

## **Pedostratigraphic analysis by geochemical mobility of an alkaline rock from Poços de Caldas volcanic caldera, Brazil**

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Poços de Caldas region fits into the Mantiqueira Province, within Varginha Complex, which comprises amphibolitic to granulitic rocks. It corresponds to one of many intrusions that occurs in the Southern Brazil Alkaline Province, along two distinct alignments, in the NE direction along the Brazilian coast and another NW, which develops from the coast. Considered as a volcanic caldera, it comprises a suite of plutonic and volcanic rocks classified mainly as phonolites and nepheline syenite. The study site is in an outcrop soil that has approximately 8 m high and 50 m long, made up of a succession of different highly weathered materials defined by truncated horizons, where ten stratigraphic / pedostratigraphic profiles were delimited. The mineralogical analysis and the major elements composition were quantified by X-ray diffractometer Siemens D 5000 and spectrometer Philips PW2400 respectively. The Hacker diagram and geochemical mass balance indicated that sodium, calcium, magnesium and potassium oxides are usually the first to be removed in the weathering process, followed by silica, which generally does not occur with the aluminum, titanium and iron oxides. Thus it was used the diagram  $(CaO+Na_2O)/(Al_2O_3+Fe_2O_3+TiO_2)/(K_2O)$  that evaluated the samples behavior against weathering and indicated two trends of weathering for the profiles: (1) loss of  $Ca^{2+}$  and  $Na^+$ , in order to form smectite that has already been weathered into kaolinite and oxide clays; (2)  $K^+$  loss to form illite, still present in the profiles, then kaolinite and oxides clays. This indicates in (1) an advanced weathering process (monossialitization and alitization), common in warm tropical zones with humid climates. And in (2) a moderate weathering (bissialitization, monossialitization and alitization) common in arid areas, also observed in molar ratio  $(SiO_2/Al_2O_3)$  or ki index and X-ray diffraction. This dynamic can also be attributed to endogenous and exogenous processes, ie, fluctuations in water level indicated by paleo lakes traces (Plinthosols) superposed by flows of coarser sediments at the base of the profile and recent tectonic activity, indicated by levels of faulted laterites on the upper profiles.