



# 5<sup>a</sup> CONFERENZA A. RITTMANN

29 Settembre 1 Ottobre 2022

CATANIA



## Programma



# 5<sup>a</sup> CONFERENZA A. RITTMANN

29 Settembre 1 Ottobre 2022

## Comitato Organizzatore

Marco VICCARO - Presidente AIV  
Carlo DOGLIONI - Presidente INGV  
Francesco PRIOLO - Rettore UniCT  
Gian Pietro GIUSSO DEL GALDO - Direttore DSBGA UniCT  
Francesca Bianco - Direttore Dipartimento Vulcani INGV  
Stefano BRANCA - Direttore Osservatorio Etneo INGV  
Roberto SULPIZIO - Segretario IAVCEI  
Ornella COCINA - INGV-Osservatorio Etneo  
Claudio Antonio TRANNE - UniBO  
Alessandro VONA - UniRM3

## Comitato Scientifico

Coordinatrice  
Rosa Anna CORSARO (INGV-OE)

Alessandro AIUPPA (UniPA)  
Raffaele AZZARO (INGV-OE)  
Alessandro BONFORTE (INGV-OE)  
Andrea CANNATA (UniCT)  
Raffaello CIONI (UniFI)  
Stefano CORRADINI (INGV-ONT)  
Paola DEL CARLO (INGV-PI)  
Francesca FORNI (UniMI)  
Lorella FRANCALANCI (UniFI)  
Guido GIORDANO (UniRM3)  
Roberto ISAIA (INGV-OV)  
Federico LUCCHI (UniBO)  
Daniela MELE (UniBA)  
Rosella NAVE (INGV-OV)  
Eugenio NICOTRA (UniCAL)  
Danilo PALLADINO (UniRMI)  
Antonio PAONITA (INGV-PA)  
Marco PISTOLESI (UniPi)  
Dmitri ROUWET (INGV-BO)  
Laura SANDRI (INGV-BO)  
Claudio SCARPATI (UniNA)

## Comitato Logistico

Coordinatore  
Pietro BONFANTI (INGV-OE)

Alfio AMANTIA (INGV-OE)  
Mauro AMORE (INGV-OE)  
Massimiliano BARONE (INGV-AC)  
Marco BORZI' (UniCT)  
Massimiliano CARDONE (UniCT)  
Massimiliano CASCONI (INGV-PI)  
Salvatore CONSOLI (INGV-OE)  
Giovanni FLORIDIA (UniCT)  
Marisa GIUFFRIDA (UniCT)  
Maria GUARNERA (INGV-OE)  
Marta MINNITI (UniCT)  
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Francesco ZUCCARELLO (INGV-OE)  
Web Group INGV  
HELPERS a cura di UniCT

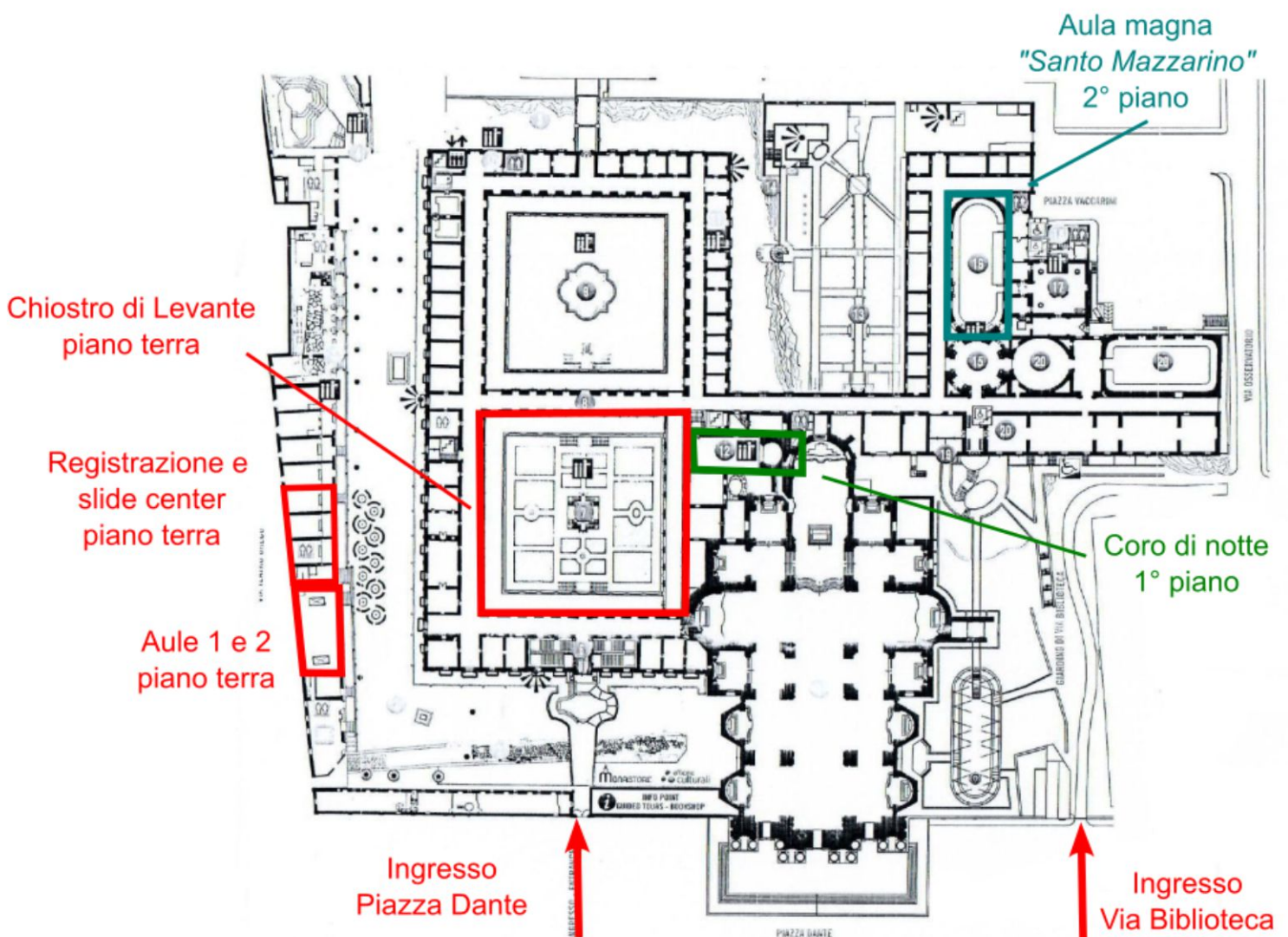
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# Timetable Conferenza

	29 SETTEMBRE 2022	30 SETTEMBRE 2022	1 OTTOBRE 2022	2 OTTOBRE 2022
08:30-08:45				<b>ESCURSIONE</b>
08:45-09:00	Registrazione dei partecipanti			
09:00-09:15				
09:15-09:30	Saluti Istituzionali (AULA MAGNA "MAZZARINO")		SESSIONE S6 (AULA 2)	
09:30-09:45	Plenary Lecture Prof. R. Sulpizio (AULA MAGNA "MAZZARINO")	SESSIONE S01 (AULA 2)	SESSIONE S05 (AULA 1)	
09:45-10:00				
10:00-10:15				
10:15-10:30				
10:30-10:45				
10:45-11:00	Coffee Break (CHIOSTRO DI LEVANTE)	Coffee Break (CHIOSTRO DI LEVANTE)	Coffee Break (CHIOSTRO DI LEVANTE)	
11:00-11:15				
11:15-11:30	Ricordo Prof. G. Occhipinti e Prof. L. Villari (AULA MAGNA "MAZZARINO")	continua SESSIONE S16 (CORO DI NOTTE)		
11:30-11:45		continua SESSIONE S01 (AULA 2)	SESSIONE S09 (AULA 2)	
11:45-12:00		SESSIONE S07 (CORO DI NOTTE)		
12:00-12:15				
12:15-12:30	SESSIONE S02 (CORO DI NOTTE)			
12:30-12:45	SESSIONE S03 (AULA 2)	SESSIONE S10 (AULA 2)		
12:45-13:00				
13:00-13:15				
13:15-13:30				
13:30-13:45				
13:45-14:00	Pranzo (CHIOSTRO DI LEVANTE)	Pranzo (CHIOSTRO DI LEVANTE)	Pranzo (CHIOSTRO DI LEVANTE)	
14:00-14:15				
14:15-14:30				
14:30-14:45				
14:45-15:00				
15:00-15:15				
15:15-15:30	continua SESSIONE S11 (AULA 1)	continua SESSIONE S04 (AULA 1)		
15:30-15:45	SESSIONE S13 (CORO DI NOTTE)	SESSIONE S14 (CORO DI NOTTE)		
15:45-16:00	SESSIONE S15 (AULA 2)	continua SESSIONE S10 (AULA 2)		
16:00-16:15				
16:15-16:30				
16:30-16:45				
16:45-17:00				
17:00-17:15		Coffee Break (CHIOSTRO DI LEVANTE)		
17:15-17:30				
17:30-17:45				
17:45-18:00				
18:00-18:15	SESSIONE POSTER e Coffee Break (CHIOSTRO DI LEVANTE)	Assemblea AIV e Conferimento Medaglie (AULA 1)		
18:15-18:30				
18:30-18:45				
18:45-19:00				
19:00-19:15				
19:15-19:30				
da 21:00		Party vulcanico - Palazzo Biscari		

# Sede della Conferenza

4



MONASTERO DEI BENEDETTINI DI SAN NICOLÒ L'ARENA - CATANIA

## **Giovedì 29 Settembre 2022 ore 10.00**

AULA MAGNA "MAZZARINO"

Prof. Roberto Sulpizio

*One year of volcanic eruptions: what we learnt and what we still miss*

## **Giovedì 29 Settembre 2022 ore 11.15**

AULA MAGNA "MAZZARINO"

*Ricordo del Prof. Giovanni Occhipinti e del Prof. Letterio Carlo Villari*

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## **Venerdì 30 Settembre 2022 ore 17.30**

AULA 1

*Assemblea dei soci dell'Associazione Italiana di Vulcanologia*

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## **Domenica 2 Ottobre 2022 ore 7.30 – 16.30**

ESCURSIONE POST-CONFERENZA

*Etna versante nord, Field Leaders: Dr. Stefano Branca (INGV-OE)  
Prof. Marco Viccaro (UNICT)*

## PROGRAMMA DELLE SESSIONI SCIENTIFICHE

### AULA 1 (12.00 - 13.30)

#### S11. THE PAROXYSMAL ERUPTIVE SEQUENCES OF MT. ETNA BETWEEN 2020 AND 2021

Conveners: *Giuseppe Salerno (INGV-OE), Ornella Cocina (INGV-OE), Salvatore Gambino (INGV-OE), Antonio Paonita (INGV-PA)*

#### 12.00 – 12.15

The 2020-22 fire fountain episodes of the SE Crater of Etna: insight from monitoring data and hazard assessment

*Stefano Branca, INGV-OE Monitoring Team, INGV-PA Monitoring Team*

#### 12.15 – 12.30

The most intense deflation of the last two decades at Etna volcano (Italy) analyzed by GNSS and tilt data: the 2019-2021 evolution of ground deformation and modelled pressure sources

*Valentina Bruno, Marco Aloisi, Salvatore Gambino, Mario Mattia, Carmelo Ferlito, Massimo Rossi*

#### 12.30 – 12.45

Ground tilt changes associated to Mt. Etna lava fountain episodes (2008-2022)

*Laura Privitera, Salvatore Gambino*

#### 12.45 – 13.00

Characterization of strain changes during the 2020-2021 Etna lava fountains

*Luigi Carleo, Gilda Currenti, Alessandro Bonaccorso, Antonino Sicali*

#### 13.00 – 13.15

Etna 2011-22: what we have learned from a decade of paroxysmal eruptions at the volcano

*Marisa Giuffrida, Rosario Calcagno, Massimiliano Cardone, Chiara Torre, Francesco Zuccarello, Marco Viccaro*

#### 13.15 – 13.30

Gas constraints on the source mechanisms of Mt. Etna 2021 paroxysmal lava fountains sequence

*Giuseppe Salerno, Alessandro La Spina, Patrick Allard, Stefano Corradini, Luca Merucci, Lorenzo Guerrieri, Pietro Bonfanti, Dario Stelitano*

### AULA 2 (12.00 – 13.30)

#### S03. TEPHROCHRONOLOGY: A POWERFUL TOOL FOR UNRAVELLING THE PAST

Conveners: *Lorenzo Monaco (UniPI), Alessio di Roberto (INGV-PI), Ivan Sunyé Puchol (UniRM1), Giuseppe Re (INGV-PI), Federica Totaro (UniNA)*

#### 12.00 – 12.15

A tool for the evaluation of the completeness of the volcanic records in the Mediterranean area

*Elisabetta Billotta, Roberto Sulpizio, Jacopo Selva, Antonio Costa*

## 12.15–12.30

Tephrochronological study of the lacustrine succession of the Castiglione maar (Central Italy) and evaluation of the possible impact on the climate of the explosive eruptions of the peri-Tyrrhenic volcanoes

*Bianca Scateni, Alessio Di Roberto, Giuseppe Re, Patrizia Macrì, Chiara Caricchi, Liliana Minelli, Gaia Siravo, Alessandra Smedile, Giovanni Zanchetta, Biagio Giaccio*

## 12.30–12.45

Tephrochronology of marine sequences in a cold seep area of the SE Tyrrhenian Sea (Paola Basin) as a tool to reconstruct main episodes of methane release

*Sara Meschiarì, Marzia Rovere, Donatella Insinga, Lucilla Capotondi, Paul G. Albert, Victoria C. Smith*

## 12.45–13.00

The tephra layers in the Crotona sequence: a microanalytical study

*Paola Donato, Chiara Benedetta Cannata, Antonio Giulio Cosentino, Mariano Davoli, Rosanna De Rosa*

## 13.00–13.15

Insights into the explosive eruption history of Campi Flegrei prior to the Campanian Ignimbrite eruption

*Sophie Vineberg, Roberto Isaia, Paul Albert, Victoria Smith*

## 13.15–13.30

There she blows! Unravelling the eruptive history at Aso caldera (Japan) using distal ash deposits

*Danielle McLean, Paul Albert, Gwydion Jones, Sophie Vineberg, Richard Staff, Hannah Buckland, Takehiko Suzuki, Jun-Ichi Kimura, Takeshi Nakagawa, Victoria Smith*

## CORO DI NOTTE (12.00–13.30)

### S02. MULTIDISCIPLINARY APPROACHES FOR VOLCANO-TECTONIC STUDIES

Conveners: *Stefano Vitale (UniNA), Paolo Madonia (INGV-OE), Mariarosaria Falanga (UniSA), Roberto Isaia (INGV-OV), Jacopo Natale (UniNA)*

## 12.00–12.15

Earthquake cycles in Central America and the impact in the volcanic activity

*Gino Gonzalez, Eisuke Fujita, Alexander Garcia, Bunichiro Shibasaki, Dmitri Rouwet, Takumi Hayashida, Federico Lucchi, Roberto Sulpizio, Antonio Costa, Marco Viccaro*

## 12.15–12.30

Influence of tectonic inheritance on the distribution and characteristics of rift-related volcanism: examples from the Main Ethiopian Rift, East Africa

*Giacomo Corti, Daniele Maestrelli, Federico Sani*

## 12.30–12.45

Analysis of the aseismic deformation referred to the Ripe della Naca fault system (Mt. Etna): a volcano tectonic approach through geological and geophysical data

*Salvatore Giuffrida, Silvia Portale, Fabio Brighenti, Francesco Carnemolla, Francesca Fichera, Enrico Indovina, Chiara Torre, Giorgio De Guidi, Salvatore D'Amico*

## 12.45–13.00

Evidence of seismic-related liquefaction processes within the volcanic record of the Campi Flegrei caldera (Italy)  
*Stefano Vitale, Jacopo Natale, Roberto Isaia, Francesco D'Assisi Tramparulo, Sabatino Ciarcia*

## 13.00–13.15

Volcano-tectonic, electrical and electromagnetic investigations at different resolutions highlight the structure of the most active sector of Campi Flegrei  
*Roberto Isaia, Maria Giulia Di Giuseppe, Jacopo Natale, Antonio Troiano, Stefano Vitale*

## 13.15–13.30

Fault systems in the offshore sector of the Campi Flegrei caldera (southern Italy): implications for nested caldera structure, resurgent dome, and volcano-tectonic evolution  
*Jacopo Natale, Stefano Vitale, Roberto Isaia, Luigi Ferranti, Lena Steinmann, Volkhard Spiess, Marco Sacchi*

## AULA 1 (15.00–16.30)

### [Continua] **S11. THE PAROXYSMAL ERUPTIVE SEQUENCES OF MT ETNA BETWEEN 2020 AND 2021**

Conveners: *Giuseppe Salerno (INGV-OE), Ornella Cocina (INGV-OE), Salvatore Gambino (INGV-OE), Antonio Paonita (INGV-PA)*

## 15.00–15.15

Investigating gas emissions from Mount Etna: a 50-yr retrospective  
*Patrick Allard*

## 15.15–15.30

Timely mapping and quantification of the 2020-2021 Etna lava flows through the exploitation of multi-sensors remote-sensing data  
*Cristina Proietti, Massimo Cantarero, Emanuela De Beni, Gaetana Ganci, Tullio Ricci*

## 15.30–15.45

Tracking lava flows during the 2021 Mt. Etna eruptions using Random Forest Machine Learning algorithm  
*Eleonora Amato, Claudia Corradino, Federica Torrisi, Ciro Del Negro*

## 15.45–16.00

Hazards from pyroclastic density currents at Etna - revisited  
*Boris Behncke*

## 16.00–16.15

Quantification of tephra mass deposited on road network during lava fountain activity in 2021-22 at Mt. Etna  
*Luigi Mereu, Manuel Stocchi, Alexander Garcia, Michele Prestifilippo, Laura Sandri, Costanza Bonadonna, Simona Scollo*

## 16.15–16.30

Tracking volcanic clouds using machine learning techniques: the 2020-2022 Mt. Etna paroxysms  
*Federica Torrisi, Eleonora Amato, Claudia Corradino, Simona Cariello, Maide Bucolo, Luigi Fortuna, Ciro Del Negro*



## AULA 2 (15.00–17.00)

### S15. THE MANIFOLD INTERACTION BETWEEN HUMANS AND VOLCANOES: INTERDISCIPLINARY STUDIES AROUND VOLCANOLOGY

Conveners: *Stefano Branca (INGV-OE), Mauro Antonio Di Vito (INGV-OV), Franco Foresta Martin (INGV-PA), Daniele Musumeci (UniCT), Orazio Palio (UniCT)*

#### 15.00–15.15

<sup>87</sup>Sr/<sup>86</sup>Sr isotopic ratios of archaeological obsidians from Ustica Island (Italy) confirm prehistoric imports from Lipari and Pantelleria  
*Franco Foresta Martin, Mariangela La Monica, Ilenia Arienzo, Monica Piochi, Silvio Rotolo, Sandro De Vita, Mauro Di Vito*

#### 15.15–15.30

Discriminating elements and data processing procedures to determine the provenance of central mediterranean obsidians: new insights and trials  
*Franco Foresta Martin, Enrico Massaro*

#### 15.30–15.45

Archaeology in relation with the geomorphology of the territory at the eastern foot of Etna. Connection between human and environment: new interpretations about prehistoric and historic settlement logic in the territories of Riposto, Fiumefreddo and Mascali (CT)  
*Dario Calderone, Giovanni De Giorgio*

#### 15.45–16.00

Clustered volcano-tectonic evolution in the central sector of the Main Ethiopian Rift and implications for early hominins evolution  
*Zara Franceschini, Raffaello Cioni, Giacomo Corti, Florian Duval, Diletta Frascerra, Gaëlle Prouteau, Federico Sani, Bruno Scaillet, Stéphane Scaillet, Abate Assan Melaku*

#### 16.00–16.15

"On volcanoes, or ignivomous mountains" of Giovanni Targioni Tozzetti (1779)  
*Paolo Sammuri*

#### 16.15–16.30

Legends and medieval sources in the volcanological studies of Lipari  
*Marco Manni*

#### 16.30–16.45

The role of cartography by Wolfgang Sartorius von Waltershausen (1809-1876) in the frame of the geological investigations of Etna volcano  
*Stefano Branca, Luigi Ingaliso, Daniele Musumeci*

#### 16.45–17.00

The evolution of Chilean volcanology in the 20th century and the work of Lorenzo Casertano  
*Daniele Musumeci, Giovanni Leone, Stefano Branca, Luigi Ingaliso*

## CORO DI NOTTE (15.00–17.15)

### S13. FROM MULTI-HAZARD ASSESSMENT TO INTEGRATED RISK IN VOLCANIC AREAS: DATA-ENABLED SCIENCE AND APPLICATIONS WITH NUMERICAL TOOLS AND STATISTICAL METHODS

Conveners: *Raffaele Azzaro (INGV-OE), Andrea Bevilacqua (INGV-PI), Francesco Neglia (UniBA), Silvia Massaro (UniBA), Jacopo Selva (INGV-BO)*

#### 15.00–15.15

VIGIL: a Python tool for forecasting and probabilistic gas dispersion modelling

*Fabio Dioguardi, Silvia Massaro, Giovanni Chiadini, Antonio Costa, Arnau Folch, Giovanni Macedonio, Laura Sandri, Jacopo Selva*

#### 15.15–15.30

Computational fluid dynamics tools to replicate mono- and poly-disperse granular flows: powerful instruments to better understand physics of multiphase flow

*Francesco Neglia, Fabio Dioguardi, Roberto Sulpizio*

#### 15.30–15.45

The total probabilistic long-term hazard of tephra fallout from Neapolitan volcanoes, and disaggregation analysis

*Manuel Stocchi, Silvia Massaro, Beatriz Martínez Montesinos, Laura Sandri, Jacopo Selva, Antonio Costa, Roberto Sulpizio, Biagio Giaccio, Massimiliano Moscatelli, Edoardo Peronace, Marco Nocentini, Roberto Isaia, Manuel Titos Luzón*

#### 15.45–16.00

Geophysical and geological constraints for modelling the source of the 2017 Casamicciola volcano-tectonic earthquake as contribution to the assessment of the Ischia seismic hazard

*Rosa Nappi, Rosella Nave, Giuliana Alessio, Valeria Siniscalchi, Giuseppe De Natale, Claudia Troise, Valeria Paoletti, Massimo D'Antonio, Alessandro Fedele, Renato Somma, Enrico Vertechi, Sabrina Porfido, Luigina Vezzoli, Alessandro Maria Michetti*

#### 16.00–16.15

Slope stability assessment at Stromboli (Italy)

*Federico Di Traglia*

#### 16.15–16.30

Pyroclastic avalanches hazard at Mt. Etna volcano

*Francesco Zuccarello, Tomaso Esposti Ongaro, Mattia de' Michieli Vitturi, Gaetana Ganci*

#### 16.30–16.45

Fixing criteria for volcanic unrest warning

*Horst Langer, Susanna Falsaperla, Salvatore Spampinato, Alfio Messina*

#### 16.45–17.00

Volcano-related hazards at Mt Etna: the new frontiers of the PANACEA project

*Raffaele Azzaro, PANACEA Working Group*

#### 17.00–17.15

A multi-risk strategy for Mount Etna: new approaches from the PANACEA project

*Vera Pessina, PANACEA Working Group*

CHIOSTRO DI LEVANTE SESSIONI POSTER (17.15 – 19.30)

## S01. VOLCANO GEOLOGY, STRATIGRAPHY, CHRONOLOGY AND PALEOMAGNETISM TO UNRAVEL THE ERUPTIVE BEHAVIOR AND RELATED HAZARDS

### Pannello 1

Deposit-derived block-and-ash flows: the hazard posed by perched temporary tephra accumulations on volcanoes; 2018 Fuego disaster, Guatemala

*Gilda Risica, Mauro Rosi, Marco Pistolesi, Fabio Speranza, Michael J. Branney*

### Pannello 2

Reconstruction of the subaerial Holocene volcanic activity through paleomagnetic and  $^{14}\text{C}$  dating methods: El Hierro Island (Canary Islands)

*Gilda Risica, Alessio Di Roberto, Fabio Speranza, Paola Del Carlo, Massimo Pompilio, Stavros Meletlidis, Alessandro Todrani*

### Pannello 3

Age of the Valle del Bove formation and chronology of the post-collapse flank eruptions, Etna volcano (Italy)

*Arianna Beatrice Malaguti, Stefano Branca, Fabio Speranza, Mauro Coltelli, Paola Del Carlo, Alberto Renzulli*

### Pannello 4

The contribution of drone images to reconstructing volcanic history: application to the island of Lipari

*Mauro Rosi, Marco Manni*

### Pannello 5

Growth, collapses, and evolution of the long-lived Ollagüe volcano, Central Andean Volcanic Zone

*Jose Pablo Sepulveda, Raffaello Cioni, Gabriel Ureta, Felipe Aguilera, Stephane Scaillet, Alfredo Esquivel, Bruno Scaillet*

### Pannello 6

$^{40}\text{Ar}/^{39}\text{Ar}$  dating of the trachytic crystal mush of the Green Tuff ignimbrite, Pantelleria island

*Alessandra Cinquegrani, Stéphane Scaillet, Pierangelo Romano, Silvio Giuseppe Rotolo*

### Pannello 7

Emplacement temperature estimation of the 2015 Calbuco pyroclastic density currents (PDCs) using charcoal reflectance (Ro%) method: preliminary results.

*Lisa Ricci, Alessandra Pensa, Daniele Morgavi, Jorge Romero, Guido Giordano, Francesco Frondini*

### Pannello 8

Magnetic fabric and paleomagnetism of the Mount Calanna dyke swarm: a comprehensive study on swarm emplacement

*Rasia Shajahan, Elena Zanella, Sara Mana, Andrew Harris, Benjamin van Wyk de Vries*

## S02. MULTIDISCIPLINARY APPROACHES FOR VOLCANO-TECTONIC STUDIES

### Pannello 9

Resolution and characterization of seismic swarms and clusters at Mt. Etna volcano (Sicily, Italy)  
*Salvatore Alparone, Graziella Barberi, Simone Cesca, Vincenza Maiolino, Andrea Ursino*

### Pannello 10

Dynamics of the main active faults bounding the mobile flank of Mt. Etna volcano, through very-long period comparisons of survey data.  
*Alessandro Bonforte, Stefano Branca, Giuseppe Brandi, Salvatore Consoli, Elena Cubellis, Salvatore Gambino, Francesco Guglielmino, Francesco Obrizzo, Laura Privitera, Giuseppe Puglisi, Umberto Tammara*

### Pannello 11

Mt. Etna volcano (Sicily, Italy): is the 2021 deep seismicity recorded on the eastern flank it represents an anomaly?  
*Anna Figlioli, Salvatore Alparone, Antonino D'Alessandro, Raffaele Martorana, Attilio Sulli, Andrea Ursino*

### Pannello 12

Historical photogrammetry-derived models to investigate the architecture of the Fremrinamar rift, Northern Iceland  
*Martina Pedicini, Fabio Bonali, Alessandro Tibaldi, Noemi Corti*

## S03. TEPHROCHRONOLOGY: A POWERFUL TOOL FOR UNRAVELLING THE PAST

### Pannello 13

Tephrochronology, modelling and dynamics of large-magnitude eruptions in the Campi Flegrei caldera  
*Giada Fernandez, Gianluca Sottili, Biagio Giaccio, Antonio Costa*

### Pannello 14

Cryptotephra layers in marine sequences of the Ross Sea, Antarctica: implications and potential applications  
*Paola Del Carlo, Giuseppe Re, Alessio Di Roberto, Karen Gariboldi, Leonardo Langone, Tommaso Tesi, CHIMERA and GRETA Projects Working Group*

### Pannello 15

Fast morphometrical data acquisition on volcanic ash particles for the eruptive style detection: a multivariate statistics approach  
*Pietro Gabellini, Raffaello Cioni*

## S04. BEHIND THE SCENES: ADVANCED METHODOLOGIES TO UNRAVEL THE ARCHITECTURE, DYNAMICS AND TIMESCALES OF VOLCANIC PLUMBING SYSTEMS

### Pannello 16

Characterization of final eruptive stages on Filicudi island (Aeolian Islands): The "Montagnola" Dome  
*Pierfrancesco Calabria*

### Pannello 17

Exploring microstructure and physical properties of rocks from the Campi Flegrei caldera: a 3D/4D multiscale characterization  
*Gianmarco Buono, Stefano Caliro, Giovanni Chiodini, Flora Giudicepietro, Francesco Maccaferri, Giovanni Macedonio, Lucia Pappalardo, Giacomo Pozzi, Elena Spagnuolo, Anna Tramelli*

## Pannello 18

Overlook into the Stromboli plumbing system: defining the spatial and temporal conditions of magma storage and transfer as prelude of paroxysmal eruptions

*Marta Minniti, Eugenio Nicotra, Marco Viccaro*

## Pannello 19

Olivine clinopyroxenite xenolith in the 2002-2003 lavas of Mount Etna

*Silvia Minissale, Gabriele Lanzafame, Roberto De Gennaro*

## Pannello 20

Real crystal-chemical variations of spinel, plagioclase and pyroxene solidified at variable cooling rates in a tholeiitic basaltic system using EPMA maps

*Emanuela Gennaro, Gianluca Iezzi, Manuela Nazzari, Piergiorgio Scarlato, Francesco Vetere*

## Pannello 21

A journey into the Monte Amiata mafic enclaves world: from fieldwork observations to chemistry

*Lucrezia Valeriani, Simone Paternostro, A. Buian, José Luis Sepulveda Birke, Martina Casalini, Eleonora Braschi, Andrea Orlando, Raffaello Cioni, Lorella Francalanci, Sandro Conticelli*

## Pannello 22

Modes and kinetics of magma storage and ascent across the Eastern and Northern Volcanic Zones of Iceland: the role of regional tectonics on the volcanic system dynamics

*Francesco Furia, Marisa Giuffrida, Marco Viccaro*

## Pannello 23

Determining the depths and timescales of pre-eruptive processes before historical Monte Nuovo eruption (Campi Flegrei caldera, Italy)

*Lydia Whittaker, Michael Stock, Victoria Smith, Evan Mutch, Penny Wieser, Roberto Isaia*

## S05. EQUILIBRIUM/DISEQUILIBRIUM PROCESSES DURING MAGMA ASCENT: NEW INSIGHTS FROM LABORATORY AND MODELLING STUDIES AND OBSERVATIONS OF THE NATURAL SYSTEM

## Pannello 24

Crystallization kinetics in hydrous trachytic and latitic melts from Campi Flegrei

*Ernestina Appiah, Stepan P. Krasheninnikov, François Holtz, Paola Stabile, Fabio Arzilli, Michael R. Carroll*

## Pannello 25

Nanocrystallization in basalts: a chemical threshold between magmas from Mt. Etna and Stromboli

*Alex Scarani, Alessio Zandonà, Fabrizio Di Fiore, Pedro Antonio Valdivia Munoz, Nobuyoshi Miyajima, Hansjorg Bornhoft, Alessandro Vona, Joachim Deubener, Claudia Romano, Danilo Di Genova*

## Pannello 26

Numerical modelling of sudden eruptive style transitions at basaltic volcanoes

*Elisa Biagioli, Giuseppe La Spina, Margherita Polacci, Jorge Romero, Mike Burton, Mattia de' Michieli Vitturi*

## Pannello 27

Rheology of 2021 lava flows at Cumbre Vieja volcano (La Palma, Canary Islands, Spain)

*Fabrizio Di Fiore, Alessandro Vona, Alex Scarani, Guido Giordano, Claudia Romano, Daniele Giordano, Luca Caricchi, Matthew Pankhurst, and the INVOLCAN Team*

## Pannello 28

Experimental constraints on fragmentation conditions of mafic magmas during large-scale, ignimbrite-forming eruptions

*Alessandro Vona, Fabrizio Di Fiore, Pedro Valdivia, Guido Giordano, Brittany D. Brand*

## Pannello 29

Are volcanic melts less viscous than we thought?

*Pedro Valdivia, Alessio Zandonà, Joachim Deubener, Danilo Di Genova*

## S06. LARGE ERUPTIONS MAGMA-CHAMBERS FORMATION AND EVOLUTION: IMPLICATIONS ON MAGMATIC PROCESSES, ERUPTION DYNAMICS AND ENVIRONMENTAL IMPACT

### Pannello 30

The TIFEHO research theme in the framework of the INGV Pianeta Dinamico project: a window into the past of the Phlegraean Volcanic District

*Sandro de Vita, Mauro Antonio Di Vito, Ilenia Arienzo, Claudia D'Oriano*

### Pannello 31

How does an eruption start? The AD79 Pompeii eruption of Mt. Somma-Vesuvius (Italy)

*Alessia Falasconi, Raffaello Cioni*

### Pannello 32

Magma chamber dynamics during the Green Tuff (Pantelleria, Italy) eruption: insights into the evolution of a peralkaline mush zone

*Pierangelo Romano, John C. White, Ray Macdonald, Bogusław Baginski, Silvio G. Rotolo, Beata Marciniak-Maliszewska*

### Pannello 33

Stratigraphic and geochemical investigations of pre-Campanian Ignimbrite ( $39.85 \pm 0.14$  ka) and pre-Monte Epomeo Green Tuff ( $56.0 \pm 1.0$  ka) volcanic sequences at Procida and Monte di Procida

*Carlo Pelullo, Domenico Sparice, Richard Brown, Paola Petrosino, Claudia D'Oriano, Domenico Doronzo, Ilenia Arienzo, Mauro Antonio Di Vito, Sandro de Vita*

### Pannello 34

Geochemical and isotopic characterization of old (>39 ka) tephra from the Phlegraean Volcanic District outcropping at Capri island

*Carlo Pelullo, Hélène Balcone-Boissard, Domenico Doronzo, Domenico Sparice, Sandro de Vita, Mauro Antonio Di Vito, Ilenia Arienzo*

## S07. TOWARDS A MULTIDISCIPLINARY APPROACH TO UNDERSTAND THE ORIGIN AND DYNAMICS OF PAROXYSMS AT BASALTIC VOLCANOES

### Pannello 35

Paroxysmal explosive activity at Mt. Vesuvius during the 1906 and 1944 eruptions

*Gianmarco Buono, Elena Cubellis, Lucia Pappalardo, Paola Petrosino*

## Pannello 36

Investigation of tiltmeters produced by different manufacturers

*Ayumu Ishikawa, Lorenzo Innocenti, Maria Cristina Silengo, Giorgio Lacanna, Takeshi Nishimura, Maurizio Ripepe*

## Pannello 37

Investigating major and ordinary Strombolian eruptions via distributed acoustic sensing with fibre optics

*Francesco Biagioli, Jean-Philippe Métaixian, Eléonore Stutzmann, Maurizio Ripepe, Pascal Bernard, Roberto Longo, Marie-Paule Bouin*

## **S08. NEW PERSPECTIVES IN DECIPHERING MANTLE GEOCHEMICAL, MINERALOGICAL AND SEISMIC HETEROGENEITIES**

### Pannello 38

Nature of metasomatic agents in the mantle wedge beneath the Imbabura-Cubilche volcanic complexes, Northern Ecuador

*Wilman Navarrete, Jean-Luc Le Pennec, Gorki Ruiz, Céline Liorzou, Stalin Solano*

### Pannello 39

The December 2018 eruption of Mt. Etna: a geochemical study of melt inclusions

*Alessandra Correale, Rosa Anna Corsaro, Lucia Miraglia, Antonio Paonita, Silvio Giuseppe Rotolo, Federica Ippolito*

### Pannello 40

Geochemical and isotopic constraints for mantle heterogeneity feeding the recent magmatic activity of the Dilo-Dukana and Mega volcanic fields (Ririba rift, southern Ethiopian Rift)

*Eleonora Braschi, Zara Franceschini, Raffaello Cioni, Giacomo Corti, Federico Sani, Ameha Muluneh*

## **S09. VOLCANO-HYDROTHERMAL SYSTEMS AND RELATED HAZARDS: MULTI-DISCIPLINARY APPROACHES**

### Pannello 41

Modelling and filtering of Etna soil CO<sub>2</sub> flux time series by mean of wavelet method

*Salvatore Scudero, Antonino D'Alessandro, Giovanni Giuffrida, Sergio Gurrieri, Marco Liuzzo*

### Pannello 42

Revealing spatio-temporal variations of soil CO<sub>2</sub> at Mt. Etna volcano

*Salvatore Scudero, Antonino D'Alessandro, Giovanni Giuffrida, Sergio Gurrieri, Marco Liuzzo*

### Pannello 43

Multidisciplinary and multilayer study of the 2022 Hunga Tonga-Hunga Ha'apai main eruption

*Serena D'Arcangelo, Alessandro Bonforte, Federico Brogi, Massimo Calcara, Saioa A. Campuzano, Gianfranco Cianchini, Mariagrazia De Caro, Alfredo Del Corpo, Angelo De Santis, the rest of CHOPIN – Pianeta Dinamico (Working Earth) Team*

### Pannello 44

Petrography and geochemistry of Secca del Capo seamount (Aeolian Islands): a preliminary study

*Roberto La Fortuna, Rosanna De Rosa, Paola Donato, Eugenio Nicotra*

### Pannello 45

Understanding groundwater circulation in active volcanic areas for the assessment of possible involvement of fresh and thermal waters in triggering phreatic explosions at Ischia (Italy)

*Silvia Fabbrocino, Eliana Bellucci Sessa, Sandro de Vita, Mauro Antonio Di Vito, Enrica Marotta, Rosario Avino*

## S10. PROXIMAL AND DISTAL VOLCANIC MONITORING USING REMOTE SENSING SYSTEMS: NOVEL PRACTICES, APPLICATIONS AND INTEGRATIONS

### Pannello 46

Long Range Infrasound Monitoring of Yasur Volcano

*Rebecca Sveva Morelli, Duccio Gheri, Paola Campus, Diego Coppola, Emanuele Marchetti*

### Pannello 47

Quantification of SO<sub>2</sub> emission rate by hyperspectral imaging

*Alessandro La Spina, Pietro Bonfanti, Giuseppe Salerno, Fabio Gulino, Stefano Buccellato, Domenico Corrao*

### Pannello 48

Study of the cross-correlation between infrasonic and seismic signals generated during the 2-5 December 2015 Etna explosive activity

*Giacomo Belli, Emanuele Marchetti, Duccio Gheri*

### Pannello 49

Monitoring of Indonesian volcanoes with I06AU infrasound array

*Duccio Gheri, Giacomo Belli, Emanuele Marchetti*

### Pannello 50

Quantifying thermal anomalies on active volcanoes: a comparison between MIROVA and FIRMS algorithms

*Adele Campus, Marco Laiolo, Francesco Massimetti, Diego Coppola*

### Pannello 51

The effects of paroxysmal eruptive activity of Mt. Etna in the ionosphere: the TEC-GNSS ionospheric monitoring

*Federico Ferrara, Michela Ravanelli, Federica Fuso, Andrea Cannata, Alessandro Bonforte, Mattia Crespi*

### Pannello 52

Ash fallout during the Cumbre Vieja 2021 eruption: insight from disdrometer measurements and particle microphysical properties

*Frank Donnadieu, Thierry Latchimy, Jade de Paoli, Clothilde Biensan*

### Pannello 53

The use of UAS for the aerophotogrammetric survey of lava fields and domes, and the assessment of erupted volumes of magma at Ischia (Italy)

*Enrica Marotta, Sandro de Vita, Pasquale Belviso, Gala Avvisati, Orazio Colucci*

### Pannello 54

Combined UAS measurements for monitoring dangerous volcanic contexts: applications at the Pisciarelli fumarolic field (Campi Flegrei) and Vesuvius crater

*Alessandro Fedele, Renato Somma, Fabio Matano, Claudia Troise, Giuseppe De Natale*

### Pannello 55

Morphometric survey of the tunnel lava of Monte Intraleo and of the Snow Cave with laser scanner and drone and application of Virtual and Augmented Reality

*Massimo Cantarero, Emanuela De Beni, Cristina Proietti, Paolo Centanni, Renzo Chiostrì, Chiara Ponti, Nicola Di Blasi, Davide Pellegrino, Roberto Maugeri*



## Pannello 56

Preliminary results of a topographic study at Grotta del Gelo ice cave (Mt. Etna, Italy)

*Danilo Messina, Gaetano Giudice, Danilo Pavone, Roberto Maugeri, Francesco Carnemolla, Giorgio De Guidi*

## S11. THE PAROXYSMAL ERUPTIVE SEQUENCES OF MT ETNA BETWEEN 2020 AND 2021

### Pannello 57

UV camera-based SO<sub>2</sub> flux observations during the Etna's 2021 paroxysmal sequences

*Giovanni Lo Bue Trisciuzzi, Marcello Bitetto, Dario Delle Donne, Salvatore Alparone, Mauro Coltelli, Gaetana Ganci, Francesco La Monica, Emilio Pecora, Alessandro Aiuppa*

### Pannello 58

Volcanic tremor and infrasonic data relative to the December 2020 - April 2021 paroxysmal sequence at the South East Crater of Mount Etna

*Chiara Torre, Adriana Iozzia, Andrea Cannata, Giuseppe Di Grazia, Mariangela Sciotto, Marco Viccaro*

### Pannello 59

Volcanic tremor investigation through seismic and infrasonic advanced monitoring

*Vittorio Minio, Luciano Zuccarello, Silvio De Angelis, Salvatore Rapisarda, Luciano Scuderi, Mariangela Sciotto, Martin Möllhoff, Alessio Rubonello, Marco Sassano, Andrea Cannata*

### Pannello 60

Effects of topography on the partitioning of elastic energy in atmosphere and solid Earth: 2021 Mt. Etna case study

*Adriana Iozzia, Leighton Watson, Massimo Cantarero, Emanuela De Beni, Giuseppe Di Grazia, Gaetana Gangi, Jeffrey Johnson, Eugenio Privitera, Cristina Proietti, Mariangela Sciotto*

### Pannello 61

Relationship between volcanic tremor and SO<sub>2</sub> emission at Mt. Etna between the 2008 and 2015

*Matteo Pagano, Giuseppe Di Grazia, Giuseppe Salerno, Carmelo Ferlito*

### Pannello 62

Ballistic particles and main eruption conditions during the lava fountains of 21 February 2022 at Mt. Etna

*Giorgio Costa, Simona Scollo, Marco Viccaro*

### Pannello 63

On the physical models and numerical algorithms for the simulation of lava flows and their interaction with topography and structures

*Vito Zago, Stefano Branca, Ciro Del Negro, Luigi Fortuna*

## S12. THE 2021 UNREST OF VULCANO, AEOLIAN ISLANDS (SICILY): NEW INSIGHT FROM MONITORING DATA AND HAZARD ASSESSMENT

### Pannello 64

Analysis of seismic signals accompanying the unrest of Vulcano in 2021

*Mario Valerio Gangemi, Salvatore Claudio Alparone, Andrea Cannata, Giuseppe Di Grazia, Mariangela Sciotto*

## Pannello 65

Subsurface stratigraphy, mineralogy and petrophysics at the Vulcano island (Southern Italy): recovering data for ground deformation and hydrothermal modeling at the unresting volcanic system

*Angela Mormone, Raffaella Silvia Iovine, Gianmarco Buono, Santina Stissi, Barbara Cantucci, Giordano Montegrossi, Gianfilippo De Astis, Lucia Pappalardo, Monica Piochi, Gilda Currenti*

## Pannello 66

Modelling erosion and floods on the Island of Vulcano (Italy)

*Rosanna Bonasia, Agnese Turchi, Paolo Madonia, Alessandro Fornaciai, Massimiliano Favalli, Andrea Gioia, Federico Di Traglia*

## S13. FROM MULTI-HAZARD ASSESSMENT TO INTEGRATED RISK IN VOLCANIC AREAS: DATA-ENABLED SCIENCE AND APPLICATIONS WITH NUMERICAL TOOLS AND STATISTICAL METHODS

### Pannello 67

Moment magnitude for weak earthquakes in the Mt. Etna volcano area

*Angela Saraò, Luca Moratto, Elisabetta Giampiccolo, Ornella Cocina*

### Pannello 68

Tephra fallout hazard assessment at Fuego volcano (Guatemala)

*Silvia Giansante, Alvaro Aravena, Federica Pardini, Mattia de' Michieli Vitturi, Raffaello Cioni*

### Pannello 69

Unrest episodes at central volcanoes in 1990-1999: analysis and interpretation

*Sara Emili, Laura Sandri, Valerio Acocella*

### Pannello 70

Pyroclastic current probabilistic invasion maps at the Campi Flegrei (Italy): from field data to numerical modeling

*Laura Calabrò, Tomaso Esposti Ongaro, Guido Giordano*

### Pannello 71

New perspectives on the hazard by lava flow invasion at Mount Etna volcano through the spatial and temporal elaboration using a GIS-based approach

*Mirko Messina, Giovanni Floridia, Marco Viccaro*

## S15. THE MANIFOLD INTERACTION BETWEEN HUMANS AND VOLCANOES: INTERDISCIPLINARY STUDIES AROUND VOLCANOLOGY

### Pannello 72

A combined approach for understanding volcanic hazard: ancient landscape and fragments of daily life, revealed by the effects of the 79 AD Somma-Vesuvius eruption, inside the archeological sites of Stabiae, Boscoreale, Oplontis, Herculaneum (Campania, Italy)

*Giuliana Alessio, Giuseppe Mastrolorenzo, Lucia Pappalardo, Massimo Ricciardi, Anna Cioffi*

### Pannello 73

Distribution and impact of historical lahars on densely-inhabited territory after sub-Plinian eruptions of Vesuvius

*Mauro A. Di Vito, Marina Bisson, Antonio Costa, Mattia de' Michieli Vitturi, Sandro de Vita, Domenico M. Doronzo, Roberto Gianardi, Ilaria Rucco, Laura Sandri, Giovanni Zanchetta*

## Pannello 74

Risk assessment from volcanic emissions at Mt. Etna: preliminary results from project HEAVEN

*Salvatore Giammanco, Daniele Andronico, Pietro Bonfanti, Walter D'Alessandro, Cinzia Federico, Nunzia Voltattorni, HEAVEN Project Team*

## Pannello 75

Volcanology and archaeology: joint investigations reveal the evolution of a territory far from active volcanoes, but largely affected by their phenomena

*Mauro Antonio Di Vito, Vincenzo Amato, Paola Bianchi, Raffaella Bonaudo, Paolo Marco De Martini, Vincenza Distasi, Domenico Doronzo, Adolfo Panarello, Daniela Panza, Daniela Pierno, Alessandra Smedile, Nadia Sergio, Domenico Sparice, Luigina Tomay*

## Pannello 76

A historical – methodological review of the studies on the 1932 eruption of the Quizapu volcano, Southern Andes, Chile

*Jose Pablo Sepulveda, Daniele Musumeci, Raffaello Cioni, Luigi Ingaliso, Stefano Branca*

## **S16. VOLCANIC HAZARD AND RISK: COMMUNICATION, INFORMATION AND TRAINING DURING QUIESCENCE, UNREST AND ERUPTION TIMES**

## Pannello 77

Web mapping and visualization services for planetary analogues

*Giacomo Nodjoumi, Riccardo Pozzobon, Angelo Pio Rossi, Nick Cox, Massimo Cantarero, Emanuela De Beni, Stefano Branca, and the EXPLORE H2020 Consortium*

## Pannello 78

Formulation of a prototype multi-choice online questionnaire as survey for volcanic crisis exercises

*Silvia Massaro, Laura Sandri, Adelina Geyer, Chiara Cristiani, Rosella Nave, Sara Loughlin, Sara Barsotti*

## Pannello 79

Virtual Reality Game for Earth Science: "A journey inside the volcano"

*Giuliana D'Addezio, Valerio Lombardo*

## Pannello 80

Vulcano 2022 exercise: A focus on risk and emergency communication activities for the population

*Michele Ciervo, Elena Lombardo, Antonella Scalzo, Maurilio Silvestri, Marina Morando, Cosimo Versace*

## Pannello 81

Increasing geo-hazards awareness in students: the "Geodynamic Laboratory" project first experience

*Massimo Cantarero, Alessandro Bonforte*

## Pannello 82

Lessons learned from the 2021 Cumbre Vieja eruption (La Palma, Canary Islands)

*Luca D'Auria, Nemesio Perez, INVOLCAN's team*

## AULA 1 (09.00–10.45)

### S04. BEHIND THE SCENES: ADVANCED METHODOLOGIES TO UNRAVEL THE ARCHITECTURE, DYNAMICS AND TIMESCALES OF VOLCANIC PLUMBING SYSTEMS

Conveners: *Simone Costa (UniPI), Maurizio Petrelli (UniPG), Marisa Giuffrida (UniCT), Gabriele Lanzafame (UniCT), Andrea Cannata (UniCT)*

#### 09.00–09.15

Determining the state of activity of transcrustal magmatic systems and their volcanoes

*Guido Giordano, Luca Caricchi*

#### 09.15–09.45

[KEYNOTE] Magma recharge and mush disruption control basaltic paroxysmal eruptions: the summer 2019 eruptions at Stromboli volcano (Italy)

*Chiara Maria Petrone, Silvio Mollo, Ralf Gertisser, Yannick Buret, Piergiorgio Scarlato, Elisabetta Del Bello, Daniele Andronico, Ben Ellis, Alessio Pontesilli, Gianfilippo De Astis*

#### 09.45–10.00

Thermal and SO<sub>2</sub> measurements reveal shallow magmatic dynamics at Stromboli volcano.

*Marco Laiola, Dario Delle Donne, Marcello Bitetto, Diego Coppola, Giorgio Lacanna, Marco Pistolesi, Alessandro Aiuppa, Maurizio Ripepe*

#### 10.00–10.15

Image-assisted analysis for unraveling textural and chemical features of volcanic rocks: A case study from the 2019 paroxysmal eruptions of Stromboli

*Roberto Visalli, Marisa Giuffrida, Marco Viccaro*

#### 10.15–10.30

Kinetic crystallization of a high-K basalt melt undercooled in laboratory: Implications for the modeling of open-conduit dynamics at Stromboli (Aeolian Islands, Italy)

*Fabio Colle, Simone Costa, Matteo Masotta, Silvio Mollo, Patrizia Landi, Alessio Pontesilli, Stefano Peres, Thomas Griffiths, Lucia Mancini*

#### 10.30–10.45

Long-term precursors to large explosive eruptions of Vesuvius: evidence from the opening phase of the Avellino Plinian eruption

*Alessia Falasconi, Raffaello Cioni, Chiara Maria Petrone, Roberto Sulpizio*

## AULA 2 (09.00–10.45)

### S01. VOLCANO GEOLOGY, STRATIGRAPHY, CHRONOLOGY AND PALEOMAGNETISM TO UNRAVEL THE ERUPTIVE BEHAVIOR AND RELATED HAZARDS

Conveners: *Gilda Risica (UniFI), Arianna Beatrice Malaguti (UniURB), Gino González (UniBA), Federico Lucchi, (UniBO)*

#### 09.00–09.15

The activity of Italian volcanoes represented in ancient maps and frescoes from Middle Age to Renaissance

*Roberto Scandone, Lisetta Giacomelli*

## 09.15–09.30

Timescale of emplacement and rheomorphism of the Green Tuff ignimbrite (Pantelleria, Italy): a multidisciplinary approach  
*Alex Scarani, Carmela Federica Faranda, Alessandro Vona, Guido Giordano, Claudia Romano, Fabio Speranza, Silvio Giuseppe Rotolo*

## 09.30–09.45

The crucial role of the Cyclopean Islands (Acitrezza, Catania) to deepen the early stage of Mt. Etna volcanism  
*Rosa Anna Corsaro, Stefano Branca, Gianfranco Di Vincenzo, Lucia Miraglia*

## 09.45–10.00

Paleomagnetic dating of prehistoric flank eruptions from the SE lower slopes of Etna volcano  
*Andrea Magli, Stefano Branca, Fabio Speranza, Guido Giordano, Mauro Coltelli, Arianna Beatrice Malaguti*

## 10.00–10.15

The chronicle of a small crater collapse at Stromboli: volcanological relevance of the 19 May 2021 ash cloud deposit  
*Giuseppe Re, Massimo Pompilio, Paola Del Carlo, Alessio Di Roberto*

## 10.15–10.30

Resumption of the sustained column during the post-Plinian phase of the 79 AD Vesuvius eruption  
*Giulia Chiominto, Claudio Scarpati, Annamaria Perrotta, Lorenzo Fedele, Ileana Santangelo*

## 10.30–10.45

Stratigraphy, lithofacies variations and transport and emplacement mechanisms of the most destructive PDC of the 79 AD Vesuvius eruption  
*Ileana Santangelo, Claudio Scarpati, Annamaria Perrotta, Lorenzo Fedele, Giulia Chiominto*

## CORO DI NOTTE (09.00–10.45)

### S16. VOLCANIC HAZARD AND RISK: COMMUNICATION, INFORMATION AND TRAINING DURING QUIESCENCE, UNREST AND ERUPTION TIMES

Conveners: *Rosella Nave (INGV-OV), Emanuela De Beni (INGV-OE), Elena Russo (UniMIB), Valerio Lombardo (INGV-ONT), Fabio L. Bonali (UniMIB), Susanna Falsaperla (INGV-OE), Vincenza Maiolino (INGV-OE), Sara Barsotti (IMO), Marco Neri (INGV-OE), Chiara Cristiani (DPC)*

## 09.00–09.15

Emergent tools to promote understanding of natural hazards  
*Danilo Reitano, Susanna Falsaperla*

## 09.15–09.30

Immersive Virtual Reality: a novel approach for geological exploration in volcanic areas  
*Elena Russo, Fabio Luca Bonali, Alessandro Tibaldi, Noemi Corti, Federico Pasquaré Mariotto, Ugo Becciani, Fabio Vitello*

## 09.30–09.45

Promoting interest in geological sites among the public via a field guide and virtual reality of Aci Castello and Aci Trezza (Sicily)  
*Joshua Brown, Massimo Cantarero, Domenico Catalano, Rosa Anna Corsaro, Emanuela De Beni*

09.45–10.00

Elica, takes children through reading into the world of science and conscious technology

*Massimo Cantarero, Emanuela De Beni, Maria Pia Basso*

10.00–10.15

Scientific communication and outreach in the schools: a strategy for the better comprehension of natural risks

*Vincenza Maiolino, Gruppo di lavoro informazione e divulgazione*

10.15–10.30

Experiential learning exercises in small communities: the example of the elementary school of Vulcano Island, Italy

*Costanza Bonadonna*

10.30–10.45

An on-line form to promote citizen science: INGV, Osservatorio Vesuviano web form experience

*Rosa Nappi, Rosella Nave, Giovanni Scarpato*

## AULA 1 (11.15–13.30)

### [Continua] **S04. BEHIND THE SCENES: ADVANCED METHODOLOGIES TO UNRAVEL THE ARCHITECTURE, DYNAMICS AND TIMESCALES OF VOLCANIC PLUMBING SYSTEMS**

Conveners: *Simone Costa (UniPI), Maurizio Petrelli (UniPG), Marisa Giuffrida (UniCT), Gabriele Lanzafame (UniCT), Andrea Cannata (UniCT)*

11.15–11.30

New insights into the recent magma dynamics under Campi Flegrei caldera (Italy) from petrological and geochemical evidence

*Gianmarco Buono, Antonio Paonita, Lucia Pappalardo, Stefano Caliro, Anna Tramelli, Giovanni Chiodini*

11.30–11.45

A data driven approach based on mineral chemistry unveils magma dynamics of long-lasting, low-intensity volcanic activity

*Simone Costa, Luca Caricchi, Marco Pistolesi, Anna Gioncada, Matteo Masotta, Costanza Bonadonna, Mauro Rosi*

11.45–12.00

Physical constraints and magma dynamics of Mt. Etna rift systems

*Pier Paolo Giacomoni, Matteo Masotta, Simone Costa, Gabriele Lanzafame, Eleonora Braschi*

12.00–12.15

Quantifying magma ascent velocity at basaltic volcanoes and its role on determining the explosivity of eruptions

*Francesco Zuccarello, Federica Schiavi, Marco Viccaro*

12.15–12.30

Relating eruptive dynamics to mineral chemistry variability during the February-March 2021 sequence of lava fountains (South-East Crater, Mt. Etna)

*Alessandro Musu, Rosa Anna Corsaro, Oliver Higgins, Corin Jorgenson, Maurizio Petrelli, Luca Caricchi*

## 12.30–12.45

Novel insights into dynamics and timescales of volcanic processes from magma storage at deep crustal levels to eruption: the contribution of synchrotron X-ray diffraction, radiography and computed microtomography

*Barbara Bonechi, Margherita Polacci, Vincenzo Stagno, Fabio Arzilli, Giuseppe La Spina, Rostislav Hrubciak, Cristina Perinelli, Mario Gaeta, Mike Burton*

## 12.45–13.00

Constraining models of magma ascent with ground deformation data: an application to Etna eruptions

*Emanuele Caruso, Antonio Costa, Giovanni Macedonio, Alessandro Bonaccorso, Gilda Currenti*

## 13.00–13.15

The Marsili plumbing system and its magmatic evolution

*Emanuela Gennaro, Gianluca Iezzi, Luca Cocchi, Guido Ventura*

## 13.15–13.30

Pre-eruptive magmatic processes leading to the 1650 CE explosive eruption at the Kolumbo submarine volcano, Greece

*Filippo Mastroianni, Iacopo Fantozzi, Alessandro Bragagni, Chiara Maria Petrone, Georgios E. Vougioukalakis, Eleonora Braschi, Lorella Francalanci*

## AULA 2 (11.15–12.30)

[Continua] **S01. VOLCANO GEOLOGY, STRATIGRAPHY, CHRONOLOGY AND PALEOMAGNETISM TO UNRAVEL THE ERUPTIVE BEHAVIOR AND RELATED HAZARDS**

Conveners: *Gilda Risica (UniFI), Arianna Beatrice Malaguti (UniURB), Gino González (UniBA), Federico Lucchi, (UniBO)*

## 11.15–11.30

Deadly thermal impact of detached ash cloud surges in 79CE at Herculaneum: a new hazard scenario at Vesuvius Volcano.

*Alessandra Pensa, Guido Giordano, Sveva Corrado, Pier Paolo Petrone*

## 11.30–11.45

Stratigraphy and eruptive dynamics of the Neapolitan Yellow Tuff, Campi Flegrei, Italy

*Gino Gonzalez, Roberto Sulpizio, Antonio Costa, Federico Lucchi, Roberto Isaia, Biagio Giaccio, Jacopo Natale, Daniela Mele, Lorenzo Monaco*

## 11.45–12.00

The Campanian Ignimbrite of southern Italy: a fissure eruption or caldera-forming event?

*Giuseppe De Natale, Christopher R.J. Kilburn, Giuseppe Rolandi, Claudia Troise, Renato Somma, Alessandro Fedele, Gianfranco Di Vincenzo, Roberto Rolandi, Judith Woo*

## 12.00–12.15

A new morphology-based classification scheme for intermediate to silicic lava flows: application to the Central Andean Volcanic Zone

*Jose Pablo Sepulveda, Raffaello Cioni, Alvaro Aravena*

## 12.15–12.30

New insights on the intimate structure of natural volcanic aggregates through X-ray micro-tomography

*Pietro Gabellini, Raffaello Cioni, Eduardo Rossi, Costanza Bonadonna, Marco Pistolesi, Lukas Baumgartner, Benita Putlitz*

## AULA 2 (12.30–13.30)

### S10. PROXIMAL AND DISTAL VOLCANIC MONITORING USING REMOTE SENSING SYSTEMS: NOVEL PRACTICES, APPLICATIONS AND INTEGRATIONS

Conveners: *Stefano Corradini (INGV-ONT), Gaetana Ganci (INGV-OE), Luca Merucci (INGV-ONT), Giuseppe Salerno (INGV-OE), Letizia Spampinato (INGV-OE), Cristina Proietti (INGV-OE), Emanuela De Beni (INGV-OE)*

#### 12.30–12.45

Remote sensing of volcanic clouds: the legacy of Prof. Frank Silvio Marzano

*Simona Scollo, Costanza Bonadonna, Stefano Corradini, Luigi Mereu, Maurizio Ripepe*

#### 12.45–13.00

Spatio-temporal evolution of SO<sub>2</sub> fluxes detected from a network of two ultraviolet cameras, and insights on the magma degassing (Stromboli Volcano, Sicily)

*Dario Delle Donne, Eleonora Lo Coco, Marcello Bitetto, Francesco Paolo La Monica, Giorgio Lacanna, Joao Lages, Maurizio Ripepe, Giancarlo Tamburello, Alessandro Aiuppa*

#### 13.00–13.15

Integrating Ground-based and Satellite Volcano Monitoring techniques applied to gas emissions from fumarole vents and from the ground at La fossa Caldera (Vulcano, Aeolian Islands, Italy)

*Iole Serena Diliberto, Giuseppe Bilotta, Annalisa Cappello, Roberto D'Aleo, Vincenzo Francofonte, Andrea Mastroli, Giuseppe Passafiume, Gaetana Ganci*

#### 13.15–13.30

Integrating mineralogical and geomorphological analyses: a first application to the highly active hydrothermal discharge area of Pisciarelli in the Campi Flegrei volcanic field (Italy)

*Teresa Caputo, Angela Mormone, Ermanno Marino, Giuseppina Balassone, Monica Piochi*

## CORODINOTTE (11.15–12.00)

### [Continua] S16. VOLCANIC HAZARD AND RISK: COMMUNICATION, INFORMATION AND TRAINING DURING QUIESCENCE, UNREST AND ERUPTION TIMES

Conveners: *Rosella Nave (INGV-OV), Emanuela De Beni (INGV-OE), Elena Russo (UniMIB), Valerio Lombardo (INGV-ONT), Fabio L. Bonali (UniMIB), Susanna Falsaperla (INGV-OE), Vincenza Maiolino (INGV-OE), Sara Barsotti (IMO), Marco Neri (INGV-OE), Chiara Cristiani (DPC)*

#### 11.15–11.30

Visualizing design thinking for volcanic risk communication

*Jorge E. Romero, Francisca Vergara-Pinto*

#### 11.30–11.45

Communicating volcanic hazard during the 2021 Fagradalsfjall eruption in Iceland: from science to operations

*Sara Barsotti, Michelle Maree Parks, Melissa Anne Pfeffer, Bergrún Arna Óladóttir, Gro B.M. Pedersen, Kristín Jónsdóttir, Björn Oddsson*

#### 11.45–12.00

General discussion



## CORO DI NOTTE (12.00–13.30)

### S07. TOWARDS A MULTIDISCIPLINARY APPROACH TO UNDERSTAND THE ORIGIN AND DYNAMICS OF PAROXYSMS AT BASALTIC VOLCANOES

Conveners: *Ida Di Carlo (ISTO), Massimo Pompilio (INGV-PI), Michel Pichavant (ISTO), Nolwenn Le Gall (UCL)*

#### 12.00–12.15

Volcanic gas constraints on the trigger mechanisms and incubation timescales of basaltic paroxysms

*Alessandro Aiuppa, Marcello Bitetto, Dario Delle Donne, Francesco La Monica, Giovanni Lo Bue Trisciuzzi, Giancarlo Tamburello*

#### 12.15–12.30

Pre-explosive ground deformations induced by normal Strombolian and paroxysmal activities at Stromboli volcano

*Ayumu Ishikawa, Takeshi Nishimura, Giorgio Lacanna, Hiroshi Aoyama, Ryohei Kawaguchi, Eisuke Fujita, Taishi Yamada, Takahiro Miwa, Maurizio Ripepe*

#### 12.30–12.45

The 19 July 2020 eruption at Stromboli: insights into the magmatic system feeding high-energy activity at an open-conduit basaltic volcano

*Marija Voloschina, Nicole Métrich, Antonella Bertagnini, Paola Marianelli, Alessandro Aiuppa, Maurizio Ripepe, Marco Pistolesi*

#### 12.45–13.00

The 2019 basaltic Vulcanian eruptions of Stromboli

*Guido Giordano, Alessandro Vona, Alessandro Frontoni, Teresa Oreade Grillo, Riccardo Russo, Gerardo Carrasco Nunez, Gianfilippo De Astis*

#### 13.00–13.15

Precursors of paroxysmal activity at Stromboli volcano through machine learning applied to seismo-acoustic features

*Flora Giudicepietro, Sonia Calvari, Luca D'Auria, Federico Di Traglia, Giovanni Macedonio, Teresa Caputo, Walter De Cesare, Gaetana Ganci, Marcello Martini, Massimo Orazi*

#### 13.15–13.30

General discussion

## AULA 1 (15.00–16.00)

### [Continua] S04. BEHIND THE SCENES: ADVANCED METHODOLOGIES TO UNRAVEL THE ARCHITECTURE, DYNAMICS AND TIMESCALES OF VOLCANIC PLUMBING SYSTEMS

Conveners: *Simone Costa (UniPI), Maurizio Petrelli (UniPG), Marisa Giuffrida (UniCT) Gabriele Lanzafame (UniCT), Andrea Cannata (UniCT)*

#### 15.00–15.15

Magma mingling and crystal recycling inside a shallow magma chamber during the last phase of magmatic activity at Nisyros volcano (Greece)

*Eleonora Braschi, Francesca Giannetti, Andrea Orlando, George Vougioukalakis, Lorella Francalanci*

15.15 – 15.30

Spatio-temporal reconstruction of the magma plumbing system of Fogo volcano, Cape Verde archipelago  
*Francesco Maria Lo Forte, Alessandro Aiuppa, Silvio G. Rotolo, Vittorio Zanon*

15.30 – 15.45

Modulation of a plumbing system by ice cover fluctuations - The Pleiades volcanic complex, Antarctica  
*Irene Rocchi, Alice Tomassini, Matteo Masotta, Maurizio Petrelli, Mónica Agreda Lopez, Sergio Rocchi*

15.45 – 16.00

Mafic recharge dynamics in Middle Triassic feeding systems of Dolomites (Southern Alps): comparison with active volcanoes  
*Nicolò Nardini, Federico Casetta, Theodoros Ntaflos, Alberto Zanetti, Massimo Coltorti*

**AULA 1 (16.00 – 17.00)**

## **S08. NEW PERSPECTIVES IN DECIPHERING MANTLE GEOCHEMICAL, MINERALOGICAL AND SEISMIC HETEROGENEITIES**

Conveners: *Antonio Caracausi (INGV-PA), Jabrane Labidi (IPGP), Giulia Marras (UniRM1), Vincenzo Stagno (UniRM1)*

16.00 – 16.15

New Inferences on Magma Dynamics in Melilitite-Carbonatite Volcanoes: The Case Study of Mt. Vulture (Southern Italy)  
*Gabriele Carnevale, Antonio Caracausi, Silvio Rotolo, Michele Paternoster, Vittorio Zanon*

16.15 – 16.30

The nature of the lithospheric mantle under La Palma (Canary Islands): New data on noble gases and CO<sub>2</sub> isotopes from the 2021 Cumbre Vieja eruption  
*Andres Libardo Sandoval Velasquez, Andrea Luca Rizzo, Federico Casetta, Theodoros Ntaflos, Alessandro Aiuppa, Mar Alonso, Eleazar Padrón, Matthew Pankhurst, Nemesio M. Pérez*

16.30 – 16.45

Multi-stage oxidizing events recorded by peridotite mantle xenoliths from the Hyblean Plateau: evidence from combined measurements of Fe<sup>3+</sup> in spinel, noble gases, and fluid inclusions composition  
*Giulia Marras, Vincenzo Stagno, Giovanni Battista Andreozzi, Antonio Caracausi, Valerio Cerantola, Maria Luce Frezzotti, Michele Zacchigna, Cristina Perinelli*

16.45 – 17.00

Application of synchrotron micro-Mössbauer and micro-FTIR spectroscopy to analyze redox-driven processes recorded by mineral and melt inclusions  
*Giulia Marras, Gabriele Carnevale, Antonio Caracausi, Silvio Rotolo, Vincenzo Stagno*

**AULA 2 (15.00 – 17.00)**

## **[Continua] S10. PROXIMAL AND DISTAL VOLCANIC MONITORING USING REMOTE SENSING SYSTEMS: NOVEL PRACTICES, APPLICATIONS AND INTEGRATIONS**

Conveners: *Stefano Corradini (INGV-ONT), Gaetana Ganci (INGV-OE), Luca Merucci (INGV-ONT), Giuseppe Salerno (INGV-OE), Letizia Spampinato (INGV-OE), Cristina Proietti (INGV-OE), Emanuela De Beni (INGV-OE)*

15.00–15.15

Quantifying thermal emission from open vent multicraters system using a multisensory space-based approach: Stromboli and Etna case studies

*Francesco Massimetti, Diego Coppola, Marco Laiolo, Adele Campus, Corrado Cigolini, Maurizio Ripepe*

15.15–15.30

Integrated use of satellite instruments for real-time monitoring of Etna emissions

*Stefano Corradini, Luca Merucci, Lorenzo Guerrieri, Dario Stelitano*

15.30–15.45

Doppler Radar Monitoring of Mt. Etna Explosive Activity

*Giuseppe Giammello, Marco Firetto Carlino, Mauro Coltelli*

15.45–16.00

Detection and Parametrization of Volcanic Plumes from Visible-Wavelength Images with PlumeTraP: Application to Plumes Associated with the 2018 Sabancaya Eruption, Perú

*Riccardo Simionato, Paul A. Jarvis, Eduardo Rossi, Costanza Bonadonna*

16.00–16.15

A new radar-based statistical parametric model to quantify the mass eruption rate and uncertainty in various wind conditions

*Luigi Mereu, Simona Scollo, Alexander Garcia, Laura Sandri, Costanza Bonadonna, Frank Silvio Marzano*

16.15–16.30

Real-time estimation of Mass Eruption Rates of tephra plumes at Mt. Etna from fixed-pointing Doppler radar

*Frank Donnadieu, Valentin Freret-Lorgeril, Michele Prestifilippo, Mauro Coltelli, Patrick Fréville, Claude Hervier, Simona Scollo, Yannick Guéhenneux, Philippe Cacault*

16.30–16.45

Analysis of high-resolution DEMs from UAS to estimate the distribution of ash-fall out and ballistics from Etna's 2021 paroxysmal events

*Cristina Proietti, Massimo Cantarero, Emanuela De Beni*

16.45–17.00

General discussion

## **CORO DI NOTTE (15.00–17.00)**

### **S14. VOLCANIC RISK MANAGEMENT IN INHABITED AREAS**

Conveners: *Antonio Colombi (DPC), Chiara Cristiani (DPC), Eugenio Privitera (INGV-OE)*

15.00–15.15

[INVITED] Relative seismic and tsunami risk assessment: the Stromboli Island (UNESCO site, Italy) case study

*Agnese Turchi*

## 15.15 – 15.30

The 2021 eruption in La Palma Island (Canary Islands, Spain): Volcano monitoring, eruptive processes and crisis management  
*Meletlidis Stavros, IGN Volcano Monitoring Group, Directorate General of Security and Emergencies of Canary Government*

## 15.30 – 15.45

Integrating hazard, exposure, vulnerability and resilience for risk and emergency management in a volcanic context: the ADVISE model  
*Costanza Bonadonna, Corine Frischknecht, Scira Menoni, Mauro Rosi, Sebastien Biass, Chris E. Gregg, Ali Asgary, Marco Pistolesi, Antonio Ricciardi, Chiara Cristiani*

## 15.45 – 16.00

Emergency management and risk reduction measures during the Vulcano (Aeolian Islands) unrest 2021-2022  
*Antonio Ricciardi, Antonella Scalzo, Chiara Cristiani, Massimo Durantini, Domenico Fiorito*

## 16.00 – 16.15

Continuous monitoring of soil CO<sub>2</sub> flux and air CO<sub>2</sub> concentration at Vulcano during 2021  
*Sergio Gurrieri, Roberto M.R. Di Martino, Marco Camarda, Vincenzo Francofonte*

## 16.15 – 16.30

Response of the civil protection office of the town of Pozzuoli to the unrest of the Campi Flegrei caldera  
*Mauro Rosi, Annamaria Criscuolo*

## 16.30 – 16.45

Buildings vulnerability under effect of bradyseism phenomena: Campi Flegrei case study  
*Daniela De Gregorio, Francesca Linda Perelli, Stefano Nardone, Giulio Zuccaro*

## 16.45 – 17.00

Approaches at regional and National levels to prevent and mitigate the risk of gas hazards in the inhabited areas of Rome, Ciampino and Fiumicino municipalities (Lazio Region).  
*Antonio Colombi, Giacomo Catalano, †Antonio Gerardi*

## AULA 1 (09.00–10.45)

### S05. EQUILIBRIUM/DISEQUILIBRIUM PROCESSES DURING MAGMA ASCENT: NEW INSIGHTS FROM LABORATORY AND MODELLING STUDIES AND OBSERVATIONS OF THE NATURAL SYSTEM

Conveners: *Giuseppe La Spina (INGV-OE), Paola Stabile (UniCAM), Michael R. Carroll (UniCAM), Margherita Polacci (UOM)*

#### 09.00–09.15

The complex rheology of bubble-bearing magmas

*Alessandro Frontoni, Alessandro Vona, Claudia Romano*

#### 09.15–09.30

Quantifying the influence of cooling rate and shear rate on the disequilibrium rheology of a basaltic melt from Mt. Etna (Italy)

*Fabrizio Di Fiore, Alessandro Vona, Antonio Costa, Silvio Mollo, Claudia Romano*

#### 09.30–09.45

A comprehensive database of crystal-bearing magmas for the calibration of a rheological model

*Alessandro Frontoni, Antonio Costa, Alessandro Vona, Claudia Romano*

#### 09.45–10.00

[INVITED] In situ 4D dendritic crystallization in hydrous basaltic magmas: implications for magma mobility within the Earth's crust

*Fabio Arzilli, Margherita Polacci, Giuseppe La Spina, Nolwenn Le Gall, Edward W. Llewellyn, Richard A. Brooker, Danilo Di Genova, David A. Neave, Daniele Giordano, Mike R. Burton*

#### 10.00–10.15

Assessing the role of equilibrium thermodynamics in magma evolution by molecular dynamics and phase diagram calculations

*Donato Belmonte, Giulio Ottonello, Francesca Menescardi*

#### 10.15–10.30

Shallow syn-eruptive carbonate assimilation and its effects on vesiculation and eruptive behaviour – insights from 3D reconstruction of experimental samples

*Marco Knüver, Daniela Mele, Alessandro Pisello, Roberto Sulpizio, Diego Perugini, Antonio Costa, Francesco Vetere*

#### 10.30–10.45

Relationship between edifice collapse and eruptive activity on instant time scales: insights from the Pacaya 1 ka and Cumbre Vieja 2021 eruptions

*Jorge E. Romero, Margherita Polacci, Fabio Arzilli, Shigeru Kitamura, Giuseppe La Spina, Francisco Cáceres, Mike Burton, Matthew Pankhurst*

## AULA 2 (09.00–10.45)

### S06. LARGE ERUPTIONS MAGMA-CHAMBERS FORMATION AND EVOLUTION: IMPLICATIONS ON MAGMATIC PROCESSES, ERUPTION DYNAMICS AND ENVIRONMENTAL IMPACT

Conveners: *Sandro de Vita (INGV-OV), Claudia D'Oriano (INGV-PI), Ilenia Arienzo (INGV-OV), Domenico M. Doronzo (INGV-OV)*

#### 09.00–09.15

Classification of ignimbrites and their eruptions

*Guido Giordano, Ray Cas*

09.15–09.30

Volcanological and petrological characterization of the Golja Ignimbrite (Main Ethiopian rift)

*Federica Langone, Zara Franceschini, Francesca Forni, Bruno Scaillet, Gaëlle Prouteau, Stéphane Scaillet, Raffaello Cioni*

09.30–09.45

From deposits to physical parameters of large-scale energetic pyroclastic density currents: the case of the 39.8 ka Campanian Ignimbrite, Italy

*Aurora Silleni, Guido Giordano, Michael H. Ort, Roberto Isaia*

09.45–10.00

Reconstructing pyroclastic currents' source and flow parameters from deposit characteristics and numerical modeling: The Pozzolane Rosse ignimbrite case study (Colli Albani, Italy)

*Laura Calabrò, Tomaso Esposti Ongaro, Guido Giordano, Mattia de' Michieli Vitturi*

10.00–10.15

The 79 CE eruption of Vesuvius - lesson from the past and future perspectives

*Domenico Maria Doronzo, Mauro Antonio Di Vito, Ilenia Arienzo, Monica Bini, Benedetta Calusi, Matteo Cerminara, Stefano Corradini, Sandro de Vita, Biagio Giaccio, Lucia Gurioli, Giorgio Mannella, Giovanni Ricciardi, Ilaria Rucco, Domenico Sparice, Micol Todesco, Elisa Trasatti, Giovanni Zanchetta*

10.15–10.30

Reconstructing the pre Campanian Ignimbrite (39 ka) activity of Neapolitan volcanoes: first stratigraphical results of boreholes drilling in proximal and intermediate-distal areas of the Campi Flegrei caldera

*Domenico Sparice, Mauro Antonio Di Vito, Sandro de Vita, Carlo Pelullo*

10.30–10.45

Timescales of mingling preceding the Zaro eruption at Ischia

*Chiara P. Montagna, Carlo Pelullo, Ilenia Arienzo, Federico Brogi, Simone Colucci, Claudia D'Oriano, Sumit Chakraborty, Massimo D'Antonio, Lucia Pappalardo, Paola Petrosino*

## **AULA 1 (11.15–13.30)**

S12. THE 2021 UNREST OF VULCANO, AEOLIAN ISLANDS (SICILY): NEW INSIGHT FROM MONITORING DATA AND HAZARD ASSESSMENT

Conveners: *Mauro Coltelli (INGV-OE), Stefano Branca (INGV-OE), Francesco Italiano (INGV-PA), Augusto Neri (INGV-PI)*

11.15–11.30

The 2021 ongoing volcanic unrest at Vulcano island (Italy): clues from the INGV multidisciplinary surveillance network

*Antonio Paonita, INGV-PA Monitoring Team, INGV-OE Monitoring Team*

11.30–11.45

Variation of CO<sub>2</sub> emissions diffused from the soil during the 2021-2022 crisis of the La Fossa volcano (Vulcano, Aeolian Islands)

*Cosimo Rubino, Luca Tarchini, Maria Luisa Carapezza, Domenico Granieri, Antonio Patera, Lucia Pruiti, Massimo Ranaldi, Francesco Sortino*

11.45–12.00

Soil CO<sub>2</sub> flux surveys at Vulcano during 2021

*Marco Camarda, Roberto M.R. Di Martino, Sergio Gurrieri, Giorgio Capasso, Vincenzo Prano*

12.00–12.15

The effects of volcanic degassing on the air composition revealed by stable isotope surveys

*Roberto M.R. Di Martino, Sergio Gurrieri*

12.15–12.30

Three dimensional magnetotelluric modeling of Vulcano Island (Aeolian archipelago, Italy) and its implications for recent volcanic unrest

*Maria Giulia Di Giuseppe, Roberto Isaia, Antonio Troiano*

12.30–12.45

A deep learning approach to monitor the thermal anomalies associated with the 2000-2022 exhalation activity in Vulcano Island (Italy) using ASTER

*Claudia Corradino, Michael Sean Ramsey, Eleonora Amato, Federica Torrisi, Ciro Del Negro*

12.45–13.00

Detection of thermal unrest at La Fossa crater (Vulcano Island, Italy) using VIIRS imaging bands

*Diego Coppola, Marco Laiolo, Adele Campus, Francesco Massimetti*

13.00–13.15

Satellite time series analysis: a statistical approach. The Vulcano Island 2021 crisis

*Federico Rabuffi, Malvina Silvestri, Massimo Musacchio, Vito Romaniello, Maria Fabrizia Buongiorno*

13.15–13.30

Volcanic-related flank instability at Vulcano island

*Roberto Gianardi, Marina Bisson, Mauro Antonio Di Vito, Paolo Madonia, Claudia Spinetti, Marco Polcari, Cristiano Tolomei, Gianfilippo De Astis*

## AULA 2 (11.15–13.15)

### S09. VOLCANO-HYDROTHERMAL SYSTEMS AND RELATED HAZARDS: MULTI-DISCIPLINARY APPROACHES

Conveners: *Franco Tassi (UniFI), Manfredi Longo (INGV-PA), Dmitri Rouwet (INGV-BO)*

*Orlando Vaselli (UniFI), Walter D'Alessandro (INGV-PA), Sergio Calabrese (UniPA)*

*Kyriaki Daskalopoulou (GFZ), Micol Todesco (INGV-BO)*

11.15–11.30

Hydrogeochemistry of the Turrialba and Irazú "twin volcanoes", Costa Rica

*Dmitri Rouwet*

11.30–11.45

Mount Etna volcanic emissions signature on the chemical composition of bulk atmospheric deposition in Sicily, Italy

*Filippo Brugnone, Walter D'Alessandro, Francesco Parello, Filippo Saiano, Marcello Liotta, Sergio Bellomo, Lorenzo Brusca, Lorenza Li Vigni, Anna Maria Abita, Sergio Calabrese*

11.45 – 12.00

The key-role of submarine calderas in the development of hydrothermal systems: new findings from Palinuro and Brothers seamounts

*Luca Cocchi, Fabio Caratori Tontini, Filippo Muccini, Cornel E. J. De Ronde*

12.00 – 12.15

Geochemistry of REE and trace elements in shallow hydrothermal vents at Panarea island (Italy)

*Fabio Sposito, Francesco Italiano, Manfredi Longo, Lorenzo Brusca*

12.15 – 12.30

The shallow hydrothermal brine of Panarea: preliminary characterisation of the acoustic signature

*Gianluca Lazzaro, Manfredi Longo, Cinzia Caruso, Sergio Scirè, Agostino Semprebello, Francesco Italiano*

12.30 – 12.45

Numerical simulations for the characterization of phreatic events on Vulcano Island

*Santina Chiara Stissi, Gilda Currenti, Micol Todesco*

12.45 – 13.00

Influence of vent geometry and grain size distribution on the dynamics of phreatic eruptions

*Silvia Giansante, Tomaso Esposti Ongaro, Mattia de' Michieli Vitturi, Marco Pistolesi, Raffaello Cioni*

13.00 – 13.15

General discussion



**Domenica 2 Ottobre,  
escursione sul versante nord dell'Etna  
salita ai crateri sommitali e visita all'Osservatorio di Pizzi Deneri dell'INGV OE**

**durata circa 8-9 ore, dalle 7.00 alle 16.00 circa**

## L'area sommitale dell'Etna

L'Etna è un vulcano straordinariamente complesso e dinamico, soggetto a frequenti cambiamenti della morfologia e delle fenomenologie eruttive. La sua attività è concentrata, per periodi più o meno lunghi, in area sommitale. Mentre fino ai primi anni del XX Secolo, in cima all'Etna era presente un solo cratere, il Cratere Centrale, oggi quest'area è caratterizzata dalla presenza di quattro crateri che si sono formati ed accresciuti nel corso degli ultimi cento anni circa. Nel 1911, sul fianco settentrionale del Cratere Centrale nasce il Cratere di Nord-Est.



Successivamente, all'interno del Cratere Centrale si formano la Voragine (1945) e in seguito la Bocca Nuova (1968). Nel 1971, sul fianco sud-orientale del Cratere Centrale si forma il Cratere di Sud-Est, che rimane attivo fino al 2007. A partire dal 2011 inizia ad accrescersi anche il Nuovo Cratere di Sud-Est, appoggiato sul fianco orientale del "vecchio" Cratere di Sud-Est e che in pochi anni ha raggiunto quasi le stesse dimensioni del "vecchio" cono. L'attività eruttiva, soprattutto di una bocca presente nella sella morfologica che fino al 2015 divideva il vecchio cono dal nuovo, ha progressivamente saldato i due coni principali, rendendoli un unico edificio vulcanico, allungato in senso NW-SE tanto che alla fine del 2020 si è tornati alla nomenclatura primigenia di Cratere di SE.



## L'Osservatorio vulcanologico di Pizzi Deneri

L'idea di ricostruire un osservatorio vulcanologico ad alta quota sull'Etna dopo la distruzione, durante l'eruzione del 1971, dello storico Osservatorio Etneo dell'Università di Catania, che era localizzato a 2940 m s.l.m. nel versante sud, nacque da un progetto di Letterio Villari che si concretizzò nel 1977 quando divenne direttore dell'Istituto Internazionale di Vulcanologia (IIV) del CNR di Catania.

Il nuovo osservatorio fu costruito durante l'estate del 1977 ad una quota 2818 m s.l.m. nel versante nord in corrispondenza del rilievo morfologico di Pizzi Deneri, che corrisponde al bordo della caldera dell'Ellittico (Fig. 1), in una posizione sicura rispetto al rischio di invasione lavica. La struttura dell'edificio fu realizzata con due cupole, che ricordano la forma dell'igloo, per evitare i grossi accumuli di neve durante la stagione invernale e quindi favorirne l'accesso.

I locali dell'osservatorio erano adibiti sia per ospitare il personale dell'IIV e ricercatori italiani e stranieri che la strumentazione per il monitoraggio e i relativi laboratori. In particolare, furono realizzati, ad una profondità di circa 10 m, due tunnel ortogonali della lunghezza di 80 m destinati ad ospitare degli clinometri a base lunga per la misura delle deformazioni del suolo, che nel tempo si sono evoluti da un sistema ottico-micrometrico ad uno con lettore laser. Attualmente l'osservatorio ospita, oltre il sopracitato clinometro, le seguenti stazioni per il monitoraggio vulcanologico: gravimetrica, sismica, GPS, infrasonica, oltre ad un strain meter in pozzo e un interferometro laser. Dall'osservatorio, risalendo la cresta di Pizzi Deneri, è possibile osservare la vasta depressione della Valle del Bove che è stata generata da una serie di collassi di fianco a partire da circa 9200 anni dal presente. Lungo le pareti interne della Valle del Bove è esposta la successione vulcanica degli ultimi 100.000 anni e le relative strutture subvulcaniche, come i dicchi e i neck.

## Alcuni consigli sull'equipaggiamento necessario

Nonostante la fine di settembre – inizio di ottobre in Sicilia si possano considerare a tutti gli effetti una coda dell'estate, l'area sommitale dell'Etna può presentare condizioni meteorologiche talvolta poco confortevoli (forte vento, temperature basse, nebbia, rapidi cambiamenti, etc.).

Oltre agli immancabili scarponi da trekking, per affrontare l'escursione sarà pertanto necessario possedere un equipaggiamento adeguato, ovvero: giacca a vento oppure shell/soft-shell, k-way, pile wind-stopper, pantaloni tech, cappello, guanti, occhiali da sole.

Orario di inizio dell'escursione: ore 7:00

Orario stimato per la conclusione dell'escursione: ore 16:00

Field Leaders: Dr. Stefano Branca (INGV-OE) Prof. Marco Viccaro (UNICT)

Costo escursione:

Il pagamento della quota di iscrizione avverrà al momento del check-in alla Conferenza, presso la Segreteria presente sul posto.