Subduction in Early Proterozoic mantle: Implications from nitrogen in carbonatites and diamonds

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The nitrogen isotopic composition of mantle samples lie between -15 to -5 ‰ and, is different from subducted sediments that varies between +6 to +15 ‰. As a result, N can be an excellent tracer of a subducted component [e.g. 1]. We have studied N from Indian carbonatites of adjacent locations in Hogenakal (2700 Ma) and Sevattur (770 Ma) with established mantle origin. We have also studied two diamonds representative of the Witwatersrand basin (2900–2700 Ma) and Jagersfontein (1100-1700 Ma) belonging to the Kapvaal supergroup. Both India and the Kapvaal craton formed part of a supercontinent that persisted as coherent units until the breakup of Pangea. Comparing the N in these diamonds with the carbonatites will put constraints on differences in their sources and the role of subduction in their generation.

The nitrogen isotopic composition of the carbonatites are comparable ranging between -3 to +13 ‰, although value as low as -22 ‰ is observed from an apatite from Hogenakal. The N contents vary from 130 to 6000 ppb. Of the diamonds, Jagersfontein have $\delta^{15}N$ of +2.3 and +9.3 ‰, while those from the Witwatersrand basin are –2.3 and 0 ‰. Their nitrogen lie between 500-900 ppm. These results have important implications for their formation and sources.

[1] Basu S., Murty S.V.S. (2015). *Journal of Asian Earth Sciences* **107,** 53-61.