CONCEPTUAL APPROACH TO THE PROBLEM OF SPATIAL DISTRIBUTION OF DIFFERENT-RANK KIMBERLITE SHOWS AT ANCIENT PLATFORMS

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Prediction of primary diamond deposits can be successful only provided that geological-genetic principles are considered in the approach to this problem. The concept proposed is based upon the hypothesis that diamond-bearing kimberlites (lamproites) being the deepest magmatic formations of ancient platforms, can be produced only by powerfull geodynamic processes generated at great depths (in the upper mantle). Rifting is such a deep process responsible for the formation of intracontinental rift systems at the platforms accompanied by intense magmatism.

The concept of the rift system implies a combination of heterogeneous structures though lying within a single area of increased flow and ascent of mantle material. The elongated arched high (I-order structure) is dissected by grabens in the central part and complicated by a number of positive structures (II-order structures) on the periphery. The rift system has been formed in the mantle with subsequent development of the process in the astenosphere and lithosphere. The structures of the rift system formed are the result of earth's crust and upper mantle response to this effect.

The rift system is distinctly reflected in parameters of the deep structure and geophysical fields. The central (trough) part is characterized by reduced thickness of the consolidated crust in combination with the very deep position of the crystalline basement, by the increased heat flow, highly dissected Moho, anomalous seismic characteristics of the upper mantle, intense linear regional gravity and magnetic anomalies. The elevated parts adjacent to the trough (peripheral highs) show the increased thickness of the consolidated crust in combination with the elevated crystalline basement surface, decreased heat flow, low dissection of the Moho,
differentiated gravity and magnetic fields caused mainly by the structural-substantial composition of the basement.

The magmatism produced by rifting shows distinct lateral formational zoning. It is represented by trachybasalt, trachybasalt-trachyandesite and basalt-dolerite formations in axial trough zones of rift systems. Alkali-ultramafic complexes containing kimberlites and carbonatites are the

lateral members of the formations' paragenesis in the elevated parts of systems adjacent to troughs. The area of deep magmatism manifestation is considered as a kimberlite subprovince.

The elevated parts of the rift system disposed bilaterally along and elongated subparallel to the axial trough represent kimberlite areas of the subprovince. The elevated parts of rift systems facing the platform center are generally monolythic and not affected by prominent processes exept rifting. So, the deepest kimberlite varieties - the diamond-bearing ones are
intruded here. The elevated parts facing the platform periphery probably experienced the intense influence of intraplate processes, apart from the influence of rifting. Hence, these parts are more fractioned. This leads to the formation of more shallow kimberlites - poorly diamond-bearing ones.

The main geodynamic stresses are subparallel to the axial zone of the rift in the outer elevated parts of the rift system, that is within kimberlite areas. They form zones alternation of maximum and minimum compression on lateral. Kimberlitecontrolling zones appear at sites where these regimes are optimum for manifestation of kimberlite magmatism. Such zones are to be marked in geophysical fields by linear zones of "lost" correlation of potential fields' anomalies.

Kimberlite areas show heterogeneous structure. It is relevant to the fact that rifting as a superimposed process had influenced a region with heterogeneous geological structure. Consequently, blocks of different-age cratonization of the crystalline basement, which show differentiated geologicgeophysical parameters (crustal thickness and density, basement composition etc.) had differently responsed to geodynamic conditions arising. Only a few of them are favourable for intrusion of kimberlite magmatism.

Such blocks assigned to the rank of a kimberlite area, have not experienced intense granitization or basification or any other intense tectonic-thermal effect in epochs previous to rifting. Due to this fact they are to have slightly increased or moderate density and increased or moderate thickness of the earth's crust. The cratonization of the crystalline basement had to be completed earlier than 2.6 bln. years ago. These blocks have low heat flow. They have experienced long-time stable elevation during the platform stage of their development or delay in subsidence in relation to the whole totally submerging territory. That is they were rather stable. Sites where such blocks are crossed by kimberlite-controlling zones are most favourable for intrusions of kimberlite magma.

The realization of magmatism, as a grouped combination of kimberlite bodies (kimberlite field) occurs at sites where additional stresses, semi-orthogonal to the axis of the rift system are available apart from the factors mentioned above.

The concept proposed has been realized as a combined deep geologic-geophysical criterium used in predicting at different stages of investigation. The all-embracing analysis of the deep geologic-geophysical structure of a platform and the history of the geological development of the territory , the study of structure and substantial composition of the crystalline basement, investigation of the spatial-temporal distribution of
magmatic formations of the platform stage of the territory development, reconstruction of paleodynamic conditions is a tool for practical realization of this approach to prediction.

The concept described has been realized in predicting different-rank kimberlite shows at the Siberian and East-European platforms.