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On an energy nature of geological processes and its effects in origin of petrogeochemical and petrophysical types of granitoids

Abstract

The evolution of the continental crust can be described as cyclic-forward changing of magmatism conditions. Granitoids that studied are quite effective to provide for geological indicators of the change of the energy mode of magmas' generation. As well these rocks to be widespread and as rule have a different genesis. The numerical distribution of the response measures of chemical elements and physical parameters in granitoids reflects the geological and thermodynamics terms of their origin: temperature, pressure, chemical potentials of melts, the interactions with hostrocks, types of an heat-mass exchange and finally an energy aspect of their origin. In spite of distinction in age, structures, granitoid rocks have much in common with physical properties, thermodynamics conditions for each stages of the earth's crust evolution. A numerical multidimensional classification of geochemical and petrophysical data of granitoids of Western Transbaikalian, Central Kazakhstan and Ukrainian Shield suggested to explain the significant petrological features for that purpose. Based on this assumptions, all studied granitoids can be classified according to different groups: 1) granitoids of similar depths and melt origin; 2) granitoids which connected to tectonic-magmatic stage of evolution of the earth's crust regardless of their age and occurrence. It is common simply to distinguish the various types of rocks. The type of area granitoids have relatively more stable spatial distribution of physical and geochemical characteristic also tend to have very high degrees of homodromous character of magmatism - from deep and high-energy to hypabyssal, mixed-age and relatively low-energy conditions. The second type of granitoid rock have heavy dependency on their properties, depths and a value of dislocation. Their indigenous bodies may be connecting to tectonic-magmatic stage of development, while for the allochthonous and para-indigenous facies to depths only. An antidromic character of magmatism reflects a reverse changing of direction of magmatic source' transfer. Integral energy estimation of data of comprehensive geological analysis it is necessary to carry out proper metallogenic study of the granitoid rocks (especially intrusive units) that have been formed in the various stages of tectonic-magmatic activation of the earth's crust.