

Paleo- to Neoproterozoic Transitional Granitoid Geochemistry and Crustal Evolution in the Bundelkhand Craton, India

KUMAR BATUK JOSHI^{1*}, JOYEETA BHATTACHARJEE¹,
GARGI RAI¹, JAANA HALLA², MATTI KURHILA³,
ESA HEILIMO⁴ AND TALAT AHMAD^{1,5}

¹Department of Geology, University of Delhi, India

(*correspondence: kr.batukjoshi@gmail.com)

²Finnish Museum of Natural History, University of Helsinki,
Finland (jaanahalla@gmail.com)

³Geological Survey of Finland, Espoo, Finland
(mattikurhila@gmail.com)

⁴Geological Survey of Finland, Kuopio, Finland
(esa.heilimo@gtk.fi)

⁵University of Kashmir, J&K, India (tahmad001@yahoo.co.in)

This study investigates the major and trace element compositions and zircon U-Pb ages (SIMS) of the granitoids from the Bundelkhand Craton, Central India, and draws conclusions on their petrogenesis, emplacement ages and evolution. The Bundelkhand Complex comprises of different types of granitoids, amphibolites, calc-silicates and quartzites, and forms the basement for linear E-W trending metasedimentary and volcanic belts. The secular and geochemical diversity of the granitoids in the complex ranges from sodium-rich TTGs (3.3-2.5 Ga) to calc alkaline, potassium-rich granitoids (2.57-2.52 Ga), which points towards a change in the source of granitoids from metabasaltic material (TTGs) to variable sources with inputs from mantle-derived material and recycled crustal lithologies (calc alkaline granitoids). The U-Pb geochronology of the granitoids indicate that the evolution of the craton was episodic and started already in the Paleoproterozoic. At 2.57-2.52 Ga, Bundelkhand experienced a rapid period of voluminous magmatic activity that produced a variety of plutonic rocks deriving from enriched mantle (e.g. sanukitoids) as well as crustal sources (intracrustal granites). In conclusion, the Bundelkhand craton grew intensively due to a new type of tectono-magmatic event near the Archean-Proterozoic boundary and was stabilized by 2.5 Ga.