

# Geochemistry and Geochronological evidences of late Jurassic intra-Neotethyan island arc from eastern Arunachal Pradesh Tran-Himalaya, north-eastern India

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The geodynamic evolution of the Late Jurassic magmatic rocks of India-Asia pre-collision from the eastern Trans-Himalayan terrane continues to be contentious. For better understanding the petrogenesis and tectonic evolution of these Late Jurassic mafic rocks, we have undertaken zircon U–Pb dating, whole-rock major and trace element analyses of the gabbroic rock from the Lohit Plutonic Complex of the eastern Trans-Himalaya in Arunachal Pradesh, northeastern India. The zircon U–Pb age indicates that the Lohit Gabbro (LG) was emplaced during the Late Jurassic ( $147.4 \text{ Ma} \pm 3.0 \text{ Ma}$ ). The LG has a tholeiitic affinity and is characterized by LREEs enrichment with flat HREEs, enrichment in large-ion lithophile elements (e.g., Rb, Sr, and Ba), and depletion of high-field-strength elements (e.g., Nb, Zr, and Ti), indicating a subduction-related setting for their generation and subduction fluid influx during its petrogenesis. The geochemical evidence suggests that the LG originated from the partial melting of a depleted mantle wedge metasomatised with slab-derived fluids, and the ascending magmas underwent fractional crystallization without significant crustal contamination. Combining our data with those from previous studies of Late Jurassic magmatism in the Trans-Himalayan belt, we proposed a double subduction system in the eastern Neo-Tethys Ocean during the Late Jurassic ( $\sim 147 \text{ Ma}$ ), and the LG was produced in intra-oceanic island arc setting during the northward subduction of the Neo-Tethys oceanic slab.

