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Carbonatites and degassing core

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Of about 500 carbonatites so far described, all appear to be located on, or near to, major intraplate fault systems or within tectonic blocks. Only a very small number of them lie along the margins of orogenic belts and no one is located on presumed subduction, but Italian carbonatites. Especially extrusive carbonatites are strictly related to mafic alkaline rocks, mostly melilitites and nephelinites and frequently carry ultramafic debris and mantle nodules. Carbonatites are highly enriched in incompatible elements. These characteristics indicate that they are the best candidate for very deep seated origin and very rapid ascent to the Earth surface in absence of direct crustal contamination. The presence of a radiogenic component in carbonatites is commonly attributed to limestone ryclicling via subduction. However, stable isotopes ratios do not correlated with radiogenic isotopes as expected if a crustal component was incorporated into carbonatite source. In addition, distribution of radiogenic mantle endmembers are not directly related with mantle volumes above Benioff planes. Italian carbonatites are highly radiogenic, but their chemistry is inconsistent with crust contamination; they may represent the best example of very deep radiogenic, volatile-rich melts. As a parallel, the high radiogenic component seen in mafic ultramafic intraplate melts, notably lamproites and kimberlites, can simply be related to long time decay in fertilized portion of deep mantle/core regions. On this base, it is questionable that subduction was capable to sensibly change the mantle composition through time, this implying that its role in the planet dynamic may need to be reconsidered.