

Geochemical and isotopic features of Cretaceous volcanic rocks of Eastern Mongolia

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Cretaceous intraplate volcanic rocks of Eastern Mongolia are a large part of Late Mesozoic igneous province which is located in northeast Asia. Previous geochemical and isotopic research related with the belt has focused on its other volcanic fields in north China and Transbaikalia whereas intraplate volcanites of Mongolia are not well understood. Numerous hypotheses have been put forward to explain the nature of the large-scale Late Mesozoic magmatic activity in northeast Asia however they do not take into account characteristics of Mongolian volcanic rocks. Therefore, the purpose of the research was to establish main geochemical and isotopic features cretaceous intraplate volcanic rocks of Eastern Mongolia and to determine potential sources and conditions of their formation.

The comprehensive study of intraplate Mongolian volcanites shows that volcanic rocks belong to the basalt-trachyte and basalt associations of calc-alkaline and alkaline series. These rocks are characterized by a high content of TiO₂ (mean 2,8 w.%) as well as a low magnesian number (mean 0,35). Cretaceous volcanic rocks are similar to OIB basalts in terms of their enrichment with trace elements. However, normalized multielement plots demonstrate negative anomalies of Nb, Ta, Ti, and Sr as well as a positive Pb anomaly. There is a significant enrichment with light REE relatively heavy REE and La_n/Yb_n ratio varies from 13 to 30. ⁸⁷Sr/⁸⁶Sr ratio (0,704381 – 0,707545) and the parameter εNd (-1 – 1,64) indicate that the source of volcanites was enriched with incompatible trace elements. Moreover, the analysis of whole-rock chemistry and isotopic parameters demonstrates that the eclogitized crust of the Paleo-Asian Ocean could be as a source of Eastern Mongolia volcanic rocks. In support of this, the computer thermodynamic modeling results of melting illustrate the validity of the eclogitic source. Finally, on the basis of the results a geodynamic model of the volcanic rocks formation has been proposed which includes melting of the hydrated crust during delamination processes reasoned by extensional deformation in Late Mesozoic time.

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