

Mineralogical, Geophysical and Structural Characterization in the Search for Kimberlite Fields in Western Mali

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ABSTRACT

The search for the diamond began in Mali, with the discovery of a 137.5 carat diamond, in 1954 by local gold miners in the vicinity of the village of Sansanto (Kéniéba) in western Mali. It is in the context of this discovery that geological prospecting work for diamonds will later be initiated by various companies or organizations: [1-7]. The work carried out identified 31 kimberlite bodies including eight (8) diamondiferous. To date, none of them have proven to be economically profitable. Despite the discovery of several diamonds and indicator minerals, the work could not identify the source of many of them. Our work focuses on the study of diamondiferous sources, in this case certain kimberlite pipes from the Kéniéba field. Our first approach consisted in a structural and geophysical study in order to identify the large structures likely to control the installation of the kimberlite pipes. Then, we were interested in the possible relations of the dolerite dykes of the Cretaceous and these pipes. On the structural level, the interpretation of the aeromagnetic data reveals NE-SW, NW-SE and EW structures. The study of indicator minerals reveals the presence of picroilmenite, chromite, calcretes. The geochemical analysis of eight (8) dolerite samples shows that the TiO_2 contents vary between 0.8 and 1.3% and indicate a negative correlation between Ti and Cr. Field and geochemical data suggest relationships between kimberlite pipes and these dolerites. Reactivation of paleo-sutures during the Late Jurassic-Cretaceous appears to control the location of kimberlites in the region. The presence of large gem-quality diamonds in the alluvial deposits adjacent to the kimberlite pipes indicates that the conditions for diamond stability were in place when the kimberlite intrusion was emplaced.

Keywords: Mineralogy, Structures, Kimberlite Fields, Diamond, Kéniéba, Mali.



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