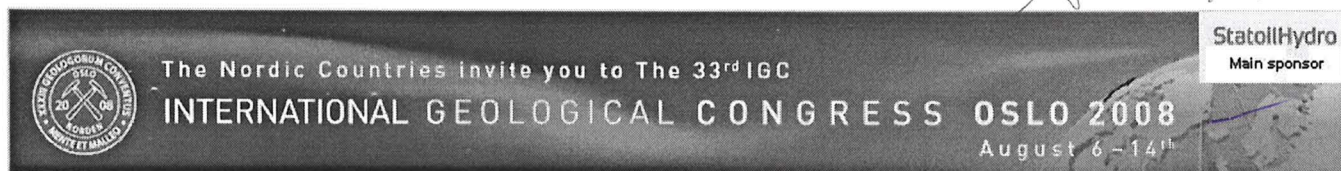


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The Late Cretaceous (~ 90Ma) Catalão I and Catalão II alkaline-carbonatitic complexes are part of the so-called Alto Paranaíba Igneous Province, located between the Paraná basin and São Francisco craton in central Brazil. These complexes have a sub-circular shape and outcrop over an area of 27 km<sup>2</sup> and 14 km<sup>2</sup>, respectively.

The main rock types in both complexes include feldspar-free lamprophyres with kamafugitic affinity, phlogopite-bearing clinopyroxenites, apatitites (with up to 50% of apatite and lower amounts of flogopite, perovskite and Fe-Ti-oxides), magnetitites (with up to 50% of magnetite and minor phlogopite, perovskite and apatite), glimmerites (with up to 50% of biotite/phlogopite and lower amounts of apatite and oxides), Mg- and Ca-carbonatites.

Kamafugites show high Ba (4257-6234 ppm), Th (27-30 ppm), La (272-307 ppm) and low Yb (2-3 ppm) contents, with high La/Ybn ratio (90-102). Clinopyroxenite shows high Ba (810 ppm), La (144 ppm) and low Th (10 ppm), Yb (1 ppm) contents, with high La/Ybn ratio (81). Glimmerite shows high Ba (978 ppm), Th (24 ppm), La (143 ppm) and low Yb (1 ppm) contents, with high La/Ybn ratio (80). Apatitites show high Ba (618-10620 ppm), Th (30-990 ppm), La (405-1390 ppm), low Yb (2-3 ppm) contents, with high La/Ybn ratio (80-556). Magnetitites show high Ba (400-4780 ppm), Th (192-1610 ppm), La (120-365 ppm) and low Yb (1-2 ppm) contents, with high La/Ybn ratio (116-246). Carbonatites show high Ba (2606-22370 ppm), La (388-656 ppm) and low Yb (2-6 ppm) contents, and variable values of Th (5-97 ppm), with high La/Ybn ratio (74-157).

Despite to the wide range of chemical composition, the Catalão rocks show relatively narrow ranges of <sup>87</sup>Sr/<sup>86</sup>Sr (0.7051-0.7058) and εNd values (-8 to -5). Oxygen and carbon isotopic ratios were determined on calcite and dolomite crystals of carbonatites. δ<sup>18</sup>OSMOW values range from +8.4‰ to +9.4‰, slightly higher than the range of primary carbonatite estimates (+6.0‰ to +8.5‰). The δ<sup>13</sup>CPDB (-6.3‰ to - 5.7‰) is within the typical range of primary carbonatite values (-7.3‰ to - 5.1‰).

Petrological modeling suggest for the kamafugites an origin from small degrees partial melting of an highly metasomatized lithospheric mantle source. Taking also in consideration the overall isotopic, mineralogical, and geochemical similarities, kamafugites can be considered parental melts from which all the other lithologies derived either as cumulates (e.g., apatitites, glimmerites, magnetitites) or as products of separation of immiscible melts (e.g., carbonatites).

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