

GUARINO, Vincenza; LUSTRINO, Michele; ZANETTI, Alberto; TASSINARI, Colombo Celso Gaeta; RUBERTI, Excelso; DE'GENNARO, Roberto; MELLUSO, Leone. Mineralogy and geochemistry of a giant agpaitic magma reservoir : the Late Cretaceous Poços de Caldas potassic alkaline complex (SE Brazil). *Lithos*, v.398-399, p. art.106330/1-23, Oct.2021. Disponível em: <https://doi.org/10.1016/j.lithos.2021.106330>. Acesso em: 19 julho 2021.

ABSTRACT

The Late Cretaceous (~78 Ma) Poços de Caldas massif is the largest alkaline complex in Brazil and the second in the world by extension (>800 km²). It is considered the westernmost outcrop of the Cabo Frio magmatic lineament, in the northern sector of Serra do Mar potassic-ultrapotassic igneous province, central-eastern Brazil. The outcropping rocks are peralkaline phonolites (~80%) and nepheline syenites (~15%) with rarer (<5%) basic-ultrabasic rocks (leucite basanites, basanites, basalts and lamprophyres). The phonolites have different levels of volatile (F and Cl) and other trace elements, which tend to decrease with increasing evolution, due to removal of F-, Mn-, HFSE- and REE-rich accessory phases accompanying cotectic alkali feldspar and nepheline. The geochemical variability of titanite, eudialyte, F-disilicates, aenigmatite, lamprophyllite, clinopyroxene, amphibole and other phases indicate the effects of removal of accessory phases and the presence of independent liquid lines of descent in the various intrusive pulses. The initial Sr–Nd isotopic ratios of the basic-ultrabasic lavas [$^{87}\text{Sr}/^{86}\text{Sr}_i = 0.70440\text{--}0.70498$; $\epsilon\text{Ndi} = -3.7$ to -1.2] are within the range of the other Late Cretaceous–Paleogene rocks of the northern sector of Serra do Mar, indicating a highly metasomatized K-rich lithospheric source. Nepheline syenites and phonolites have Sr Nd isotopes largely overlapping with that of the basic-ultrabasic lavas ($^{87}\text{Sr}/^{86}\text{Sr}_i = 0.70503\text{--}0.70540$ and $\epsilon\text{Ndi} = -3.9$ to -2.5 for nepheline syenites; $^{87}\text{Sr}/^{86}\text{Sr}_i = 0.70511\text{--}0.70527$ and $\epsilon\text{Ndi} = -3.4$ to -3.2 for phonolites). Prolonged fractional crystallization processes dominated by clinopyroxene removal from melts with compositions resembling those of the basic-ultrabasic compositions can produce residual liquids qualitatively comparable with those represented by the phonolites and nepheline syenites.