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Geochemical investigations of Iridium (Ir) and other platinum group elements from the intrabasaltic palaeosols (bole beds), associated basalts and soils from the Deccan Traps of Koynanagar region (India).

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Anomalously high Iridium (Ir) concentrations at the Cretaceous-Tertiary Boundary (KTB) and its global occurrence opened a considerable debate about its origin. Some considered the enriched concentration of Ir was due to the bolide impact at KTB while others suggestedits source from the Irrich mantle material emanations during Deccan volcanism in India. In view of this the Ir rich layers have been searched within the KTB sediments associatedwith the Deccan volcanic episode. The high Ir rich clays from the intertrappean beds as well as alkaline rocks of Deccan traps from Saurashtra and Kutch areas of western India have been reported. In the present investigations a weathering profile exposing the intrabasaltic red bole, associated basalts and soils developed over the basalt have been investigated for the concentrations of platinum group elements (PGE) in them. It has been found that the basalts and red bole contain lesser iridium (<600 pg/g) whereas the modern soil show slight enrichment (746 pg/g). Lateritic soil, however, shows stupendously high Ir concentration (>35 times its concentration in the parent basalt). Other platinum group elements viz. Ruthenium (Ru), Rhodium (Rh), Palladium (Pd), Osmium (Os) and Platinum (Pt) also show similar enrichments in the lateritic soil. Ru, Rh and Ir show enrichment while Pd, Os, Pt and Au show depletion in the modern soil developed over its parent basalt which overlies the red bole horizon. Interestingly red bole shows enrichment in the concentrations of PGE, excepting Os, with respect to the underlying parent basalt. Following inferences can be drawn from the geochemical distributions of the PGE:

1. The palaeoweathering conditions during red bole formation were notably different than the present day weathering environments leading to pedogenesis.
2. The general higher concentrations of PGE in the lateritic soil as compared to the red bole suggest prolong weathering/pedogenesis for the lateritic soil in contrast to the palaeoweathering conditions during the red bole formation.
3. Neither red bole nor associated basalts show high concentrations of Ir (indicating Ir has not been incorporated in the basalts and basalt derived red bole from the mantle sources) could suggest that the physico-chemical conditions during the formation of red bole were different from the Ir enriched intertrappean beds reported from Anjar.