



Late Tertiary andesites and basaltic andesites from Khangai, Khingan, and Vitim Plateau: geochemical similarities and differences of sources

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Andesite is a typical rock of island arcs and active continental margins. This kind of volcanic rocks is not characteristic for inner parts of continents. Andesites and associated rocks (basaltic andesites, trachyandesites, basaltic trachyandesites) were identified, however, in many Cenozoic volcanic fields of Inner Asia, which was never referred to the mentioned geodynamic settings. To define geodynamic meaning of andesites and related rocks, we present isotopic and geochemical systematics of their sources for three key areas: Khangai, Khingan, and Vitim Plateau. Low-K andesite and basaltic trachyandesite lavas from East Khangai erupted at about 7-6 Ma from lower crustal source with enriched isotopic signatures of Nd and Sr and were followed by high-K mantle-derived basaltic lavas at 5.5-4.8 Ma that show depleted signature in terms of Sr isotopes and enriched one in terms of Nd isotopes. This lava sequence is indicative for delamination of the lower lithosphere beneath the East Khangai orogenic province. Andesite, basaltic andesite, trachyandesite, and basalt lavas from Greater and Lesser Khingan, which are characterized by wide variations of K_2O/Na_2O ratios, erupted in different areas of the Greater and Lesser Khingan in the time interval from 22 to 1 Ma from heterogeneous crustal and mantle sources with enriched isotopic signatures of Nd and Sr. Unlike the crust-mantle magma-generated processes beneath East Khangai, those beneath Khingan were dispersed in time and space. Basaltic andesite lavas from Vitim Plateau, erupted at 14-13 Ma after high-Mg basanites and picrobasalts, show depleted isotopic signatures of Nd and Sr. In terms of trace-element modeling, lavas of this unit were derived through high-degree partial melting (15-20 %) in the shallow (garnet-free) mantle lithospheric source. The found geochemical grouping of rocks is considered as the basis for systematics of shallow mantle and crustal sources of Cenozoic volcanic rocks from different regions of Inner Asia.

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