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The Late Triassic Kataev volcanoplutonic association in western Transbaikalia, a fragment of the active continental margin of the Mongol-Okhotsk Ocean

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Abstract

The Kataev volcanoplutonic association has been recognized in western Transbaikalia. It unites the volcanosedimentary rocks of the Kataev Formation and associated granites localized within the lower plates of the Buteel-Nuur and Zagan metamorphic-core complexes. The rocks of the Kataev association are dynamometamorphosed to different degrees, which is due to the tectonic exposure of metamorphic-core complexes in the Early Cretaceous. The U-Pb zircon dating of the Kataev Formation rhyolites yielded an age of 226 ± 3 Ma. The U-Pb zircon age of the granites intruding the Kataev Formation rocks is 223.4 ± 5.0 Ma. The volcanics of the Kataev Formation belong to the subalkalic basalt-andesite-dacite-rhyolite series. The trachybasalts and trachyandesite-basalts of the Kataev Formation have geochemical characteristics of igneous rocks formed as a result of subduction, e.g., they show distinct negative Nb and Ti and positive Ba and Sr anomalies on multielemental patterns. The specific composition of mafic volcanics points to their formation through the melting of a mantle source resulted from the mixing of depleted mantle and subduction components. Trachyandesites have higher Th and U contents than basaltoids. They can result from the contamination of a mantle source, similar in composition to the Kataev Formation basaltoids, with crustal material. The felsic volcanics of the Kataev Formation and granites intruding them show nearly identical geochemical characteristics corresponding to both *A*- and *I*-type granites. These rocks might have formed through the melting of a moderately water-saturated magmatic source of diorite-tonalite composition at 742–833 ºC. We have established that the rocks of the Kataev volcanoplutonic association in western Transbaikalia and Northern Mongolia formed in the Late Triassic synchronously with the calc-alkaline granitoids of the Henteyn–Daurian batholith and the alkali granites and bimodal volcanic associations of the Kharitonovo and Tsagaan-Hurtey volcanoplutonic associations. The synchronous formation of volcanoplutonic associations of normal and high alkalinity agrees with the geodynamic setting of the Andean-type active continental margin existing in the area of present-day western Transbaikalia and Northern Mongolia in the Early Mesozoic. This setting was the result of the subduction of the Mongol-Okhotsk oceanic plate beneath the Siberian continent.
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Keywords: volcanics; granites; U-Pb geochronology; geochemistry; active continental margin; Triassic; Mongol-Okhotsk Ocean; Transbaikalia

Introduction

Early Mesozoic igneous rocks are widespread within the Central Asian Fold Belt north and northwest of the Mongol-Okhotsk suture (Transbaikalian and North Mongolian areas) (Parfenov et al., 1999; Yarmolyuk et al., 2002) (Fig. 1). According to modern concepts, the Early Mesozoic magmatism in this area was related to the evolution and closure of the Mongol-Okhotsk Ocean basin. The latter event took place in the Middle Jurassic–Early Cretaceous and terminated with the formation of the Mongol-Okhotsk suture zone (Kravchinsky et al., 2002; Tomurtogoo et al., 2005; Yakubchuk and Edwards, 1999; Zorin, 1999). The ocean closure led to the intraplate magmatic activity and development of metamorphic-core complexes (MCCs) in the area of modern Transbaikalia and Northern Mongolia in the Late Mesozoic (Donskaya et al., 2000, 2008; Sklyarov et al., 1994, 1997; Zorin et al., 1997).

According to the present-day concept of the magmatism development in western Transbaikalia and Northern Mongolia in the Early Mesozoic, the study area was subjected only to bimodal volcanism at that time. It took place within the Selenga (Parfenov et al., 1999; Popeko et al., 2005) or the

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