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Do the Precambrian Indian kimberlites constitute a part of a large igneous province?

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The generation and emplacement of kimberlites require a thermal and/or tectonic trigger mechanism for low degrees partial melting of a mantle source enriched in lithophile elements. Widespread ca. 1.1 Gyr kimberlites and related rocks (ultramafic lamprophyres and lamproites) are known from the southeastern Indian Shield aligning almost parallel to the Eastern Ghats Mobile Belt. What initiated the generation of this ca. 1.1 Gyr kimberlites and related rocks corridor is an open question. Based on the temporal coincidence between the kimberlites and related rocks of the southeastern Indian Shield and emplacement of several large igneous provinces (LIPs) such as Umkondo in Southern Africa (1112-1106 Ma), Warakurna in central and western Australia (1078-1070 Ma), and Keweenawan in North America (1117-1085 Ma), the role of a short-lived mantle plume was invoked in the origin of these rocks [1, 2]. We argue that an obvious lack of an age-wise linear disposition of kimberlites and related rocks with a record of protracted magmatic activity compared to the time span of coeval large igneous provinces along with a cooler ambient mantle as revealed from the entrained xenoliths, constitute important limitations for this mantle plume model. The geographical and temporal links with an orogenic belt advocate in favor of plate tectonic processes involved in the magma generation and emplacement of kimberlites and related rocks in the southern Indian Shield [3]. The origin of such rocks of the Precambrian age during continental collision is also known from South Africa [4]. An abrupt rise in the frequency of global kimberlite magmatism at ~1.2-1.1 Gyr is consistent with the transition of the continental lid to modern-style plate tectonics.

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