

**Petrogenesis of Early
Cretaceous volcanic rocks of the
Manketouebo Formation in the
central Great Xing'an Range,
NE China, and tectonic
implications: Geochronological
and geochemical evidence**

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Late Mesozoic volcanic rocks are widespread in the Great Xing'an Range and adjacent areas of northeast (NE) China. Many studies have examined the late Mesozoic volcanic rocks of the Great Xing'an Range over the past decade, but the petrogenesis of these late Mesozoic volcanic rocks and the processes that caused the magmatism in this area remain controversial. Here, we present new zircon U–Pb data and geochemical data for samples of the Manketouebo Formation from the central Great Xing'an Range, with the aim of addressing the above-mentioned question.

The Manketouebo Formation in the study area is dominated by rhyolites and rhyolitic tuffs. The zircon U–Pb dating indicates that these volcanic rocks formed between 143 and 139 Ma. The volcanic rocks contain high silica (66.70–79.91 wt.%) and total alkali (5.93–9.72 wt.%) concentrations, and low concentrations of MgO (0.08–1.15 wt.%), total FeO (0.68–4.50 wt.%), and CaO (0.10–2.56 wt.%). They are enriched in large ion lithophile elements (LILEs; e.g., Rb, Th, and U) and light rare earth elements (LREEs), and depleted in high field strength elements (HFSEs; e.g., Nb, Ta, Ti, and P) and heavy rare earth elements (HREEs). These data, combined with previous research into the spatial–temporal distribution of Mesozoic volcanic rocks in NE China, suggest that the Early Cretaceous magmatism in the Great Xing'an Range was influenced by both the subduction of the Paleo-Pacific Plate and the closure of the Mongol–Okhotsk Ocean. This was a crucial period in the transformation from the Mongol–Okhotsk Ocean to the Paleo-Pacific tectonic regimes. In summary, the early stages of Early Cretaceous magmatism in this area were related to closure of the Mongol–Okhotsk Ocean, whereas the later stages of magmatism in this area and elsewhere in NE China were related to subduction of the Paleo-Pacific Plate.