

Paleoproterozoic active volcanic arc setting of the north Indian continental margin: Insights from U-Pb ages and Bulk rock geochemistry from Kumaun Himalaya

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Integrated zircon U-Pb geochronology and bulk rock geochemistry of granitic gneisses of Chiplakot Crystallines klippe (CC) and orthogneisses of Munsiri Formation along Kaliganga valley, Kumaun Himalaya suggest Paleoproterozoic active arc setting of north India continental margin and a Lesser Himalayan tectonostratigraphic affinity for the Chiplakot Klippe. Trace-element concentrations of CC and Munsiri orthogneisses are more consistent with a typical subduction related magmatic source. Most of the zircons from CC ($\geq 95\%$) and Munsiri orthogneisses ($\geq 60\%$) are of magmatic origin ($\text{Th/U} \geq .1$). The weighted mean average of zircon Pb^{207} - Pb^{206} ages for three samples from the CC provide a range from 1861.2 ± 3.3 Ma to 1969.8 ± 3.5 Ma. Weighted mean average of zircon Pb^{207} - Pb^{206} ages for two samples from the Munsiri orthogneisses have a range from 1857.6 ± 4.5 Ma to 1963.0 ± 5.0 Ma. Our results indicate that CC is contemporaneous with the Munsiri orthogneisses and, they are both of Lesser Himalayan origin. Based on these lines of evidences, we suggest *circa* 100 Ma protracted period of magmatism in Paleoproterozoic from *circa* 1.96 Ga to *circa* 1.86 Ga along northern extremity of Indian continental margin. This magmatism related to subduction or continental arc setting, which can be correlated with the accretionary processes that occurred during the formation of the Columbia supercontinent. The ages we obtained are similar to that of Munsiri Formation and various crystalline Klippen across the entire Himalayan orogen.