



3<sup>rd</sup> International Workshop on NATURAL HAZARDS

## VOLCANIC RISKS



Available: [https://www.abc.es/ciencia/abci-misteriosa-burbuja-roca-surge-profundidades-201712181049\\_noticia.html](https://www.abc.es/ciencia/abci-misteriosa-burbuja-roca-surge-profundidades-201712181049_noticia.html)

Angra do Heroísmo, Terceira Island, Azores  
26<sup>th</sup> and 27<sup>th</sup> May 2022



## INDEX

INTRODUCTION .....	4
ORGANIZING COMMITTEE .....	5
SECRETARIAT .....	5
SCIENTIFIC COMMITTEE .....	6
GENERAL INFORMATION .....	7
ORGANIZATION OF SESSIONS .....	8
KEYNOTE LECTURES .....	8
KEYNOTE SPEAKERS .....	9
EXTENDED PROGRAM .....	14
POSTER EXHIBITION .....	17
FIELD TRIP 1 .....	18
FIELD TRIP 2 .....	19

## **INTRODUCTION**

The Regional Secretariat for Tourism, Mobility and Infrastructure through the Regional Laboratory of Civil Engineering (LREC) promotes the **International Workshop on NATURAL HAZARDS – NatHaz22** – under the theme **Volcanic Risks**, that will take place at Angra do Heroísmo, in Terceira Island (Azores), on the **26<sup>th</sup> and 27<sup>th</sup> of May 2022**.

The Workshop will offer a good opportunity for a forum on several issues related to the natural hazards, focused on volcanic risks and hazards, in this third edition. Due to its tectonic and volcanic environment, the Azores region is affected by most all-natural hazards: earthquakes, volcanic eruptions, landslides, floods, coastal erosion, etc. So, it is the perfect place where professionals in these fields can discuss their problems. Moreover, it will be a great opportunity to close contact with the local reality, which concerns the natural risks that can affect that island and visit several peculiar geological and volcanological aspects.

In addition to technical sessions, where 17 communications will be orally presented, and 9 posters will be an exhibition, there will be 4 keynote lectures by renowned experts. Furthermore, we are pleased to inform that accepted proceedings will be published in a special volume of the “Springer ASTI Series + IEREK” (Advances in Natural Hazards and Volcanic Risks: Shaping a Sustainable Future – Proceedings of the 3rd International Workshop on Natural Hazards (NATHAZ22), Terceira Island – Azores 2022).

We hope that all presentations and discussions held during this Workshop **NatHaz22** will contribute to updating knowledge and exchange of experience in the area of volcanic risks.

**Welcome to the Azores!**

*Organizing Committee, May 2022*

## **ORGANIZING COMMITTEE**

**President:** Francisco Fernandes, *LREC*

- Ana Malheiro, *LREC*
- Helder I. Chaminé, *ISEP*
- Helena Brasil, *LREC*
- Letícia Cunha, *LREC*
- Roberto Dutra, *LREC*

## **SECRETARIAT**

### **Laboratório Regional de Engenharia Civil (LREC)**

Helena Brasil

Rua de S. Gonçalo, s/nº 9500-343 Ponta Delgada

Telf: +351 296 301 500/11

Fax: +351 296 301 502

e-mail: NatHaz@azores.gov.pt

<https://nathaz.azores.gov.pt/index.html>

## SCIENTIFIC COMMITTEE

**Chairs:** Ana Malheiro (Portugal) and Helder I. Chaminé (Portugal)

- Adriano Pimentel, Portugal
- Alberto Gomes, Portugal
- Annalisa Cappello, Italy
- António Trota, Portugal
- Celeste Jorge, Portugal
- Chiara Arrighi, Italy
- Dave Chester, United Kingdom
- Federico Di Traglia, Italy
- Gabriela Queiroz, Portugal
- Gala Avvisati, Italy
- Giuseppe Di Capua, Italy
- Giuseppe Sappa, Italy
- Gordon Woo, United Kingdom
- Humberto Varum, Portugal
- Isabel Fernandes, Portugal
- Joan Martí, Spain
- Joaquim Pombo, Portugal
- João C. Duarte, Portugal
- João Carlos Nunes, Portugal
- João Luís Gaspar, Portugal
- José Luís Zêzere, Portugal
- José Martins Carvalho, Portugal
- José Pacheco, Portugal
- José Teixeira, Portugal
- José Virgílio Cruz, Portugal
- Kelvin R. Berryman, New Zealand
- Luis E. Hernández-Gutiérrez, Spain
- Luis González de Vallejo, Spain
- Luis Ribeiro e Sousa, Portugal
- Manuel Abrunhosa, Portugal
- Maria Ferentinou, United Kingdom
- Maria Pregnolato, United Kingdom
- Maria Viana-Baptista, Portugal
- Maurizio Barbieri, Italy
- Nabil Khélifi, Germany
- Nicolau Wallenstein, Portugal
- Pedro JM. Costa, Portugal
- Ricardo Garcia, Portugal
- Rui Coutinho, Portugal
- Rui Marques, Portugal
- Sara Barsotti, Iceland
- Silvia Peppoloni, Italy
- Stefano Lorito, Italy
- Teresa Ferreira, Portugal
- Tew-Fik Mahdi, Canada
- Tiago Abreu, Portugal

### ***NATHAZ'22 Support***

**SPRINGER ASTI SERIES**, IEREK – Interdisciplinary Series for Sustainable Development (<https://www.springer.com/series/15883>): Publishing Editor Dr. Nabil Khélifi and Series Editor Dr. Mourad Amer

## ***GENERAL INFORMATION***

### ***Date and place***

The International Workshop will be held on Thursday May 26, at Centro de Congressos de Angra do Heroísmo, Terceira Island (Azores).

### ***Language***

The official language of the Workshop is English.

### ***Use of mobile phones***

It is forbidden to keep mobile phones connected inside the conference room.

### ***Information for authors***

Authors should submit the files of their oral presentations in "power-point" to the secretariat no later than one hour before the beginning of the session.

All sessions will be video recorded only for future memory.

### ***Coffee-Breaks***

Coffee and biscuits will be served during the morning (10h45 – 11h15) and afternoon (16:30 – 17:00) coffee-breaks.

### ***Lunch***

On the day of the Workshop, lunch will be served to the participants at the event site.

## **ORGANIZATION OF SESSIONS**

The **NatHaz22** is organized in 4 keynote lectures, 3 plenary sessions and a special session.

### **KEYNOTE LECTURES**

#### **9:15 – Keynote 1**

**"Geoethics to face natural risks by improving societal resilience"**

*Silvia Peppoloni, INGV & IAPG (Italy)*

#### **12:30 – Keynote 2**

**"Multi-hazards risk assessment at the Canary Islands"**

*Joan Martí, CSIC (Spain)*

#### **15:30 – Keynote 3**

**"Risk-informed decision-making on volcanic hazards"**

*Gordon Woo, RMS (United Kingdom)*

#### **17:30 – Keynote 4**

**"Earthquakes, Volcanoes and God: Changing Perspectives on the Importance of Religion as an Important Influence in Cultural Responses "**

*David Chester, UL (United Kingdom)*



## KEYNOTE SPEAKERS

### *Silvia Peppoloni*



**Silvia Peppoloni**, PhD geologist, a researcher at the Italian Institute of Geophysics and Volcanology (INVG), her scientific activity concerns georisks, geohazards, and communication with society. She is an international leader of geoethics, fully involved in the base research on the philosophy of geosciences, focusing on ethical, social and cultural implications of geoscience knowledge, research and practice, and key concepts for society such as sustainability, prevention, adaptation and geo-education. Adjunct Professor at the University of Rome "Sapienza" (2008-2011), she is a founding member and Secretary-General of the International Association for Promoting Geoethics, Director of the School on Geoethics and Natural Issues, Councillor of the International Union of Geological Sciences (2018-2022), member of boards of several organizations (among them the International Council for Philosophy and the International Association of Engineering Geology and Environment Italian section). Work package/task leader and member of advisory boards in European projects, editor of volumes on geoethics for Elsevier, Springer, Geological Society of London, Annals of Geophysics, she is Editor in Chief of the SpringerBrief on geoethics, science writer and contributor of Italian newspaper/magazines, co-author of the "Geoethical Promise" and the "Cape Town Statement on Geoethics". She has been awarded Italy prizes for science communication and natural literature.

## *Joan Martí*



**Joan Martí** since he obtained a PhD in Geology at the University of Barcelona in 1986, Joan Martí has concentrated his scientific career on physical volcanology, experimental and numerical modelling of volcanic processes, and volcanic hazard assessment as a researcher at the Institute of Earth Sciences Jaume Almera (ICTJA), of the Spanish Research Council (CSIC). Professor of Research since 2000 and director of this Institute since 2019, he has been Secretary of the Volcanic Risk Section of the EGU (2004-2007), Secretary-General of the IAVCEI (2007-2015), and Chair of the IUGG Commission on Geophysical Risk and Sustainability (GRC) (2015 -2018). Chief Editor of the Journal of Volcanology and Geothermal Research (Elsevier) from 2007 to 2019, Associated Editor of the Journal of Natural Hazards and Earth Sciences Studies (NHES, EGU) (2006 to 2010) and Minerals (2020-); and also has coordinated several EC funded projects. He has been a Member of the Academia Europaea since 2014 and an Honorary Fellow of the IUGG since 2019. Co-editor of the books "Volcanoes and the Environment" (CUP, 2005) and "Caldera Volcanism" (Elsevier 2008), is the principal author and co-author of over 250 peer-reviewed papers.

## *Gordon Woo*

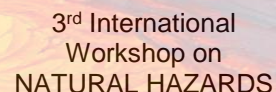


**Gordon Woo** is a catastrophist at Risk Management Solutions, specializing in quantitatively modelling extreme risks, particularly earthquakes and volcanic eruptions. He has undertaken seismic hazard assessments for most countries and has developed his own computer programs for probabilistic hazard analysis. He also has considerable experience in volcano hazard assessments. His current research has focused on the simulation of natural hazard historical catalogues. His work lies at the interface between geohazards and georisks, and he is the editor of the *Frontiers in Earth Science* section on 'Geohazards and Georisks'. He has contributed notably to the literature on evidence-based decision-making during volcanic crises, including developing the use of risk-informed evacuation protocols. He has written the chapter on geophysical hazards for the Elsevier dictionary of geology among his recent publications. Educated at Cambridge, MIT and Harvard, he is the author of 'The Mathematics of Natural Catastrophes' and 'Calculating Catastrophe', published by World Scientific Press. He is also a visiting professor at University College London and an adjunct professor at Nanyang Technological University, Singapore.

## *David K. Chester*



**David K. Chester** has been a researcher for over forty-five years and has worked on various hazard and hazard-related issues. These have included: assessing and mapping volcanic and seismic threats; using archival sources to reconstruct the effects of large-scale historic earthquakes and eruptions on people their activities; the role of religious beliefs (Judaism, Christianity, Islam and Hinduism) in influencing cultural responses to extreme natural events and regional studies of volcanology and seismology in Italy, mainland Portugal, the Azores, the Canaries, Peru and the USA. He has published: 5 research volumes (as author and editing); over 40 book chapters, and over 60 articles in learned journals. His latest jointly written volume concerns the historic volcanoes and earthquakes of the Azores. Outside the hazard sphere, he has researched human influences on landscape change in the circum-Mediterranean during the Holocene and the intellectual history of volcanology. As well as being employed at the University of Liverpool for most of his academic life and more latterly at Liverpool Hope, he is also a priest in the Anglican (*i.e.* Episcopalian) Church. In 2020 he retired from university service but remains an active researcher and holds an emeritus post at the University of Liverpool.



## EXTENDED PROGRAM

### THURSDAY, 26<sup>th</sup> of May 2022

08:30 - 09:00     **REGISTRATION**

09:00 - 09:15     **OPENING CEREMONY**

09:15 - 10:00     **Silvia Peppoloni** (Keynote 1)  
                          *"Geoethics to face natural risks by improving societal resilience"*  
**Chair:** Helder I. Chaminé (ISEP)

10:00 - 10:45     **Special Session "Volcano-related multi-hazard at Mount Etna"**  
**Convenor:** Annalisa Cappello (INGV)  
**Chairs:** João Carlos Nunes (UAç/INOVA) and Raffaele Azzaro (INGV)

10:00	<i>Toward a multi-hazard assessment at Etna volcano (Italy): the PANACEA project</i> <b>Raffaele Azzaro</b> , Salvatore D'Amico, Esposti Ongaro Tomaso, Gaetana Ganci, Simona Scollo, Marco Aliotta, Boris Behncke, Giuseppe Bilotta, Carmelo Cassisi, Paola Del Carlo, Mattia de Michieli Vitturi, Alessio Di Roberto, Luigi Lodato, Luigi Mereu, Michele Prestifilippo, Cristina Proietti, Tiziana Tuvè, Francesco Zuccarello and Annalisa Cappello
10:15	<i>From multi-hazard to multi-risk at Mount Etna: approaches and strategies of the PANACEA project</i> <b>Vera Pessina</b> , Alexander Garcia, Fabrizio Meroni, Laura Sandri, Jacopo Selva, Raffaele Azzaro, Bevilacqua Andrea, Giuseppe Bilotta, Branca Stefano, Mauro Coltelli, Salvatore D'Amico, Mattia De Michieli Vitturi, Esposti Ongaro Tomaso, Gaetana Ganci, Luigi Mereu, Simona Scollo and Annalisa Cappello
10:30	<i>Discussion</i>

10:45 - 11:15     **COFFEE-BREAK**

11:15 - 12:30     **Session 1 - Rock falls, Landslides, Hydrology & Volcanic Hazards**  
**Session Chairs:** Rui Coutinho (UAç) and José Virgílio Cruz (UAç)

11:15	<i>Does the updating of landslides inventories have a relevant impact on the landslide susceptibility assessment?</i> <b>Raquel Melo</b> , Sérgio C. Oliveira, Ricardo A.C. Garcia and José Luís Zêzere
11:25	<i>From Geological to lithological maps –exploring differential erosion to improve lithological information for landslide susceptibility assessment</i> <b>Sérgio C. Oliveira</b> , Raquel Melo, Fernando Marques, Rute Fonseca, Rita Pimenta and José Luís Zêzere

11:35	<i>Road network exposure to deep-seated and shallow slides at the basin-scale (Grande da Pipa River basin, Portugal)</i> <b>Igor Branco</b> , Sérgio C. Oliveira and Raquel Melo
11:45	<i>Pico volcano flank landslides and hazard implications - preliminary results</i> <b>Fernando Marques</b>
11:55	<i>A decade of monitoring and research on the San Andrés megalandslide on El Hierro, Canary Islands, Spain</i> <b>Jan Blahůt</b> , Jan Klimeš, Stavros Meletlidis, Jan Balek and Matt Rowberry
12:05	Improving infrastructure management for rockfalls during <i>rainfall events</i> Sergio Leyva, Noelia Cruz-Pérez, Jessica Rodríguez-Martín and Juan C. Santamarta ( <b>Isabel Gamallo Paz</b> )
12:15	<i>Discussion</i>

12:30 - 13:15 **Joan Martí** (Keynote 2)  
*"Multi-hazards risk assessment at the Canary Islands"*  
**Chair: Nicolau Wallenstein (UAç)**

13:15 - 14:30 **LUNCH**

14:30 - 15:45 **Session 2 - Urban Management & Volcanic Hazards**  
**Session Chairs: Chiara Arrighi (UFz) and Tiago Abreu (ISEP)**

14:30	<i>Proposal for systematization of vulnerability elements and parameters in volcanic risk assessment</i> Ana Malheiro, João Luis Gaspar, Gabriela Queirós, Teresa Ferreira, <b>Paulo Amaral</b> , Filipe Marque and Letícia Cunha
14:40	<i>Historical volcanism as a source of knowledge to assess the vulnerability of population settlements in the Azores</i> Fernando Pereira, <b>Ana Oliveira</b> , Ana Botelho, Paula Cabral, Luísa Magalhães and Tomás Medeiros
14:50	<i>Infrasonic Long-range observations at IS42 Station, Azores Islands: Study cases of Grimsvötn volcano (Iceland), and Mt. Etna and Stromboli volcanoes (Italy)</i> <b>Sandro Matos</b> , Nicolau Wallenstein, Paola Campus and Maurizio Ripepe
15:00	<i>The functional schematization of the city as a model for anticipating post-event scenarios for volcanic hazards</i> <b>Rafael Ramirez Eudave</b> and Tiago Miguel Ferreira
15:10	<i>Multi-hazard and multi-vulnerability analysis in historical urban areas: challenges and opportunities</i> <b>Chiara Arrighi</b> , Marco Tanganelli, Vieri Cardinali, Maria Teresa Cristofaro, Antonino Maria Marra, Fabio Castelli and Mario De Stefano
15:20	<i>Multi-scale characterization of flood risk components: a case study at the municipal level</i> <b>Pedro Pinto Santos</b> , Susana Pereira, Tiago Miguel Ferreira, Maria Xofi, José Carlos Domingues, Carolina Pais, Sérgio Cruz Oliveira, Ricardo A. C. Garcia, Eusébio Reis, José Luís Zêzere and Paulo B. Lourenço
15:30	<i>Discussion</i>

15:45 - 16:30 **Gordon Woo** (Keynote 3)  
*"Risk-informed decision-making on volcanic hazards"*  
**Chair:** Paulo Amaral (LREC)

16:30 - 17:00

**COFFEE-BREAK**

17:00 - 17:45 **Session 3 - Geotechnics, Society & Volcanic Hazards**

**Session Chairs:** José Teixeira (UP) and Letícia Cunha (LREC)

17:00	<i>Geomechanical characterization of volcanic rocks by VRS empirical system</i> Luís Ribeiro e Sousa, Rita Sousa and Carlos Oliveira
17:10	<i>Specific characteristics of volcanic materials in landslides</i> Celeste Jorge
17:20	The role of the individual in successful disaster management in pre-industrial societies: the cases of the southern Italy and the Azores Angus Duncan, Rui Coutinho, <b>David Chester</b> , Nicolau Wallenstein, Stefano Branca and Alessandra Lotteri
17:30	<i>Discussion</i>

17:45 - 18:30 **David Chester** (Keynote 4)  
*"Earthquakes, Volcanoes and God: Changing Perspectives on the Importance of Religion as an Important Influence in Cultural Responses"*  
**Chair:** Ana Malheiro (LREC)

18:30 - 18:45 **CLOSING CEREMONY**



## POSTER EXHIBITION

### ***Volcanic Hazards and other Natural Hazards***

*Volcanic island drainage divide migration: implications for land planning  
(Assomada Plateau, Santiago, Cape Vert)*

Rui Fernandes, **José Teixeira**, Alberto Gomes and Martin Stokes

*The effectiveness of post-wildfire slope stabilization measures: a case study in  
Oliveira do Hospital*

**Luís Araújo Santos**, Paulo Coelho and António Correia

*Study, Definition and application of general alert and alarm criteria for road  
geotechnical structures in the operation and maintenance phase*

José Rafael Sousa, **Pedro Varela**, Sara Sanches, Adriana Neves and Alexandra Ferreira

*Dimension stone quarries risk assessment Estremoz marble*

**Luís Lopes**, Ruben Martins, António Pinho, Isabel Duarte and Paula Faria

*Rock Cut-Slope quarry assessment (NW Portugal): a preliminary hazard  
assessment*

Luís Ramos, Ana Mendes, José Filinto Trigo, Fernando Pedro Figueiredo, Liliana Freitas, Maria José Afonso and **Helder I. Chaminé**

*Analysis of morphological changes at Aveiro coast (NW Portugal) between 2012  
and 2018*

**Tiago Abreu**, Paulo A. Silva, Paulo Baptista, Cristina Bernardes, Sandra Fernández-Fernández, Caroline Ferreira and Ángela Fontán-Bouzas

*Equilibrium beach profile: La Garrofera beach case study*

**Tiago Abreu**, Maria de Fátima Silva, Luís Vasconcelos and Sheila Torres-Toran

*Numerical validation of a newly developed river morphological prediction  
software*

**Tew-Fik Mahdi**

*Hydraulic analysis of the suitable construction solutions in the middle Tiber River*

**Giuseppe Sappa** and Giuseppe Mellace

## FIELD TRIP 1

**Coordinator:** João Carlos Nunes, Azores University/INOVA



## Terceira Island

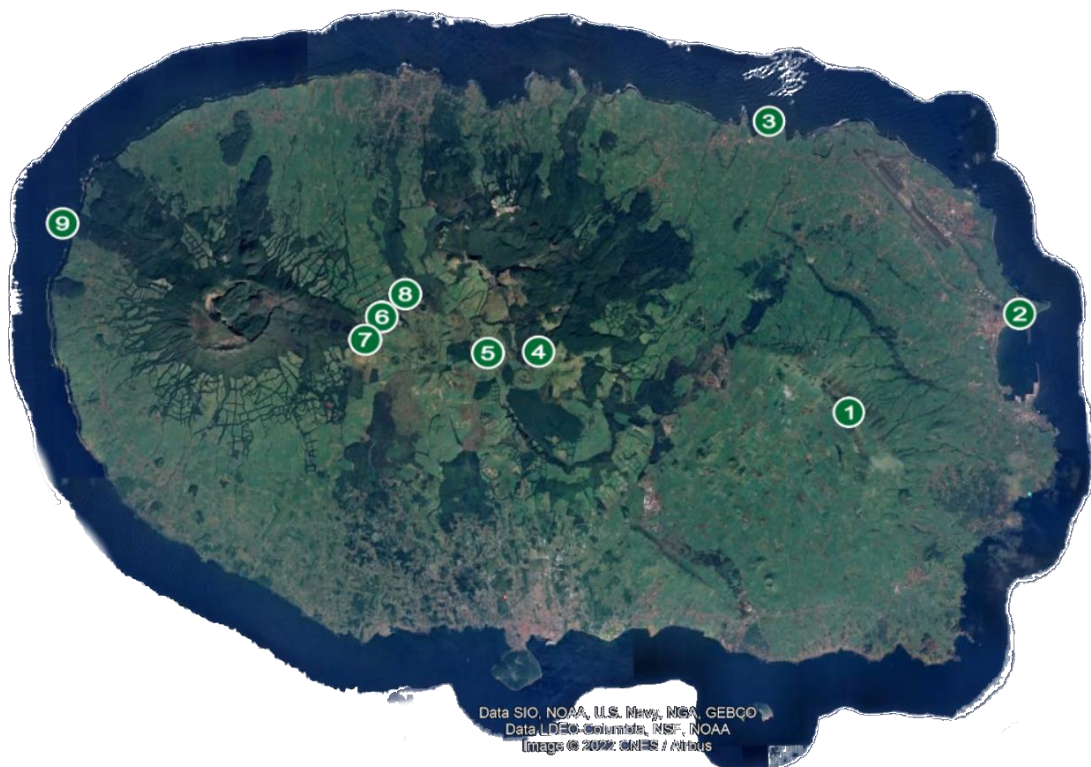


## FIELD TRIP 2

**Coordinator:** Adriano Pimentel, Azores University



## Terceira Island



## ORGANIZING



GOVERNO  
DOS AÇORES

**SRTMI**



**REGIONAL SECRETARIAT FOR TOURISM, MOBILITY AND INFRASTRUCTURE**  
through  
**REGIONAL LABORATORY OF CIVIL ENGINEERING**