

**Kimberlites, Lamproites, Lamprophyres and their Entrained Xenoliths: Keys for Unraveling Geodynamic Evolution of the Cratons and Mobile Belts – N.V.Chalapathi Rao, BHU, Varanasi - 221 005 (Email: [nvcr100@gmail.com](mailto:nvcr100@gmail.com)) (Summary of T.N. Muthuswami Endowment Lecture)**

Small-volume potassic-ultrapotassic alkaline rocks such as kimberlites, lamproites, lamprophyres and their entrained xenoliths provide us the most direct information about petrology of the sub-continental lithospheric mantle and constitute 'windows to the earth's mantle'. Their unique mineralogy, unusual geochemistry, episodic emplacement in geological time-frame coupled with diamondiferous nature render their study academically exciting and economically rewarding. The first part of the lecture addresses various petrographical and geochemical aspects of these three rocks types as well as their xenoliths/xenocrysts. This is followed by their aspects of distribution in time and space in various cratons and mobile belts of India. The subsequent part of the lecture focuses on

the salient results obtained by the speaker and his research team. In recent times, on diverse aspects such as (i) original spatial extent of the Purana (Proterozoic sedimentary basins), (ii) multi-stage metasomatism in the Eastern Ghats mobile belt, (iii) garnierite mineralization in Tokapal kimberlite, Bastar craton, (iv) original spatial extent and origin of the Deccan Large Igneous Province, (v) layered nature of the SCLM beneath the Bastar craton, (vi) mass-extinctions at the K-Pg boundary, (vii) origin of ultra-potassic rocks in the Damodar valley, Chhotanagpur Gneissic Terrane and their links to Kerguelen mantle plume, and (viii) genesis of lamprophyres from the Chhotaudepur sub-province and their Deccan connection, obtained vis-à-vis kimberlites, lamproites, lamprophyres and their entrained xenoliths.

Inclusions in diamond serve as 'time-capsules' for recording continental-scale events such as closing and opening of ocean basins and operation of plate-tectonics even in the Precambrian. The final part of the lecture addresses these aspects taking global examples. The ultimate objective of this lecture is to highlight that despite their insignificant volume, kimberlites and related rocks (together with their xenoliths) can be of immense utility in unraveling large-scale, and apparently unconnected, geodynamic aspects such as the spatial extent of sedimentary basins, generation of continental flood basalts, and evolution of cratons and mobile belts. Therefore, more thrust should be given to this field of research and more young talent should be enthused and encouraged to take up exciting researches on deeper-mantle petrology.