

## Melt inclusions constrain S behaviour and redox conditions in Etnean magmas

Mimma Emanuela Gennaro, Giada Iacono-Marziano, A Rizzo, Antonio Paonita, Marcello Liotta, Michel Pichavant, Caroline Martel, Silvio G. Rotolo

### ► To cite this version:

Mimma Emanuela Gennaro, Giada Iacono-Marziano, A Rizzo, Antonio Paonita, Marcello Liotta, et al.. Melt inclusions constrain S behaviour and redox conditions in Etnean magmas . Goldschmidt Conference, Jun 2016, Yokohama, Japan. Goldschmidt Conference. <insu-01547128>

HAL Id: insu-01547128

<https://hal-insu.archives-ouvertes.fr/insu-01547128>

Submitted on 4 Jul 2017

**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.

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/305748631>

# Melt inclusions constrain S behaviour and redox conditions in Etnean magmas

Conference Paper · June 2016

CITATIONS

0

READS

43

8 authors, including:



**Andrea Luca Rizzo**

National Institute of Geophysics and Volcano...

113 PUBLICATIONS 802 CITATIONS

SEE PROFILE



**Marcello Liotta**

National Institute of Geophysics and Volcano...

47 PUBLICATIONS 348 CITATIONS

SEE PROFILE



**Michel Pichavant**

CNRS Orleans Campus

95 PUBLICATIONS 2,609 CITATIONS

SEE PROFILE



**Silvio G. Rotolo**

Università degli Studi di Palermo

54 PUBLICATIONS 515 CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:



Geochemistry of fluids emitted from Kolumbo underwater volcano (Greece) [View project](#)



Sulfur behavior in Etna magmas [View project](#)

All content following this page was uploaded by [Emanuela Gennaro](#) on 01 August 2016.

The user has requested enhancement of the downloaded file.

## Melt inclusions constrain S behaviour and redox conditions in Etnean magmas

E. GENNARO<sup>1,2</sup>, G. IACONO-MARZIANO<sup>2</sup>, A.  
RIZZO<sup>3</sup>, A. PAONITA<sup>3</sup>, M. LIOTTA<sup>3</sup>, M.  
PICHAVANT<sup>2</sup>, C. MARTEL<sup>2</sup>, S. ROTOLO<sup>1,3</sup>

<sup>1</sup>DiSTeM, University of Palermo (Italy)

<sup>2</sup>ISTO, UMR 6113 CNRS-Université d'Orléans  
(France) (\*correspondence:  
emanuela.gennaro@cnrs-orleans.fr)

<sup>3</sup>INGV, Palermo (Italy)

Mount Etna is a complex magmatic system characterized by a continuous variability both in terms of eruptive style and composition of erupted products. Currently, its volcanic activity is marked by high gas fluxes (of above all SO<sub>2</sub>), both during eruptive and non-eruptive periods.

In this study, we have studied the volatile contents and Fe speciation of olivine-hosted melt inclusions from 6 eruptions of the last 15 ky, mainly to investigate the behavior of S during ascent and differentiation of Etnean magmas.

Samples selected come from the FS eruption which is the most primitive (picritic composition, Fo<sub>91</sub>), Mt Spagnolo (the oldest) and from more recent eruptions: 2002/3, 2006, 2008, and 2013.

S concentrations in glass inclusions are extremely variable, from a few hundred ppm in recent lavas up to 4000 ppm in the older Mt Spagnolo products (Fo<sub>88</sub>). This variation broadly correlates with the degree of differentiation of the melt, as expressed by the major element (SiO<sub>2</sub>, K<sub>2</sub>O) chemistry. However, both degassing and variations in redox conditions influence the S behavior, as revealed by variations in volatile concentrations, sulfide saturation and Fe speciation in melt inclusions.

Fe<sup>3+</sup>/ΣFe spectra in some glass inclusions were collected by XANES synchrotron radiation. Results span a large range of Fe<sup>3+</sup>/ΣFe ratios, generally decreasing from the most primitive (FS) to the most recent (2013) melts. Fe<sup>3+</sup>/ΣFe ratios were used for estimating the redox conditions of Etnean magma, yielding quite oxidizing and fairly variable *f*O<sub>2</sub>.

Interpretation of the glass inclusion data (notably S content and Fe speciation) uses hydrous and S-bearing basaltic experimental glasses synthesized in the range of conditions (P, T, *f*O<sub>2</sub>) relevant to the Etnean system. Results corroborate an important control of *f*O<sub>2</sub> and of the melt Fe concentration on the S concentration of Etnean glasses.