrysts of KFsp ovoids and Qu and was saturated in F and Cl. Such melt have retrograde boiling in condition of decompression and F and Cl were removing in gas faces. As a result of the loss fluing elements, temperature of melt crystallization becomes higher and took place rapid crystallization of anchicotectic melt. Ovoids of KFsp have been the centers of crystallization for orbicules. Quick growth of orbicules bring to cork up fracture zone, and evolution of the restitic melt and fluid phases continued in conditions of closed system, that caused to crystallization of pegmatoidic matrix.