VOLCANICLASTIC ROCKS OF THE UPPER CRETACEOUS, DIAMONDS AND ENVIRONMENT CHANGES: A CASE STUDY FROM THE ALTO PARANAÍBA (MG) AND VICINITIES

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The Upper Cretaceous sequence of volcaniclastic rocks of the Capacete Formation and equivalent units in the Alto Paranaíba (MG) and vicinity (*e.g.* Paraná Basin) covers thousands of square kilometers, with thicknesses up to 180m. Sequence characteristics have been known for decades like Gas-pipes, levels of magnetite/perovskite/ilmenite, quartz with corrosion gulfs, and high content of REE, Nb, Ta, Ba and Sr. The origin of the volcanic material is attributed to Kimberlite Clan Rocks (KCR). Because alluvial diamonds have been recovered since the 1760's in this region, prospecting was carried out over the last 50 years to discover their source rock. Today, after high investments by traditional and high-tech methods, hundreds of KCR are known, however all are sterile or non-economic. Few diamonds have been recovered locally from the volcaniclastic sequence. Based on the lack of known economic sources in most drainages with rich diamondiferous gravels, the authors suggest that the secondary surface source for the diamonds is represented by this volcaniclastic sequence. Geochemical and geophysical signatures point towards KCR and/or Mg-carbonatites as the primary source for the pyroclastics, *e.g.* the airborne gamma-ray spectrometry. The ternary map showing the K-Th-U content of the Upper Cretaceous sequences reveals a clear KCR or alkaline signature based on the very high Th/K ratio present. The volcanic component of the sequence is huge and can't be attributed solely to the KCR with an average surface area of 10 Hc. Furthermore, the quantity of diamonds produced since their discovery is estimated at 40±10 Million carats pointing towards a much larger source, or many small extremely rich sources – two very remote possibilities. The authors suggest that the primary source for the huge volcanic part of this sequence was the Serra Negra/Salitre Complex (SNSC) with a plug about 30 times deeper than an average KCR. The intrusive volume is calculated at ±2000km^3, suggesting that the explosive phase scattered thousands of cubic kilometers of volcanic material and diamonds across this vast area. Age determination of the SNSC and the volcaniclastic sequence corroborate this hypothesis. Mankind has never observed KCR or carbonatite eruptions. We can only infer that these eruptions could be different from silicic eruptions, as viscosities are different. The Vesuvius and Stromboli may be the closest models for the formers. Magma has dissolved limestone and became highly charged with CO_2 generating an enormous pressure, leading to explosions. Carbonatitic magma is stable until depths of ±2km, where it explodes, producing lime and CO_2. From a supervolcano like the SNSC, we can expect extremely violent explosions blowing material to the stratosphere leading to drastic changes of the environment and having severe influence on the paleobiota. Descending gases and material would spread across a huge area, and active lime would aid in the preservation of bones due to the high pH at land surface and of waters.

KEY-WORDS: UPPER-CRETACEOUS, DIAMONDS, ENVIRONMENT-CHANGE