

## Geochemical characterization of alkaline gneissic rocks of Alentejo (Portugal)

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This study presents and interprets, on a petrological/petrogenetic point of view, a set of mineral and whole-rock geochemical data collected from the so called “Alkaline Province of Northeast Alentejo”, a group of gneisses that outcrops in lithostratigraphic domains known as Ossa-Morena Zone and Blastomilonitic Belt. It's composed by felsic gneissic rocks of (per)alkaline type, represented by syenites with sodic inosilicates (riebeckite and/or aegirine), nefelinic syenites and hastingsitic syenites, as well as hedenbergitic granites. Most of riebeckitic syenites presents  $(Zr/Nb) < 10$ ,  $(Y/Nb) < 0.7$  e  $(Th/Nb) < 0.3$ , while hastingsitic ones and hedenbergitic granites reveal higher values of these ratios (15.0, 2.0 e 0.6, respectively). The highest contents of Zr (4800 ppm) are also observed on peralkaline terms, with minimum values measured on alkaline granites (135 ppm). Maximum contents of F (6100 ppm) and Cl (7233 ppm) have been determined on riebeckitic and nefelino-sodalitic syenites, respectively, and seems that halogenous contents may be correlated with devolatilization processes, deformation/micro-fracturation and REE mobility. Even though irregular crystallization of phases which consume high contents of REE (e.g. allanite) can disturb the correspondent geochemical signatures, it is still possible to identify, in most of the cases, distinctions between maximum values of  $(La/Sm)_N$ ,  $(La/Lu)_N$  and  $(Gd/Lu)_N$  of peralkaline rocks (29.6, 11.6, 2.4), hastingsitic syenites (14.8, 4.8, 2.0) and alkaline granites (4.0, 3.1, 1.7). Riebeckitic and nefelinic facies present, simultaneously, the sharpest negative anomalies of Ti and the less marked negative anomalies of Nb (means of 0.9 and 0.7), which can be interpreted as a result of differentiation processes with small to moderate contributions of crustal contamination; comparatively, this anomaly is higher in hastingsitic (0.6) and granitic terms (0.4). Obtained in a small set of mafic and felsic samples, Rb-Sr and Sm-Nd isotopic data, show the vulnerability of the first system to post-magmatic processes. Peralkaline rocks show  $(+2.5 < \epsilon Nd_{480} < +4.9)$  values which reflect the origin of these magmas from time-integrated depleted mantle sources, that were enriched in LREE at the time of, or shortly before, the igneous episode in an intracontinental rift setting. Sr-Nd petrogenetic modelling adds complementary information: i.) intracontinental alkaline character of (primary) basaltic magmas as precursors of this alkaline province; ii.) low to moderate crustal contamination during differentiation processes, namely 7% to 20% for peralkaline syenites and about 26% for alkaline granites.