



Alkaline basaltic volcanism in Central Mongolia and Northeast China for the past 15 Ka: decompressional and delayed fluid melting of the mantle

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Compilation of ^{14}C dating results on volcanic eruptions of the past 15 ka demonstrates the earlier activity in Central Mongolia than in Northeast China. Cessation of volcanism in the former area and its initiation in the latter one occurred at ca. 8780-8740 years B.P. (calibrated ages by tree rings). In both cases, volcanism might be triggered by a strong tectonic impulse occurred in the Indo-Asian collision zone. Geochemical study of volcanic rocks showed that this delay was accompanied by a change of magma generation in the mantle from adiabatic decompression to fluid style. Source heterogeneities of volcanic rocks were studied by means of trace-element modeling. It was inferred that firstly, decompression-derived small (1.5-3 %) liquid fractions from a metasomatized source with 5 % of garnet were exhibited along the west-eastern volcanic line in the Taryat basin of Central Mongolia, the subsequent melt fractions (up to 5 %) from a source region with garnet content as low as 3 % were manifested along the north-north-eastern line. Compositionally similar alkaline basalts were produced in Jingpohu of Northeast China at time interval of 5430-4400 years B.P. (Zhang et al., 2002). Initial partial melts of ca. 2 % beneath the Frog Pool volcanic center and those of ca. 5 % beneath the Crater Forest volcanic line (with 8 and 5 % of garnet, respectively) were followed by varied melt fractions beneath the latter area with final portions of ca. 5 % produced at source region with garnet contents from 8 to 3 %. Unlike volcanic rocks from Central Mongolia, those from Northeast China were isotopically heterogeneous and depleted by high field strength elements (Nb, Ta, and Hf). Volcanic activity in Central Mongolia appeared to be a direct response to processes in Indo-Asian collision zone, the one in Northeast China might be caused by a delayed influence of isotopically depleted fluids related to the stagnated Pacific slab.