

**Archean TTG and associated K-granite
petrogenesis: Mineral Chemistry and Geochemical
perspective**

Hiredya Chauhan^{1*}, Ashima Saikia¹, Talat Ahmad², Tatiana Kaulina³, Tamara Bayanova³

1. Department of Geology, University of Delhi, India.
(*correspondence: hiredyageosci@gmail.com)
2. Vice Chancellor Office, Jamia Millia Islamia
University, New Delhi, India.
3. Geological Institute of the Kola Science Center,
Russian Academy of Sciences, Apatity, Russia.

Tonalite-trondhjemite-granodiorite (TTG) and associated K-granites represent the supracrustal suites which are the primary archive of the earth's geological history. In the present study, TTGs & K-granites of two adjacent cratons namely Aravalli & Bundelkhand show distinct groups at microscopic scale. EPMA analysis of TTGs from Aravalli indicates that the plagioclase feldspar is albite to oligoclase in composition with the absence of amphiboles. While in Bundelkhand TTGs, predominant plagioclase feldspar is sodic, potash feldspar is sanidine. Variation in calcic amphiboles from magnesio to ferro to ferroschermakite hornblende due to the Fe²⁺-Mg ion substitution is observed in Bundelkhand TTGs. Biotites of Bundelkhand are siderophyllite in nature showing two distinct trends and are associated with mafic minerals. K-granites in both the cratons are shoshonites and shows the alkaline trend. Geochemical data of TTGs from both the cratons point towards a volcanic arc setting along with the fractionation of Ti-bearing phases. Trace element data suggests involvement of crustal components due to positive Pb anomaly. The HREE depletion and relative LREE enrichment along with the negative Eu anomalies point to the presence of garnet, amphibole and plagioclase in the source mineralogy. U-Pb ID-TIMS Zircon age of 2680 ± 30 Ma is interpreted as an age of magmatic crystallization of tonalites for the Aravalli Craton. Integrating the data, it has been inferred that there is an episodic crustal growth in both the cratons resulting in the formation of TTGs & K rich granites at variable depths.