ABSTRACT

The Canary Islands are an example of intra-plate volcanism in the ocean environment, characterized by alkaline magmatism. On the youngest of these islands, Fuerteventura, a volcano of Miocene age reached maximum peak altitude at 3,000 metres at the time, before being rapidly eroded by a gigantic landslide. The plutonic rocks located at the volcano's base and grouped under the term Fuerteventura basal complex are accessible as outcrop today, hence enable a unique opportunity to study the root zone of the volcano. Vega de Rio Palmas, the subject of this study, is an annular complex dated at 20.6 ± 1.7 Myr and it is part of this set of plutons. This intrusion is mainly composed of syenites, but also intermediate and gabbroic rocks, set in lenses that alternate in a concentric geometry. Nearby Vega is situated the pluton PX1 dated at 22 Myr, which consists of a dense network of entangled dykes. E.Tornare (2016) has shown that this intrusion represents the feeding channels of the Miocene volcano. These dykes are essentially composed of olivine-rich wehrlites, pyroxenites and gabbros. These rocks are formed within the conduits under a dynamic context by segregation and thickening of the minerals with each new injection of magma. The formation of any one of these rocks depends mainly on the system's ability to extract the interstitial liquid. If it is extracted, as a result of tectonic movements, the final rock is a pyroxenite. If the liquid is retained and has the ability to cool, plagioclases crystallize in the interstices and the rock is then a gabbro.

The presente work proposes 3 hypothesis to explain the genesis of the differentiated magmatic rocks of Vega's complex related to PX1 intrusion. The main hypothesis is associated to the extraction of the interstitial liquid during the cristallization of pyroxenites. Thus, this residual liquid could be the magma source of the differentiated rocks of Vega's pluton. The second hypothesis proposes that the partial melting of the embedding rock related to the dike intrusion of PX1 could have generated the differentiated liquid as the source of Vega's intrusion. Finally, the last hypothesis suggests that the establishment of a

high-temperature zone within the upper crust, although less thermally mature than PX1 pluton, could potentially create the right environment for the genesis of a differentiated rock intrusion.

The results obtained from the major elements show that it is not possible to form syenitic rocks by the extraction of residual liquids directly from PX1 pyroxenites. Therefore, a multi-stage extraction should be considered. A simple quantitative model based on the composition of the major elements was applied in order to achieve a realistic prediction of the successive extractions, leading to Vega's differentiated rocks from the most primitive ones of PX1. According to this model, it appears that monzonites can be generated by extracting the interstitial liquid from a monzodioritic magma. Vega's foid-gabbros represent the cumulative rocks resulting from this extraction. Trace elements applied to the quantitative model also corroborate with the results obtained. Consequently, this means that the system is still able to produce syenites during later events. The strong negative strontium anomaly and the drop in the Ba/La ratio related to the most differenciated Vega'syenites allow to conclude that these rocks would be the result of a very high fractionation of feldspaths, however the viscosity of the magma prevents such fractionation from occurring. The extraction and migration of the last residual liquids from a *mush,* within a highly evolved system, seems to be required to explain the presence of ultra-differentiated syenites within the Vega's intrusion.

Keywords: *alkaline magmatism, Fuerteventura basal complex, Vega de Rio Palmas ring complex, PX1 pluton, syenite rocks.*