

MINERAL-CHEMISTRY FINGERPRINTS OF LIQUID IMMISCIBILITY AND FRACTIONATION IN THE TAPIRA ALKALINE-CARBONATITE COMPLEX (MINAS GERAIS, BRAZIL).

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The Tapira complex is the southernmost of a series of carbonatite-bearing intrusions occurring in the Alto Paranaíba region, southeast Brazil. Together with kamafugites, lamproites and kimberlites, these carbonatite complexes form the Late-Cretaceous Alto Paranaíba Igneous Province (APIP). Whole-rock and mineral chemistry data point to a strong kamafugitic affinity of Tapira primitive magmas. The complex is composed of several intrusions of carbonatites and volumetrically-dominant silicate rocks, emplaced into the Late-Proterozoic Brasília mobile belt. Compositional variations in olivine, clinopyroxene, phlogopite, perovskite and garnet from a range of Tapira rock-types cannot be reconciled with simple fractionation processes operating in a single magma chamber. Instead, they point to a multi-stage evolution history. The interplay of alternating liquid immiscibility and fractionation episodes can be pinpointed by using mineral chemistry evidence, such as: a) sharp increase or decrease in the content of immiscibility-sensitive elements within single crystals; b) unexpected sudden shifts in the direction of fractionation-related trends; c) presence of carbonatite-like chemical signatures in minerals from silicate rocks (and vice-versa); d) relatively evolved composition of minerals from presumably unevolved host rocks. The observations made from mineral chemistry are consistent with textural evidence and with the whole-rock chemical behaviour of fine-grained dykes.