PETROLOGICAL SCENARIO OF THE EVOLUTION OF LARGE SILICIC SYSTEMS

ABRAMOV S.S. Institute of Ore Deposits Geology, Petrology, Geochemistry and Mineralogy, Moscow, Russia.

We determined the standard evolution pattern of Large Silicic Systems (LSS). The early stage of LSS evolution is defined as hybridism of mantle initial magmas (probably alkaline) with magmas produced by the melting of the country rocks. The melting of the crust leads to the enlargement of the intrusive reservoir with subsequent evolution of the resulted magma towards subalkaline compositions. There is a critical size of the reservoir which is responsible for thermal and chemical gradients and triggers processes of melt convection and crystal settling (fractionation).The appearance of a temperature gradient results in crystal mush at the magma/country rock contact. This boundary zone serves as a permeable medium for chemical and heat flows to the host rocks and the reinforcement of their melting. Therefore, the middle stage evolution of LSS is characterized by simultaneously acting crystallization differentiation and country-rock melting. These processes lead to monzonite-granodiorite composition of the magmatic reservoirs. However, a magmatic reservoir cannot grow infinitely but only until the mantle magma source is capable of supporting the system in a steady state. Once the reservoir exceeds the critical value, the processes of assimilation ceases, and the magma composition is determined by the in-chamber differentiation. In the roofs of such cameras, a fluid flow through the magma can occur and result in ore-bearing magmas. This characterizes the final stage of LSS evolution (granitic batholith, ignimbrites, etc.). This work is supported from a RFFI grants 98-05-64052, 99-05-65550.