**The bright side of the plume: volcanic lightning and volcanic ash electrification.**

Corrado Cimarelli – Department of Earth and Natural Sciences, Ludwig-Maximilians- Universität München, Munich, Germany.

What is volcanic lightning and how it generates? Why should we study volcanic plume electrification and how? Electrification phenomena accompanying explosive eruptions have been observed and described since time immemorial. However, recent focus studies forwarded by recent technological advancement reveal that such phenomena are more frequent than we thought and can be considered a constituent property of volcanic plumes and explosive eruptions. In this respect the systematic study of such phenomena both in the field and in the laboratory is pivotal for the mechanistic understanding of volcanic electrification and their use in volcano monitoring efforts. Electrification mechanisms, measuring techniques and the correlation of electrification and explosive eruption dynamics will be presented and discussed in light of current and future research.

Cosa sono i fulmini vulcanici e come si generano? Perché studiare i fenomeni di elettrificazione dei plume vulcanici e come? Fenomeni elettrici concomitanti le eruzioni esplosive sono stati descritti e studiati fin da tempo immemore. Tuttavia, moderne tecniche di osservazione oggi rivelano che tali fenomeni possano essere molto più frequenti di quanto fino ad ora considerato. In tal senso, quelle elettriche possono essere considerate proprietà intrinseche di molte eruzioni vulcaniche esplosive. Per questo motivo il loro studio sistematico sul terreno e in laboratorio risulta funzionale allo sviluppo di modelli concettuali di elettrificazione dei plume vulcanici ed il loro utilizzo per il rilevamento ed il monitoraggio delle eruzioni esplosive. Nel seminario verranno introdotti e discussi i meccanismi di elettrificazione e le tecniche di studio utilizzate nell’ambito delle ricerche in atto e di quelle future.

**Biographic notes**

Main focus of my research is understanding the dynamics of explosive eruptions, including magma rheology, conduit dynamics, volcanic ash generation and dispersion, by merging field and laboratory techniques. Recent focus of my research is the electrification of volcanic plumes and volcanic lightning that I study experimentally and by monitoring active volcanoes around the world (Sakurajima, Stromboli, Etna, La Palma). Currently, I am the only researcher using this twofold approach to study volcanic lightning. I am at the centre of strategic multi-disciplinary collaborations with leading specialists in fields related to plume electrification, eruptive dynamics and volcanic ash reactivity. These topics are the focus of my recently funded ERC-Consolidator Grant.

08.2013 – present Faculty staff Department of Earth and Natural Sciences, Ludwig-Maximilians- Universität München, Munich, Germany.

03.2020 – present Visiting Scientist at Lawrence Livermore National Laboratory, Livermore CA, USA.

11.2011 – 07.2013 AXA Research Fund Fellow. “Risk from Volcanic Ash in the Earth System”. Department of Earth and Natural Sciences, Ludwig-Maximilians-Universität, Munich, Germany.

12. 2009 - 11. 2011 Marie Curie Research Fellow. “Experimental constrains on magma flow conditions during highly-explosive basaltic eruptions”. Ludwig-Maximilians-Universität, Munich, Germany. Coordinator: Prof. D. Dingwell.

03. 2009 - 9. 2009 Royal Society - Accademia dei Lincei Research Fellow. “Rheological properties of basaltic magmas modelled as analogue multiphase suspensions: A case study from Etna 2001 explosive eruption”. Department of Earth Sciences, Bristol University, United Kingdom. Coordinator: Dr. H. Mader.

11.2020 - present National Scientific Qualification of the Italian Ministry of Education, University, and Research (MIUR) as Full Professor in Geochemistry, Mineralogy, Petrology, Volcanology and Georesources.

02.2020 – present Habilitation as Professor (Privat Dozent) and Venia Legendi in Mineralogy.

04.2017- present National Scientific Qualification of the Italian Ministry of Education, University, and Research (MIUR) as Associate Professor in Geochemistry, Mineralogy, Petrology, Volcanology and Georesources.

03. 2006- 03. 2009 Post-Doctoral Research Associate. “Eruptive mechanisms and dynamic of transport and deposition of volcanic products”. Dipartimento di Scienze Geologiche Università degli Studi Roma Tre, Rome Italy. Coordinator: Prof. D. de Rita.

11. 2002 – 11. 2005 Ph.D. in Volcanology. Dipartimento di Scienze Geologiche, Università degli Studi Roma Tre, Italy. Thesis title: “New geo-volcanological data on the evolution of the Panarea Volcanic Complex (Aeolian Island) and their implication for volcanic hazard”. Supervisor: Prof. D. de Rita.