APPROACHES TO CREATE THE MODEL OF KIMBERLITE FIELD FORMATION

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It is still not known how a kimberlite field is formed because of scarce information on the spatial distribution of substance characteristics of kimberlite within a field. There are three aspects in research of substance: 1- petrochemistry and geochemistry of kimberlite; 2- composition of minerals of heavy fraction of kimberlite; 3- composition of mantle xenoliths. The first aspect gives information on heterogeneity of the magma chamber under kimberlite field, the second and third are to define depths of generation of magma chambers. Another approach covers a sequential order (i) development of the model of multi-phase kimberlite pipe formation to (ii) development of the model of generation of a cluster of pipes and (iii) development of the model of generation of a kimberlite field. We studied the distribution pattern of such oxides as TiO2, FeOtotal, K2O, P2O5 within diamondiferous Alakit and diamond-free Kuoik fields of Yakutian province. The spatial distribution of TiO2 and FeOtotal content complies with linear zoning model of the fields. There are kimberlites with low TiO2 and FeOtotal content in the central zone of the Alakit field, but in Kuoik field linear zoning is reverse. Linear zoning of the kimberlite field shows heterogeneity of the magma chamber, which is explained by different depths of formation of chambers in the central and peripheral parts of the field, lateral heterogeneity of the mantle, different degree of metasomatism of mantle rocks. This conclusion can be specified by studying the composition of mantle minerals from heavy fraction of kimberlites. The goal of the research needs collective efforts of many scientists, who are interested to cooperate.The work was supported by grant #98-05-64174/RFFR.