Kimberlites, Flood Basalts, Mantle Plumes and Mass Extinctions

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There is a temporal and spatial relationship between small-volume, volatile-rich and highly potassic continental melt fractions, such as kimberlites and carbonatites, and large-volume continental flood basalts in several Large Igneous Provinces (LIPs). The small-volume melts either immediately pre-date or post-date or even are co-eval with the main flood basalt event. Interestingly, many of these LIPs are widely regarded as products of mantle plume-lithosphere interactions and some of them are also linked to Phanerozoic mass extinctions at geological boundaries. Recently reported occurrences of end-Cretaceous diamondiferous kimberlites in central India, which are synchronous with the flood basalts and carbonatites of the Deccan Large igneous province, provide an opportunity to re-evaluate the role of mantle plume-lithosphere interactions in the generation of these disparate magmas. The possible role of kimberlites, together with flood basalts and associated carbonatites, in contributing towards mass extinctions by "Verneshot" explosive (CO_2 and SO_2) events at the Cretaceous-Tertiary boundary is also explored.