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**Evaluation of palaeoclimatic variability during Deccan Volcanic Episode: Perceptions from the intrabasaltic palaeosols (bole beds) occurring around Koynanagar area of Maharashtra (India).**

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**Abstract:** Geochemical proxy analysis of the intrabasaltic red bole beds (Deccan Trap palaeosols) occurring around the Koynanagar area of Maharashtra has been attempted in inferring the variations in the climatic conditions which prevailed during their formation. For this study the bole beds exposed at different elevations in the Kumbharli ghat section were collected along with associated basalts and the soils for the comparison. The Chemical Index of Alteration (CIA) values show appreciable variations indicating the differences in the palaeoweathering conditions which is also supported by the Parker's Weathering Index (PWI) and Weathering Potential Index (WPI). Bole beds from the higher elevations show higher hydrolysis but lower calcification and salinization indicating quite humid, fairly leached and well-drained conditions. While bole beds seem to have formed under temperatures similar to the present day and do not show much variations the rainfall seems to be lower than the modern times with considerable variability. Most of the bole beds show oxidizing conditions (although quite variable), as compared to the modern soils, the lower boles show less acidic conditions than the upper boles and modern soils. In general the  $Al_2O_3/SiO_2$  values point towards more clayey nature of upper red boles indicating their prolonged weathering. A-CN-K plots reveal weathering trends towards smectite formation in the red boles from lower part while kaolinite and gibbsite formation from the upper parts indicating weak lateritization, similar to the modern soils. None of the bole beds from lower part show lateritization indicating their incipient weathering. The upper bole beds show enrichment in LREE and depletion in HREE with respect to their parent basalts indicating intensely weathered residual products, however there is no significant REE fractionation in the lower bole beds signifying their lesser weathering intensity. Overall -ve Eu anomaly and +ve Ce anomaly indicate oxic environments during the formation of bole beds. From the  $(Gd/Yb_N)$  versus  $Eu/Eu^*$  plot it is inferred that the bole beds were formed by *in-situ* basaltic weathering without differentiation or recycling. To summarize the upper bole beds were formed by intensive weathering under humid, fairly leached, acidic and well-drained conditions with much higher rainfall while the lower bole beds show incipient weathering under poorly-drained, moderately leached and less acidic conditions with lower rainfall.

**Keywords:** Deccan Volcanic Province, Bole beds, Intrabasaltic paleosols, Palaeoclimatic variability.

