# Quantitative model of fractional crystallization for the shoshonitic lava series of the Vancori complex of Stromboli volcano (Sicily, Italy).

*Study carried out in 1982; ULg.*


*ABSTRACT*

*Available chemical data indicate that the evolution of the shoshonitic lavas outcropping within the Vancori complex of Stromboli is mostly controlled by fractional crystallisation at shallow depth. A quantitative approach of the differenciation by least-squares computer method was tested in this study.*

*The results show that three crystal-liquid fractionation processes possibly took place from very alike magmas, under different ($pH_20$-$pO_2$) conditions. The bulk compositions of these assumed parental magmas are closely similar to that of the most liquid currently erupted by the volcano. Their distinct incompatible element distributions can be explained, in the light of a previous study, by metasomatic contamination having affected, with variable rates in time, the upper mantle area overlying the descending Calabrian slab of oceanic lithosphere.*

*With respect of a common primary liquid, the composition of the presently erupted magma suggests that it was produced by a moderate removal of Mg-olivine plus minor Cr-spinel and possibly orthopyroxène, at high depth. The mixing calculations for major elements are mostly supported by trace element behaviour and they show that the low-pressure fractionation processes mainly involved, in variable proportions, the settling of augitic clinopyroxene and calcic plagioclase with minor subtraction of magnesian olivine – or bronzitic orthopyroxene at an advance stage of differenciation – and Fe-Ti oxide minerals.*

*As suggested by petrological data as well as the iron enrichment pattern, different $f0_2$ conditions are recorded during the evolution of the most primitive magmas.*



Alain Melchior



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*Lab. Ass. Géologie, Pétrologie, Géochimie; Université de Liège, B-4000 Sart-Tilman (Belgium)*