

# Curriculum Vitae

## Daniele Giordano

### *Personal data:*

Geological Sciences Department  
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*Present position:* Researcher at the Geological Sciences department of the Third University of Rome

### *Present research:*

- Experimental characterisation and modelling of the rheological (viscous to brittle) and thermodynamic properties of single and multi phase silicate melts of interests for the volcanology, metallurgy and glass industry. Application to understanding sin- and post-eruptive (e.g., welding, remobilization, flow of lava) processes.
- Spectroscopic analysis (FTIR, microRaman) of silicate melts for the comprehension of structural variations that produce the significant variation of physical properties. Modelling of the relationships between spectroscopic feature and composition for anhydrous and volatile bearing melts.
- Fluid-dynamic modelling for the simulation of magma ascent along eruptive volcanic conduit and application to volcanic hazard forecast.

### **Main technical-scientific interests:**

#### a) *Scientific field:*

Experimental Volcanology and physics of Volcanism.

#### *Topics:*

- Investigations of the physical and thermodynamic properties of natural magmas and synthetic equivalents with varying thermodynamic properties (P, T):
  - a) modelling of the properties and their influence on volcanic and igneous processes;
  - b) application to the eruption dynamics processes by the numerical simulation approach.
- Spectroscopic analyses (FTIR, Raman) applied to:
  - c) the investigation of the effect of the volatile content to the structure of silicate melts with varying P, composition and volatile content;
  - d) the investigation of the original volatile contents of glassy inclusions and volcanic glasses.

#### b) *Technical field:*

Experimental Volcanology laboratory creation.

Creation of an experimental volcanology laboratory to study the rheological, calorimetric and volumetric properties of single and multiphase silicate melt materials of geological interest. The laboratory setup will be constituted by the following apparatuses:

- High temperature (concentric cylinder) and low temperature (uniaxial press) rheometers;
- Differential Scanning Calorimetry (DSC) for the high and low temperature determination of specific heat and other physical properties;
- Thermomechanical analyser (TMA) for the dilatometric and micropenetration investigation of volumetric and rheological properties of single and multi-phase silicate melts;
- Hydrothermal cell for the investigation of a) viscoelastic deformation of natural materials under varying H<sub>2</sub>O pressure conditions; b) degassing and crystallization processes for materials of geological and industrial interest;
- High temperature furnaces for the syntheses of silicate materials;
- Karl Fisher titration (KFT) device for the evaluation of the dissolved H<sub>2</sub>O content in silicate glasses;

### **Education**

- 15 July 2002. PhD degree at the Institute of Mineralogy Petrology and Geochemistry (IMPG) of the Ludwig Maximilian University (LMU) of Munich (Germany). The thesis titled: "Experimental Determinations and Modelling of the Viscosity of Multicomponent Natural Silicate Melts: Volcanological Implications", was devoted to the characterization of the rheological and calorimetric properties of dry and hydrous natural multicomponent silicate melts, collected from active volcanic areas (e.g. Phlegrean Fields; Vesuvius; Tenerife; Povoaco; Stromboli; Nyiragongo; Etna; Unzen). The thesis was developed under the supervision of professor

D.B. Dingwell in collaboration with P. Papale of the National Institute of Geophysics and Volcanology (INGV), Italy and C. Romano of the Dept. of Geological Sciences of the Third University of Rome;

- 21 march 1997. Laurea (master degree) in Geological Sciences at the Department of Earth Sciences of the University of Pisa with marks 103/110. The thesis entitled: "The 1631 Vesuvius eruption: mineralogical and petrographic study and simulation of the ascent of magma along the eruptive conduit" (L'eruzione del Vesuvio del 1631: studio mineralogico e petrografico e simulazione dell'ascesa del magma lungo il condotto eruttivo) was developed within the Volcanic Simulation Groups (GSV) of the University of Pisa, having as supervisors Prof. M. Rosi and Dr. P. Papale.

### Research grants and awards

- March 2007. Contract research assignment at the Dept. of Geological Sciences of the Third University of Rome for the creation of an experimental volcanology laboratory (supported by the "Funds of Basic Research" Italian project FIRB AIRPLANE 2007-2010);
- June 2004-November 2005. Izaak Walton Killam research grant *award* at the Dept. of Earth & Ocean Sciences (EOS) of the University of British Columbia, Vancouver B.C. – Canada;
- From may 2003 to march 2007. Research collaboration assignment at the Dept. of Geological Sciences of the Third University of Rome;
- September 2002 – February 2003. Postdoc fellowship within the International Quality Network: Georisk (IQN-Georisk) program, supported by the German Academic Exchange Service (DAAD).
- 1 September 2000 – 30 November 2001. GNV (National Volcanology Group, Italy) study grant in the context of the GNV project n° 27, whose responsible was Dr. P. Papale;
- March 1999 – August 2000. Development of the EU ENV4-CT98-0703 (TMR) grant;
- August 1998 – February 1999. Development of the FMRX-CT96-0063 (TMR) grant;
- June 1998 – August 1998. Development of a EU (TMR) LSF grant;
- 01 February- 31 May 1998. Research contract within the context of "The geomorphological cartography of Victoria Land – Antarctica" supported by Dr. Carlo Baroni.-

### Professional research assignments

- 01-06-2007/29-06-2007. Research assignment for the "Rheological characterisation of natural products" at the Geological Sciences Dept. Of the Third University of Rome;
- 15 April – 15 July 2004. Research contract with Dr. Roberto Moretti of the Vesuvian Observatory, Naples, Italy – INGV on the theme: "Employment of the polymeric model for the parameterisation of the rheological properties of silicate melts";
- 15 August – 15 October 2003. Research contract with Dr. Paolo Papale (INGV – Pisa) on the theme: "Modelling of the viscosity of magmatic liquids with variable amount of dissolved water in the region of eruptive conditions";
- 01 April – 31 June 2003. Research contract within the context of "MULTIMO" (Multi-disciplinary Monitorino, Modelling and Forecasting of Volcanic Hazard) project – European Commission;
- Collaboration with Prof. M. Rosi of the Dept. of Earth Sciences of the University of Pisa has been carried out in the last 5 years through research assignments covering a 23 months period (08-November 2001 08-March-2002; 01-02-2001/01-04-2001; 11-05-2000/11-07-2000; 03-06-1999/03-12-1999; 05-10-1998/05-12-1998).

### Research collaborator within the following projects:

**PRIN** (*Progetti di Ricerca di Interesse Nazionale – National Interest Research Project*) and **FIRB** (*Fondi Italiani per la Ricerca di Base – Italian Funds of Basic Research*) projects supported by the Italian Ministry of Education and Research (MIUR):

- PRIN 2008-2010 – Physical and chemical properties of volatile-bearing silicate melts: experiments, modelling and application to volcano degassing;
- FIRB 2007-2010 - Progetto AIRPLANE – "Laboratorio di Vulcanologia Sperimentale" - Experimental Volcanology Laboratory

*National Volcanology Group (GNV) – Italy:*

- GNV project 2005-2007. Subproject V3\_6 – Etna, Task 2, UR12;
- GNV project 2005-2007. Subproject V3\_2 – Campi Flegrei, Task 6, UR17;
- GNV project 2005-2007. Subproject V3\_4 – Vesuvio, Task 1, UR05;
- Triennial GNV 2001-2003/17 project "Simulation of eruptive scenarios at Phlegrean Fields on the basis of field, laboratory, and experimental studies, and implications of volcanic hazard",;

- Triennial GVN 2001-2003/9 project "Numerical and textural studies of magma fragmentation in explosive eruptions",;
- GNV project – Nyiragongo "Physico-chemical investigation of volcanic products erupted during the January 2002 eruption, and simulation of possible lava flow paths, aimed at volcanic hazard mitigation",;

*European Commission projects:*

- "Exploris": (Explosive Eruption Risk and Decision Support for EU Populations Threatened by Volcanoes) - progetto: EVR1-CT-2002-40026;
- "MULTIMO" (Multi-disciplinary Monitoring, Modelling and Forecasting of Volcanic Hazard) European Commission project;

*National Sciences and Engineering Research Council (NSERC) of Canada:*

- NSERC Grant (*Research Tools and Instruments grants are for fostering and enhancing the discovery innovation and training capability of university researchers in natural sciences*). Title: High-T Apparatuses to Study Feedback between Porosity, Permeability, Magma Rheology and Volcanic Eruption Style. EOS, UBC, Vancouver - Canada.

**Main research collaborators:**

- Dr. C. Romano, Dr. G. Giordano, Prof. F. Barberi - Geological Sciences department of the Third University of Rome;
- Prof. J.K. Russell – EOS – UBC , Vancouver B.C., Canada
- Prof. D.B. Dingwell – Dept. Of Earth & Environmental Sciences of the LMU Munich, Germany;
- Dr. A. Di Muro – Laboratoire PMMP, UMR, University of Paris, France;
- Dr P. Papale, Dr M. Pompilio and Dr. M. Polacci INGV, Pisa, Italy;
- Prof. R. Cas, Monash University, Melbourne, Australia;
- Prof. M.W. Schmidt, Prof. P. Ulmer, Dr. L. Burlini, ETH Zurich, Switzerland;
- Dr. R.A. Corsaro INGV, Catania, Italy;
- Dr. C. Soriano – Earth Sciences dept."Jaume Almera" – Barcelona, Spain;
- Dr. R. Moretti , Dr. M. Piochi – Vesuvian Volcanology Observatory (Osservatorio Vesuviano), INGV, Napoli;
- Prof. M. Nowak – Geological Sciences dept., University of Tübingen, Germany;
- Prof. H. Behrens – Institute of Mineralogy, University of Hannover, Germany;
- Prof. M. Rosi –Earth Sciences dept., University of Pisa, Italy

**Known Languages:**

Italian native  
 English good knowledge  
 Spanish good knowledge  
 German basic

**Editorial activity - Reviewer for the following international ISI journals and research institutions:**

- American Mineralogist;
- Geochimica et Cosmochimica Acta;
- Chemical Geology;
- Journal of Volcanology and Geothermal Research;
- Bulletin of Volcanology;
- Mineralogical Magazine;
- Physics and Chemistry of Minerals

*Research institutions:* National Science Foundation (NSF, USA)

**Computer Skills:**

Operative Systems: Windows 95, 98, NT, XP, MacIntosh, UNIX and DOS fundamentals.  
 Applications and programming: Office package, SigmaPlot, Kaleidagraph, MathCad, Adobe, Canvas, Corel Draw, Cricket-Graph, Microcalorigin, FileMaker, Matlab, Visual basic, HTML, Fortran fundamentals.

**Attended specialization courses and workshops:**

4 - 9 June 2000. Specialization course on the use of the Cameca 50 SX microprobe. Prof. T. Fehr, IMPG Munich University;

10 - 14 July 2000. Progresses in rheological investigations. Prof. D. Dingwell, IMPG Munich University;  
22-27 September 2002. 3rd workshop on non-equilibrium phenomena in supercooled fluids, glasses and amorphous materials. Pisa – Italy;  
7-11 October 2003. 7th Silicate melt workshop. La Petit Pierre, Strasbourg – France.

### Lectures

March - April 2004, cycle of lectures (8 hours) on behalf of Prof. M. Rosi within the course of Physics of Vulcanism. The lectures were held at the Dept. of Earth Sciences of the Pisa University.

March 2003, cycle of lectures (8 hours) on behalf of Prof. M. Rosi within the course of Physics of Vulcanism. The lectures were held at the Dept. of Earth Sciences of the Pisa University.

### List of publications:

1. A model for the viscosity of rhyolite as a function of H<sub>2</sub>O -content and pressure: a calibration based on centrifuge piston cylinder experiments. Paola Ardia, D. Giordano, M.W. Schmidt. *Geochim. Cosmochim. Acta*, doi:10.1016/j.gca.2008.08.025;
2. MicroRaman Determination of Iron Redox State in Dry Natural Glasses: Application to Peralkaline Rhyolites and Basalts. A. Di Muro, N. Metrich, M. Mercier, D. Giordano, D. Massarre, G. Montagnac. *Chem. Geol.*, doi:10.1016/j.chemgeo.2008.08.013;
3. Influence of glass polymerisation on microRaman calibrations for total water determination: implications for the analyses of basaltic glasses. M. Mercier, A. Di Muro, D. Giordano, N. Metrich, M. Pichavant, R. Clocchiatti, G. Montagnac. *Geochim. Cosmochim. Acta*, doi:10.1016/j.gca.2008.09.030;
4. Viscosity and glass transition temperature of hydrous melts in the system CaAl<sub>2</sub>Si<sub>2</sub>O<sub>8</sub>–CaMgSi<sub>2</sub>O<sub>6</sub> (2008). D. Giordano, M. Potuzák, C. Romano, D.B. Dingwell, M. Nowak. *Chem. Geol.* 256 - doi:10.1016/j.chemgeo.2008.06.027;
5. Rheological properties of magma from the 1538 eruption of Monte Nuovo (Phlegrean Fields, Italy): an experimental study (2008). L. Caricchi, D. Giordano, L. Burlini, P. Ulmer, C. Romano. *Chem. Geol.* 256, 157-170;
6. Rheology of porous volcanic materials: High-temperature experimentation under controlled water pressure (2008). G. Robert; J.K. Russell; D. Giordano. *Chem. Geol.* 256, 215-229;
7. Viscosity of magmatic liquids: A model. D. Giordano, J.K. Russell, D.B. Dingwell. *Earth Planet. Sci. Lett.* 271, 123-134;
8. High-T deformation of volcanic materials in the presence of water (2008). G. Robert, J.K. Russell, D. Giordano, C. Romano. *American Mineralogist* 93, 74-80.
9. Texture and composition of pumices and scoriae from the campi flegrei caldera (Italy): implications on the dynamics of explosive eruptions (2008). M. Piochi, M. Polacci, G. De Astis, A. Zanetti, A. Mangiacapra, R. Vannucci, D. Giordano. *Geochem. Geophys. Geosyst.*, 9, Q03013, doi:10.1029/2007GC001746.
10. Thermo-rheological magma control on the impact of highly fluid lava flows at Mt Nyiragongo (2007). D. Giordano, M. Polacci, A. Longo, P. Papale, D. Dingwell, E. Boschi, M. Kasereka. *Geophys. Res. Lett.* 34, L06301, doi: 10.1029/2006GL028459.
11. A rheological model for glassforming silicate melts in the systems CAS, MAS, MCAS (2007). D. Giordano, J.K. Russell - *J. Phys.: Condes. Matter* 19, 205148.;
12. An expanded non-Arrhenian model for silicate melt viscosity: A treatment for metaluminous, peraluminous and peralkaline liquids (2006). D. Giordano, A. Mangiacapra, M. Potuzák, J.K. Russell, C. Romano, D.B. Dingwell, A. Di Muro - *Chem. Geol.* 229, 42-56;
13. Influence of composition and thermal history of volcanic glasses on water content determination by microRaman spectrometry (2006). A. Di Muro, D. Giordano, B. Villemant, G. Montagnac, C. Romano - *J. App. Geochem.* 21, 802-812;
14. A model for silicate melt viscosity in the system CaMgSi<sub>2</sub>O<sub>6</sub>-CaAl<sub>2</sub>Si<sub>2</sub>O<sub>8</sub>-NaAlSi<sub>3</sub>O<sub>8</sub>. J.K. Russell, D. Giordano - *Geoch. Cosmoch. Acta* 69, 5333-5349;
15. Glass transition temperatures of natural hydrous melts: a relationship with shear viscosity and implications for the welding process (2004). D. Giordano, A.R.L. Nichols, D.B. Dingwell. *Jour. Volc Geoth. Res.* 142, 105-118;
16. The combined effects of water and fluorine on the viscosity of silicic magmas (2004). D. Giordano, C. Romano, B. Poe, D.B. Dingwell and H. Behrens. *Geoch. Cosmoch. Acta* - 68, 5159-5168;
17. The viscosity of trachytes, and comparison with basalts, phonolites, and rhyolites (2004). D. Giordano, C. Romano, P. Papale and D. B. Dingwell *Chem. Geol.* - 213, 49-61;
18. Viscosity of peridotite liquid (2004). D.B. Dingwell, P. Courtial, D. Giordano, A.R.L. Nichols. *Earth Planet. Sci. Lett.* 226, 127-138;
19. PhD thesis 2002, published online at: <http://edoc.ub.uni-muenchen.de/archive/00000744/> (archivio LMU);
20. Dynamics of Magma Ascent and Fragmentation in Trachytic Versus Rhyolitic Eruptions. M. Polacci; P. Papale; D. Giordano; D. Del Seppia; C. Romano. *Jour. Volcanol. Geoth. Res.* 131, 93-108;
21. The dry and hydrous viscosities of alkaline melts from Vesuvius and Phlegrean Fields (2003). C. Romano, D. Giordano, V. Mincione, K. U. Hess, D. Dingwell and P. Papale. *Chem. Geol.* 202, 23-38;
22. High-temperature limits of non-Arrhenian silicate melts: Implications for modelling compositional dependencies (2003). J. K. Russell, D. Giordano, D.B. Dingwell. *Am. Mineralogist*, 88, 1390-1394;
23. The kinetic fragility of natural silicate melts (2003). D. Giordano and D.B. Dingwell. *J. Phys.: Condes. Matter* 15, S945-S954);
24. Non-Arrhenian Multicomponent Melt Viscosity: A Model (2003). D. Giordano & D.B. Dingwell *Earth Planet. Sci. Lett.* 208, 337-349;

25. Viscosity of Etna Basalt: implications for Plinian-style basaltic eruptions (2003). D. Giordano and D.B. Dingwell. *Bull. Volcanol.* 65, 8-14;
26. Modelling the non-Arrhenian rheology of silicate melts: numerical considerations (2002). J.K. Russell, D. Giordano, K.U. Hess and D.B. Dingwell *Eur. J. Mineral.* 14, 417-427;
27. Predicting shear viscosity during volcanic processes at the glass transition: a calorimetric calibration (2002). J. Gottsmann, D. Giordano, D.B. Dingwell. *Earth Planet. Sci. Lett.* 198, 417-427;
28. Viscosity of a Teide phonolite in the welding interval (2000). D. Giordano, C. Romano and D.B. Dingwell. *Jour. Volc Geoth. Res.* 103, 239-245;

#### Submitted papers:

1. Giant gas bubbles in a rheomorphic vent fill at the Las Cañadas caldera, Tenerife (Canary Islands). C. Soriano, D. Giordano, I. Galindo, M. Hürlimann, P. Ardia.
2. Predicting viscosity of natural hydrous silicate melts at glass transition temperatures. A.R.L. Nichols, D. Giordano, D.B. Dingwell;

#### Article in preparation:

- The rheological evolution of Vesuvius magmas. D. Giordano, P. Ardia, C. Romano, A. Di Muro, D.B. Dingwell, R. Cioni, M.W. Schmidt, A. Mangiacapra, K-U. Hess;
- Evaluating the effect of iron on modelling the Newtonian rheology of multicomponent silicate liquids. A. Mangiacapra, D. Giordano, K. Russell, M. Potuzak and D.B. Dingwell;
- The problem of fragmentation of low viscosity phonolitic magmas. Giordano D., Polacci M., Papale P., Romano C., Dingwell D. B.;
- Magma mixing and volatile transfer in the Mount Pinatubo (Philippines) reservoir. A. Di Muro, M. Semet, B. Villemant, A. Michel, D. Giordano;
- The effect of iron on the rheological properties of silicate melts. Potuzak, M.; Giordano, D.; Courtial, P.; Dingwell, D.B.;
- The rheology of sodium-aluminium-silica (NAS) system at peraluminous conditions. D. Giordano, C. Romano, D.B. Dingwell;
- A method to accurately evaluate the sample temperature on a commercial rotational rheometer. L. Andreozzi, M. Hvala, D.Giordano, G. Mojoli.

#### Reports:

1. Determination of the viscosity of phonolitic and trachitic magmas from Vesuvius and Phlegrean Fields. D. Giordano, C. Romano, P. Papale, D.B. Dingwell. 1<sup>st</sup> year Assembly - Programma Quadro – for the Survey and Research activity at Italyn active volcanoes, National Volcanology Group (GNV), Italy, Rome 9-11 october 2001;
2. Dynamics of magma ascent for trachitic and rhyolitic eruptions (2001) P. Papale e D. Giordano. 1<sup>st</sup> year Assembly - Programma Quadro – for the Survey and Research activity at Italyn active volcanoes, National Volcanology Group (GNV), Civil Protection Department, Italy, Rome 9-11 october 2001;
3. Experimental contribution to hazard evaluation at Vesuvius an Campi Flegrei (2001). C. Romano, K.U. Hess, D. Giordano, D.B. Dingwell, P. Papale. In: Bayerisches Forschungsinstitut für Experimentelle Geochemie und Geophysik Universität Bayreuth, Annual Report 1999;
4. Influence of water on the viscosity of Etna basalt. D. Giordano and D.B. Dingwell. In: Bayerisches Forschungsinstitut für Experimentelle Geochemie und Geophysik Universität Bayreuth, Annual Report 1999\_3.5 g.;
5. Viscosities of alkaline silicate melts. Some considerations and constraints on the fit parameters of constitutive TVF equations. D. Giordano and D.B. Dingwell. In: Bayerisches Forschungsinstitut für Experimentelle Geochemie und Geophysik Universität Bayreuth, Annual Report 1999\_3.5 j.;
6. Welding of volcanic glasses: Quantification via viscosity-temperature-H<sub>2</sub>O relationship for Teide phonolites. D. Giordano and D.B. Dingwell, (in collaboration with C. Romano/Rome and J. Marti/Barcelona) In: Bayerisches Forschungsinstitut für Experimentelle Geochemie und Geophysik Universität Bayreuth, Annual Report 1998\_3.7 f.;
7. Evaluation of the behaviour at Stromboli as a consequence of a collapse of its summital part - Technical report on the February 2003 volcanic crisis. (Valutazione del comportamento del sistema magmatico di Stromboli in conseguenza ad un crollo della parte sommatiale del vulcano. Rapporto tecnico sulla crisi del vulcano stromboli - Febbraio 2003). INGV, Unità funzionale Pisa, in collaborazione con le unità funzionali di Roma e Catania, l'Instituto di Mineralogia Petrologia e Geochimica LMU (Monaco), il Laboratorio Pierre Sue CEA-CNRS, CE-Saclay, Gif/Yvetter, France ed il Dip.to di Scienze della Terra dell'Università di Pisa;
8. Modelling the Non-Arrhenian Rheology of Silicate Melts: Preliminary Results from the Anorthite-Albite-Diopside System.J.K. Russell, D. Giordano, D.B. Dingwell. Eleventh Annual V. M. Goldschmidt Conference (2001).

#### Abstracts (published on the acts of congresses):

1. The GRD Model for Silicate Melt Viscosity: Volcanological Applications J.K. Russell, D. Giordano, D.B. Dingwell. AGU 2008, San Francisco, California;
2. High Temperature Strain-Rate Dependent Rheology of Strombolian Magmas. A. Vona, C. Romano, D.B. Dingwell, D. Giordano. AGU 2008, San Francisco, California;
3. Water Content And Behavior In Mafic Glasses And Melt Inclusions: An Approach Using microRaman Spectroscopy M. Mercier, A. Di Muro, D. Giordano, N. Métrich, M. Pichavant, B. Scaillet, R. Clocchiatti, P. Lesne, G. Montagnac. AGU 2008, San Francisco, California;
4. The effect of pressure on the network structure of dry and hydrous haplogranites. P. Ardia, D. Giordano, A. Di Muro, M.W. Schmidt, S. Pizzanelli, R. Petrini. EMPG XII (2008), Innsbruck, Austria;
5. The multiphase rheology of Strombolian magmas. A. Vona, C. Romano, D.B. Dingwell, D. Giordano. EMPG XII (2008), Innsbruck, Austria;
6. Viscosity of Volatile-rich Magmatic Liquids: A Model. J.K. Russell, Daniele Giordano, Don Dingwell. IAVCEI 2008, General Assembly, Reykjavick, Iceland;
7. The rheology of crystal-bearing basaltic magmas from the paroxysmic eruption of 15 March 2007 at Stromboli. C. Romano, A. Vona, D. Dingwell, D. Giordano. IAVCEI 2008, General Assembly, Reykjavick, Iceland;
8. The dynamics of explosive eruptions: insights from textures and compositions of pumices and scoriae from the Campi Flegrei caldera (Italy). M. Piochi, M. Polacci, G. De Astis, D. Giordano. IAVCEI 2008, General Assembly, Reykjavick, Iceland;
9. The subliquidus rheology of recent basaltic lavas from Stromboli A. Vona, C. Romano, D.B. Dingwell, D. Giordano. EGU 2008 meeting, Wien, Austria;
10. Models of Viscosity – Strengths, Weaknesses and The Challenges. Russell JK, Giordano D, Dingwell DB GAC – MAC, Annual Meeting (2008), Quebec City, Quebec, Canada;
11. A spectroscopic study on quenched glasses to understand physical melt behavior. P. Ardia, D. Giordano, A. Di Muro, S. Pizzanelli, M.W. Schmidt, R. Petrini. Geosciences Student Meeting (2008) at the IGP, Paris, France;
12. Pressure effect on the viscosity of hydrous rhyolite: a model. P. Ardia, D. Giordano, M.W. Schmidt. Journée Magmatique (2008), Zurich, Switzerland;
13. The Rheological behaviour of Vesuvius magmas. Giordano, D., Ardia, P., Romano, C., Dingwell, D.B., Mangiacapra, A., Cioni, R., Schmidt, M.W., Hess K.-U., 2007. Eos Transactions, American Geophysical Union, Fall Meet. Suppl., Abstract 88 (52), V31C-0600;
14. The rheology of Phlegrean Field magmas. Romano, C., Giordano, D., Caricchi, L., Vona, A., Dingwell, D. B., Hess, K.U., Burlini, L., Ulmer, P., 2007. Eos Transactions, American Geophysical Union, Fall Meet. Suppl., Abstract 88 (52), V31E-0705;
15. Texture and composition of pumice and scoria provide new insights into the dynamics of explosive eruptions at Campi Flegrei (Italy) Polacci, M., Piochi, M., De Astis, G. Zanetti, A., Mangiacapra, A., Vannucci, R., Giordano, D., 2007. Eos Transactions, American Geophysical Union, Fall Meet. Suppl., Abstract 88 (52), V22A-03;
16. Models of Viscosity – Strengths, Weaknesses and The Challenger. Russell, J.K., Giordano, D., Dingwell, D.B. 2007. Eos Transactions, American Geophysical Union, Fall Meet. Suppl., Abstract 88 (52), V51D-0785;
17. Pressure Effect on Hydrous Rhyolite Viscosity: a Model. Ardia, P., Giordano, D., Schmidt, M.W., 2007. Eos Transactions, American Geophysical Union, Fall Meet. Suppl., Abstract 88 (52), MR32A-08;
18. Rheological controls on the evolution of the eruption dynamics at Mount Etna (Italy). Giordano, D., Polacci, M., Corsaro, R.A., Pompilio, M., Caricchi, L., Russell, J. K., Romano, C., 2007. EGU 2007 meeting, Wien, Austria;
19. Viscosity of Magmatic liquids: a model. D. Giordano, J.K. Russell, D.B. Dingwell - EGU 2007 meeting, Wien, Austria;
20. Rheological controls on the evolution of the eruption dynamics at Mount Etna (Italy). D. Giordano, M. Polacci, R.A. Corsaro, M. Pompilio, L. Caricchi, J. K. Russell, C. Romano - EGU 2007 meeting, Wien, Austria;
21. Rheological behavior of Monte Nuovo magma (Phlegrean Field, Italy). L. Caricchi, D. Giordano, L., P. Ulmer, C. Romano, D. B. Dingwell - EGU 2007 meeting, Wien, Austria;
22. Thermo-rheological magma control on the impact of highly fluid lavafloes at Mt. Nyiragongo. D. Giordano, M. Polacci, A. Longo, P. Papale; D.B. Dingwell, E. Boschi, M. Kasereka - EGU 2007 meeting, Wien, Austria;
23. Falling sphere viscosity of hydrous rhyolitic melt considering H<sub>2</sub>O-T-P variations. P. Ardia, D. Giordano, M.W. Schmidt. EGU 2007 meeting, Wien, Austria;
24. The rheology of Vesuvius magmas. D. Giordano, P. Ardia, A. Mangiacapra, C. Romano, D.B. Dingwell, R. Cioni, M.W. Schmidt, K-U. Hess - EGU 2007 meeting, Wien, Austria
25. Caricchi, L., Faccenda, M., Ulmer, P., Burlini, L., Giordano, D., Romano, C., 2007. Rheology of crystal-bearing magmas. International Union of Geodesy and Geophysics (IUGG XXIV general assembly), Perugia, Italy.
26. Russell, J.K., Giordano, D., Dingwell, D.B., 2007. Viscosity of Magmatic Liquids: A model for volcanology International Union of Geodesy and Geophysics (IUGG XXIV general assembly), Perugia, Italy.
27. Ardia, P., Giordano, D., Schmidt, Max W., 2007. P-T Dependence of viscosity of hydrous rhyolitic melt. International Union of Geodesy and Geophysics (IUGG XXIV general assembly), Perugia, Italy.
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**A list of the main methodologies employed to develop the above mentioned lines of research is following reported:**

- Rotational high temperature viscometry (concentric cylinder) for the superliquidus and subliquidus multiphase rheology.
- "*uniaxial compressive strength*", "*point load test*" and parallel plate viscometer for the viscous to brittle multiphase rheology investigation at variable stress-strain deformational regimes;
- High P-high T (up to 10 Kbar - 1600 °C) piston cylinder syntheses to obtain hydrous glasses with a variable water content.
- Dilatometric method of micropenetration, to measure the dry and hydrous viscosity of supercooled samples produced by the high T and high P syntheses.
- FTIR spectroscopy to characterise original water content and distribution in glassy inclusions and synthesis products;
- MicroRaman spectroscopy for the determination of the original water content and distribution in volcanic glasses and for the comprehension of the effect of the thermodynamic intensive variables and chemistry on the silicate melt structures;
- FTIR and microRaman spectroscopy, to measure the water content and distribution before and after the micropenetration measurements and to evaluate the original water content present in the glass inclusions of samples from Vesuvius and Phlegrean Fields. This was intended to provide the minimum water contents capable of generating the eruptions, which have been used, together with the modelled viscosity, in the simulation model provided by Paolo Papale of the University of Pisa.
- Karl-Fisher-Titrations (KFT), performed at the IM-Hannover University, were used to determine the absolute water contents of several glasses. By combining the KFT and the FTIR methods the linear absorptivity coefficients for trachytic products (not available in existing literature) at 3500, 4500 and 5200 cm<sup>-1</sup> could be determined.
- Compositions and some textural features were investigated using a scanning electron microprobe techniques;
- Differential scanning calorimeter (DSC –Netzsch 404 Pegasus) to determine the glass transition temperatures at varying cooling and heating rates and to check for the occurrence of phase transitions at experimental conditions;
- Pycnometric methods for the quantification of textural feature such as vesicularity and density