Geophysical Research Abstracts, Vol. 7, 01228, 2005
SRef-ID: 1607-7962/gra/EGU05-A-01228

The Nature of Primary Magmas of the Chaîne des Puys (Massif Central, France): a Melt Inclusion Approach

S. Jannot (1), P. Schiano (1), P. Boivin (1), L. Ottolini (2)

1 (1) Laboratoire Magmas et Volcans, OPGC-Université Blaise Pascal-CNRS, 5 rue Kessler, 63038 Clermont-Ferrand, France, (2) C.N.R.-Istituto di Geoscienze e Georesorse (IGG), Sezione di Pavia, Via Ferrata, 1, I-27100 Pavia, Italy

s.jannot@opgc.univ-bpclermont.fr/ Fax: +33 4 7334 6744

The Massif Central area, characterized by a typical intraplate alkaline serie, is the largest magmatic province of the West-European Rift system. Although it has been the subject of several studies, the nature of Massif Central sources is still a matter of debate and many hypotheses are proposed, including deep-rooted continental hotspot, metasomatised spinel lherzolites and an asthenospheric flow linked to the lithospheric root of the Alpine chain.

The Chaîne des Puys is the last magmatic province of the French Massif Central and is composed of hundred young well-preserved volcanoes. The present work aims to supply information on the nature and the origin of the source chemistry of alkaline serie from the Chaîne des Puys, by characterizing the trace and major element composition of minute melts preserved as quenched glass inclusions inside olivine phenocrysts in scoria from several volcanoes of this volcanic province.

Heating stage experiments performed at ambient pressure on partially crystallised primary melt inclusions suggest CO_2 oversaturation of the trapped melt with variable entrapment temperatures between 1170˚C and 1250˚C $\pm$10˚C. Daughter mineral analyses indicate a Ti-and Ca-rich basaltic paragenesis, which correspond well with the paragenesis of erupted basalts from this volcanic chain.

Inclusions trapped in the more primitive olivine phenocrysts have alkali-basalt compositions that fall on the primitive end of the compositional trend defined by the lavas of the Chaîne des Puys. Their major element chemistry rules out the hypothesis of a mantle source in the spinel stability field and requires a garnet-bearing mantle source. Analyzed for trace-element by SIMS, they display enriched patterns similar to those characterizing EM-type basalts, i.e., magmas related to mantle sources involving continental-derived materials. The compilation of trace-element data on several volcanoes of the Chaîne des Puys will not only enable us to discuss the evolution of these melts, but possibly help constraining the potential source(s) that contribute to this volcanic system.

In addition, petrological evidence (i.e., hydrous daughter phases), as well as low total oxide contents, suggests that H_2O could play a significant role during evolution of the Chaîne des Puys parental magmas.