

Final Closure of the Paleo-Asian Ocean and onset of subduction of Paleo-Pacific Ocean : Constraints from Early Mesozoic magmatism in central-southern Jilin Province, NE China

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When the Paleo-Asian Ocean closed and the Paleo-Pacific subduction started in NE China remains controversial. To constrain these key issues, we carried out zircon U-Pb-Hf isotopic and whole-rock geochemical studies of Early Mesozoic igneous rocks in central-southern Jilin Province, NE China. Early Mesozoic igneous rocks in region were formed at three stages: the middle Triassic (246 Ma), the late Triassic (219–220 Ma), and the early Jurassic (172–194 Ma). Middle Triassic trachyandesites in southern Jilin Province were solely generated through partial melting of ancient lower crust of the North China Craton (NCC), implying ongoing southward subduction of Paleo-Asian Ocean Plate beneath the NCC at this time. Late Triassic trachyandesites in southern Jilin Province were derived from the magma mixing/mingling of the NCC lithospheric mantle and juvenile eastern CAOB crustal sources. Late Triassic hornblende gabbros in central Jilin Province were derived from depleted lithospheric mantle previous metasomatized by subduction-related fluids. Coeval adakitic granodiorites were likely produced through the partial melting of thickened juvenile lower crust. Spatially, these rocks occurred on both sides of the Solonker–Xra–Moron–Changchun Suture Zone and record N–S-directed extension accompanied by the final closure of the Paleo-Asian Ocean. Early Jurassic andesites were produced through mixing/mingling between partial melts derived from eastern CAOB lithospheric mantle and ancient NCC crust. In contrast, Early Jurassic felsic rocks, including A-type granites, were derived from the partial melting of Neoproterozoic accreted lower crust, jointly implying an extensional setting as the result of the initial subduction from Paleo-Pacific Plate at this time.

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