

## **Carbon and oxygen isotopes of the carbonatitic lavas from Catanda, Kwanza Sul, Angola: genetic implications**

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Remains of carbonatitic volcanic buildings are located near the village of Catanda (Kwanza Sul, Angola). These volcanic carbonatites occupy an area of 50 Km<sup>2</sup> forming small and eroded edifices mostly covered by quaternary sediments and hosted in Archaean granites. The age of the Catanda volcanic activity is not precisely calculated although Silva and Pereira (1973) proposed an approximated age of 92 ( $\pm$  7 m.y). Pyroclastic rocks form the most important deposits in the area with typical sequences of beds up to 10-40 cm in thickness mostly composed by lapilli tuffs and with presence of granitic blocks, up to 50 cm in size. Lavas form massive flows, up to 7 m thick, interbedded between the pyroclastic layers. Two main types of carbonatitic lavas can be distinguished in Catanda: cream-colored calciocarbonatites and dark grey silicocarbonatites. The calciocarbonatitic lavas have a porfídric texture and are essentially formed by a calcitic matrix with apatite and calcite phenocrysts. The silicocarbonatitic lavas have an aphanitic texture and are composed by less quantities of calcite than the calciocarbonatites. Apatite, and calcium silicates such as cuspidine or britholite are present in its matrix and the accessory minerals such as ulvöspinel, perovskite, pyrochlore and periclase are also abundant. Comparing the geochemical features of both types of lavas it is possible to distinguish marked differences between calciocarbonatites and silicocarbonatites. The first have significant contents in CaO that rise up to 46,5 wt.%, SiO<sub>2</sub> is from 6,3 to 12,8 wt.%, Fe<sub>2</sub>O<sub>3</sub> rise from 4,2 to 8,1 wt.% and MgO is between 1,4 and 9,7 wt.%. In the silicocarbonatites CaO contents are lower than in calciocarbonatites and stay between 29,4 and 31,8 wt.%. SiO<sub>2</sub> is significantly higher ranging between 14,3 and 23,3 wt.%, Fe<sub>2</sub>O<sub>3</sub> vary from 8,6 to 11,3 wt.% and MgO ranges from 8,6 to 9,4 wt.%.  $\delta^{13}\text{C(V-PDB)}$  values of calcite from the Catanda carbonatites are between -12,2 ‰ and -4,1 ‰ and  $\delta^{18}\text{O(V-SMOW)}$  between 9,4 ‰ and 14,6 ‰ except one value of +27,2 ‰. The carbon and oxygen isotopic compositions do not show a good correlation and most of the calcite carbonatites have lower  $\delta^{13}\text{C}$  and higher  $\delta^{18}\text{O}$  values compared with those of the mantelic origin. Fractionation derived from secondary processes causes an increase of the  $^{13}\text{C}$  content. In the surroundings of the carbonatite there are only igneous rocks. Then a possible explanation for these unusual low values of  $\delta^{13}\text{C}$  in carbonatites could be a crustal contamination of the magma or a reaction of the magma with CO<sub>2</sub> removed from the melt by a degasification process previously to the calcite crystallization.