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Platinum-group of elements (PGE) in lamprophyres from the Dharwar Craton and the Deccan Large Igneous Province, India: A comparison in space and time

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Lamprophyres are volatile-rich mafic-ultramafic alkaline igneous rocks, which at times can be diamondiferous and provide invaluable insights into the nature of the underlying sub-continental lithospheric mantle. Lamprophyres are also known to be active scavenging agents of various platinum group of elements and precious metals[3].

The Dharwar craton of southern Indian shield hosts many gold deposits and also has the PGE occurrences in association of komatiites. Continuity of the Dharwar Craton is believed to be up to north western India and concealed beneath thick pile of Deccan Lavas. Some preliminary PGE studies on different igneous suits of Deccan LIP have not only shown promising result in terms of PGE mineralization but also suggests differentiated distribution of PGE concentration by the process of fractional crystallization in alkaline and tholeiitic series[1,2,4].We report PGE and Au in 45 samples of Mesoproterozoic- (Dharwar craton) and end-Cretaceous- (Deccan LIP, NW India) lamprophyres which are distinct in their space and time and attempt their comparison.

The Dharwar lamprophyres show σPGE ranging from 12.34 to 80.45 ppb with very low IPGE ranges from 3.40 to 13.79 ppb whereas the Deccan Lamprophyres have a wider σPGE ranges from 7.28 to 180.73 ppb and with relatively more IPGE concentrations which range from 2.173 to 22.131 ppb. Lamprophyres from both the domains shows enriched PPGE + Au relative to IPGE in their chondrite normalized plots and variable fractionated Pd/Ir trend suggesting highly evolved compositions. Cu-Pd plots of studied samples reveal sulphur under-saturated and depleted nature of source. Details pertaining to mechanism of enrichment processes in the light of mantle metasomatism will be discussed.

References:

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