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First approach to geochemical study of São Jorge lavas, Azores

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São Jorge Island (38º46' – 38º33'N and 28º20' – 27º45'W) belongs to the Azores archipelago and is located in a complex tectonic setting containing the junction of the American, Euroasiatic and Nubia tectonic plates. East of the Mid Atlantic Ridge, São Jorge developed by fissural volcanic activity along fractures with the regional WNW-ESE trend with right-lateral strike slip motion (Lourenço et al., 1998), presenting aligned volcanic cones and structures that reveals an important relation between tectonics and volcanic activity. Stratigraphically the island developed during three main volcanic phases (Forjaz & Fernandes, 1975), giving place to Topo complex in the east, Rosais complex in the west and to Manadas complex that covered the center of the island and the contact between the previous two.

São Jorge lavas, frequently porphyric, are dominantly alkaline with Y/Nb $\leq$ 1.0, and experience some degree of differentiation extending from basanite and tefrite to basaltic trachy-andesite composition, pointing to magma fractionation processes before erupting. This process is more evident in São João lava sequence, from Topo complex, where the porphyric lavas have more evolved composition (Mg#: 0.22-0.37), presenting highly developed zoned plagioclase fenocryst.

Primitive lavas (Mg#$>$0.40) from São Jorge will allow to characterized initial magma composition. For this we used rare earth elements (REE) normalized to chondritic values (Sun & McDonough 1989) and found fractionation between Light REE and

Heavy REE ((La/Yb)n: 6.99-18.61) indicating an LREE enriched source, as is common in ocean island basalt, where garnet is present. In addition, the samples present low K negative anomaly, especially in Rosais that combined with high Ba/Ce (3.4-5.0) points to a source composition that might have a mineralogical phase enriched in K as amphiblole or phologite as reported in other Atlantic Ocean islands (Halliday et al., 1995; Mata, 1996; Ribeiro, 2001).

Some intra and inter-complexes differences that affect magma composition were found in (Tb/Yb)n ratio that is higher in Rosais and Cubres set from Topo complex, and in Rb, Ba, K and Th concentrations that are higher in Rosais complex. This might result from lower degrees of partial melting (higher incompatible element concentration), deeper mantle source or slightly differences in source composition.

The question remains in how the magma composition has differentiated and how intra and inter-complexes composition differences have influenced the lava sequence composition and mineralogy.