On the conditions of mafic-felsic magmas mixing and its bearing on andesite production in the crust
Bruno Scaillet, Mickael Laumonier, Michel Pichavant, Rémi Champallier, Joan Andújar, Laurent Arbaret

To cite this version:
Bruno Scaillet, Mickael Laumonier, Michel Pichavant, Rémi Champallier, Joan Andújar, et al.. On the conditions of mafic-felsic magmas mixing and its bearing on andesite production in the crust. EGU General Assembly 2015, Apr 2015, Vienne, Austria. 17 (EGU2015-7248), 2015, Geophysical Research Abstracts. <insu-01298817>

HAL Id: insu-01298817
https://hal-insu.archives-ouvertes.fr/insu-01298817
Submitted on 6 Apr 2016

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers. L’archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.
On the conditions of mafic-felsic magmas mixing and its bearing on andesite production in the crust

Bruno SCAILLET (1), Mickael LAUMONIER (2), Michel PICHAVANT (1), Rémi CHAMPALLIER (1), Joan ANDUJAR (1), and Laurent ARBARET (1)
(1) ISTO, CNRS-Université d’Orléans-BRGM, 1a rue de la Férollerie, 45071 Orléans, France, (2) Bayerisches Geoinstitute, BGI, Bayreuth, Germany

Mixing between magmas is thought to affect a variety of processes, from the growth of continental crust to the triggering of volcanic eruptions, but its thermophysical viability remains unclear. Here, using high pressure mixing experiments, we show that mixing only occurs at low viscosity contrast, when the touching crystal network of the more viscous magma breaks down. Using thermal calculations, we show that hybridization requires injection of high proportions of the replenishing magma during short periods. The incremental growth of crustal reservoirs limits the production of hybrids to the waning stage of pluton assembly and to small portions of it. Large scale mixing appears to be more efficient at lower crustal conditions, but requires higher proportions of mafic melt, hence produces hybrids more mafic than in shallow reservoirs. Altogether, hybrid arc magmas correspond to periods of enhanced magma production at depth.