

Diamondiferous trend of the kimberlites in the Lunda region (Angola)

Zinchenko, V.¹, Felix J.T.², Francisco J.³

^{1,2,3}CATOCA Mining Project (SM CATOCA), felix@catoca.com

The first study of the relationship between the diamond content of kimberlites and the composition of associated pyrope in the Lucapa corridor of the Lunda region, NE Angola, was established by Sobolev et al. [1]. These researchers determined that the increase in the diamond content of kimberlite pipes was proportional to the Cr₂O₃ content of kimberlitic pyrope.

We obtained new data on the chemical composition of 630 grains of pyrope from the Kamafuka, Kamuanzanza, Txiuzo, Catoca and Luele kimberlites in order to test this relationship. The results confirm that diamond content (Ct/T) is related to the Cr₂O₃ content in an exponential relationship (Fig. 1). The exponential character of this function is believed to be determined by the maximum allowable concentration of Cr₂O₃ in kimberlitic pyrope. From NE to SW, the average content of the diamonds in kimberlites increases 5 times, from 0,22 Ct/T (Kamafuka) to 1,10 Ct/T (Luele) (Fig. 1) [5].

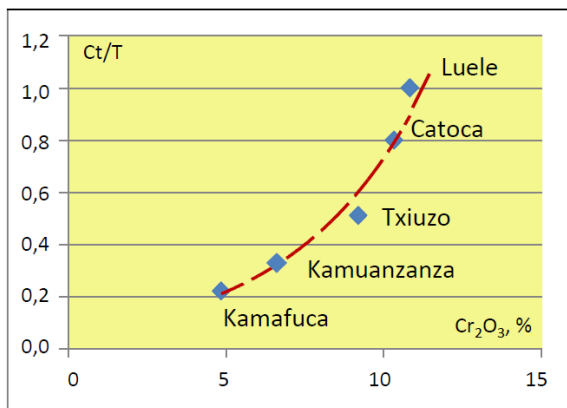
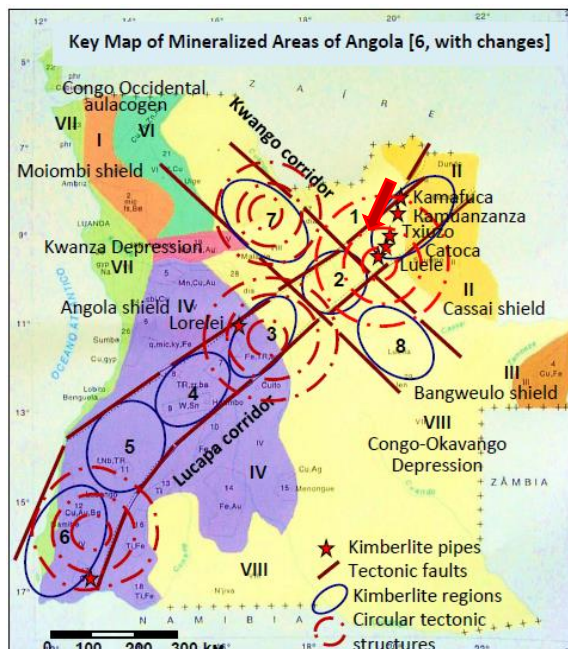


Figure 1: Dependence of diamond content on Cr₂O₃ content of kimberlitic pyrope in the Lunda region [1, 5].

The distribution of the kimberlite pipes of the Lunda region is thought to be controlled by the massive, circular Saurimo structure (200 km diameter), the growth of which is related to the activation of a mantle plume under the Cassai Archean shield in the Early Cretaceous [2, 3, 5, 6] (Fig. 2).

Similar structures are observed in other kimberlite regions of NE Angola (Fig. 2): Kukumbi (2), Kwanza (3), Cunene (6) and Kwango (7). It is possible that these may also be associated with diamondiferous kimberlite pipes which could be evaluated based on trends in the Cr₂O₃ content of pyrope in these areas.



References:

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