

# 1st IAVCEI-GVM Workshop

## From Volcanic Hazard to Risk Assessment

**Geneva, 27-28 June 2018**

## Motivation

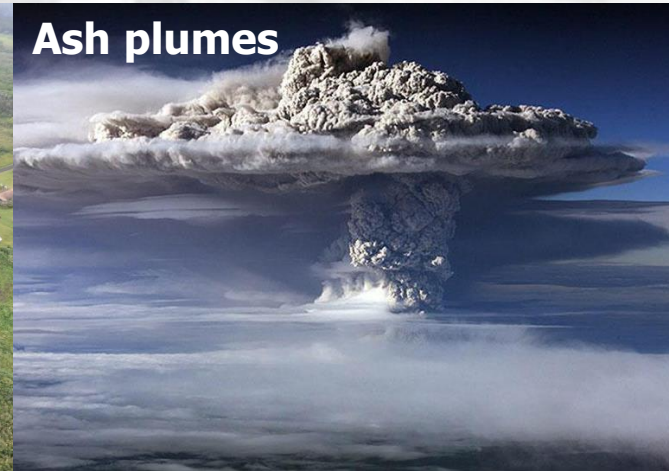
➔ Volcanic unrest, volcanic eruptions and their aftermath are associated with multiple primary and secondary hazards, which pose short- to long-term threats to people and property



Fuego 2018



Kilauea 2018



Cordon Caulle 2011



# Motivation

➔ Volcanic unrest, volcanic eruptions and their aftermath are associated with multiple primary and secondary hazards, which pose short- to long-term threats to people and property

## Landslides/Tsunamis



Stromboli 2002



Wind-remobilized ash:  
ash storms

Cordon Cauille 2011



Water-remobilized pyroclastic  
material: lahars

Pinatubo 1991

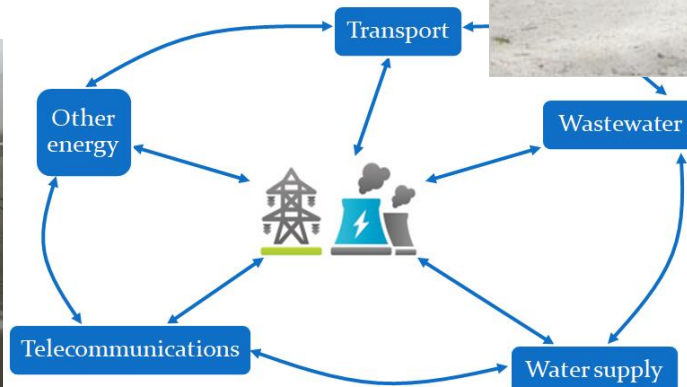
Cordon Cauille 2011



## Motivation

➔ Policies of risk reduction should be developed based on:

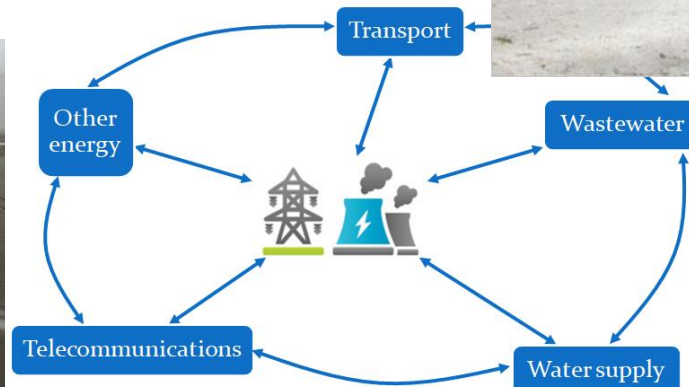
- comprehensive analysis of volcanic risk encompassing the full spectrum of volcanic primary hazards (e.g. pyroclastic density currents, lava flows, tephra accumulation and dispersal, gas emissions) and secondary / interacting hazards (e.g. lahars triggered by intense rainfall)
- associated vulnerabilities (physical, systemic, social, economic, institutional)



## Motivation

➔ no comprehensive methods for vulnerability and risk analysis exist

some models identify individual interactions between volcanic hazard and vulnerability, but the absence of multiple dimensions of vulnerability in risk analysis limits our understanding of the real volcanic risk faced by society and the development of efficient and timely mitigation measures



## Why 1<sup>st</sup> IAVCEI – GVM workshop on volcanic risk?

- ➔ harmonize the currently fragmented volcanic risk community in order to optimize our risk reduction effort
- ➔ initiate a series of regional / thematic workshops to address specific needs

IAVCEI is the **International Association of Volcanology and Chemistry of the Earth's Interior** (part of the International Union of Geodesy and Geophysics, IUGG). It is the primary international focus for research in volcanology and for efforts to mitigate volcanic disasters.

- Committee on Cities and Volcanoes (Leader: Carolyn Driedger; Executive: Thomas Wilson, Graham Leonard, Natalia Deligne, Gustavo Villarosa)

aims to provide a linkage between the volcanology community and emergency managers, to serve as a conduit for exchange of ideas and experience between "volcano cities", and promote multi-disciplinary applied research, involving the collaboration of physical and social scientists and city officials

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- Commission on Volcanic Hazards and Risk (leaders: H. Wright - USGS; S. Takarada - GSJ)

front line between academic research and governmental organizations. The focus is on understanding, quantifying and communicating the hazards, the extent and likelihood of their occurrence and assessing their impacts and the societal vulnerabilities they create from near to far-field

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GVM is the **Global Volcano Model**: a network of scientists whose goal is to inspire and support a global effort to build resilience and reduce volcanic disaster risk.

It was initiated by the University of Bristol and BGS with NERC funding. It is voluntary, collaborative, a successful 'brand'. BGS is proposing to support a GVM secretariat from 2018.

- Contact: S. Loughlin (BGS)



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### What is IAVCEI?

About IAVCEI / 06 October 2015 / Hits: 23334

Ratings ☆☆☆☆☆ (0)



IAVCEI stands for the **International Association of Volcanology and Chemistry of the Earth's Interior**. The Association represents the primary international focus for: (1) research in volcanology, (2) efforts to mitigate volcanic disasters, and (3) research into closely related disciplines, such as igneous geochemistry and petrology, geochronology, volcanogenic mineral deposits, and the physics of the generation and ascent of magmas in the upper mantle and crust.

IAVCEI is run by an Executive Committee whose membership changes every four years. The Executive determines policies for the Association, enacting them through a series of Commissions and TaskGroups. IAVCEI aims to be outward-looking, seeks relationships with other international scientific organisations, and participates in international scientific projects. It aims also to maintain a robust publishing policy, encouraging the presentation of high caliber, volcanological research results, mainly through its premier international journal the *Bulletin of Volcanology*.



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#### Welcome to the Global Volcano Model Network (GVM)



#### Mission Statement:

"GVM is a growing international network that aims to create a sustainable, accessible information platform on volcanic hazard and risk. GVM will provide systematic evidence, data and analysis of volcanic hazards and risk on global and regional scales, and support Volcano Observatories at a local scale. GVM will develop capabilities to anticipate future volcanism and its consequences."

The GVM project will develop an integrated global database system on volcanic hazards, vulnerability and exposure, make this globally accessible and crucially involve the international volcanological community and users in a partnership to design, develop, analyse and maintain the database system. The GVM project will aim to establish new international metadata standards that will reduce ambiguity in the use of global volcanic datasets. Vulnerability and exposure data will be integrated into the GVM and again new methods of assessment and analysis will be investigated and tested.

The project also intends to establish methodologies for analysis of the evidence and data to inform risk assessment, to develop complementary volcanic hazards models, and create relevant hazards and risk assessment tools.

The research will provide the scientific basis for mitigation strategies, responses to ash in the atmosphere for the aviation industry, land-use planning, evacuation plans and management of volcanic emergencies.

## Main goal of 1<sup>st</sup> IAVCEI – GVM workshop

➔ gather experts in the field of volcanic hazard, exposure, vulnerability and risk assessment in order to evaluate the state of the art of risk assessment in volcanology, investigate current gaps and identify research priorities

## Specific objectives

➤ identify the benefits of risk assessment/s for decision makers, current gaps and potential improvements (what has worked and what can be done better?) → *complex process that will be explored across multiple workshops with multiple decisions makers*

*complementary assessments might be needed as different products might suit different users, e.g. qualitative, quantitative*

*individual in a community, private sector, NGOs, local or national authorities ...*

## Main goal of 1<sup>st</sup> IAVCEI – GVM workshop

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## Specific objectives

- identify the benefits of risk assessment/s for decision makers, current gaps and potential improvements (what has worked and what can be done better?)
- identify key vulnerability aspects that need to be assessed for a comprehensive and efficient risk assessments
- identify the key vulnerability aspects that need to be considered in a multi-hazard context
- identify the optimum hazard and vulnerability products necessary for risk assessments at different scales

## Main product

- Consensual document

## Organizing committee

**Costanza Bonadonna**, Dpt of Earth Sciences, University of Geneva, Switzerland

**Corine Frischknecht**, Dpt of Earth Sciences, University of Geneva, Switzerland

**Susan Loughlin**, British Geological Survey, UK

**Scira Menoni**, Dpt of architecture and urban design, Politecnico di Milano, Italy

**Chris E. Gregg**, Dpt of Geosciences, East Tennessee State University, USA

**Thomas Wilson**, School of Geological Sciences, University of Canterbury, New Zealand

**Susanna Jenkins**, Earth Observatory of Singapore, Singapore

**Sébastien Biass**, Earth Observatory of Singapore, Singapore

**Shinji Takarada**, Geology Survey of Japan, Japan

**Eliza Calder**, School of Geosciences, University of Edinburgh, UK

# Program

## 27 June, Morning

8:00 – 8:30	<b>REGISTRATION</b>	
8:30 – 8:45	Welcome and Workshop Opening (Costanza Bonadonna)	
	THEME 1: Volcanic risk assessment: current perspectives	
8:45 – 10:30	<p>Talks:</p> <ul style="list-style-type: none"> <li>➤ Sue Loughlin (BGS, GVM) “Needs for volcanic risk assessment worldwide”</li> <li>➤ Pascal Peduzzi (GRID-Geneva) “The GAR approach to risk assessment”</li> <li>➤ Sahar Safaie (Canada, Sage Risk Management) “Relevance of Understanding Volcanic Risk: From Sendai Framework Implementation to Planning My Life In Guatemala”</li> <li>➤ Guðrún Jóhannesdóttir (CP, Iceland) “From risk assessments to mitigation measures for volcanic eruptions”</li> <li>➤ Domenico Mangione (CP, Italy) “Risk assessment from a civil protection perspective”</li> </ul>	<p>Moderator: S. Takarada</p> <p>Rapporteurs: A. Bear-Crozier; P. Jarvis (UNIGE)</p>
10:30 – 11:00	Coffee Break - Posters	
11:00 – 12:30	Breakout sessions	
12:30 – 13:00	Plenary	
13:00 – 14:00	Lunch	

# Program

## 27 June, Afternoon

	<b>THEME 2: How to analyse vulnerability in a volcanic context – Part I</b>	
<b>14:00 – 15:45</b>	<p><i>Talks:</i></p> <ul style="list-style-type: none"> <li>➤ Russell Blong (Macquarie University, AU) “Analysing vulnerability”</li> <li>➤ Giulio Zuccaro (Univ. of Naples Federico II) “Physical vulnerability for quantitative risk assessments”</li> <li>➤ Tom Wilson (Univ. of Canterbury, NZ) “What’s the Consequence? Using field and laboratory volcanic impact assessment approaches to inform volcanic vulnerability assessment”</li> <li>➤ Chris Gregg (East Tennessee Univ., USA) “Assessment of social vulnerability” <b>SKYPE</b></li> <li>➤ Luis Martins (GEM) “Assessing the impact from earthquakes and volcanoes: what is different and what is not”</li> </ul>	<p><i>Moderator: C. Magill</i></p> <p><i>Rapporteurs: K. Wallace; A. Fries (UNIGE)</i></p>
<b>15:45 – 16:15</b>	Coffee Break - Posters	
<b>16:15 – 17:45</b>	Breakout sessions	
<b>17:45 – 18:30</b>	Plenary, Poster presentation	
<b>20:00</b>	<i>Workshop Dinner – Café Papon (Old Town)</i>	

# Program

## 28 June, Morning

	<b>THEME 2: How to analyse vulnerability in a volcanic context – Part II</b>	
<b>8:30 – 10:00</b>	<p><i>Talks:</i></p> <ul style="list-style-type: none"> <li>➤ Scira Menoni (Politecnico di Milano, Italy) “Aspects and concepts of systemic vulnerability applied to volcanic risk assessment: learning lessons from real events and improving modelling capacity”</li> <li>➤ Giulia Pesaro (Politecnico di Milano, Italy) “Economic vulnerability in disasters: lessons learnt from the field”</li> <li>➤ Susanna Jenkins (EOS, Singapore) “Case study vulnerability assessments across volcanic hazards”</li> <li>➤ Eliza Calder (University of Edinburgh) “The 3 June 2018 eruption of Fuego volcano, Guatemala: hazard, vulnerability and risk in a dynamic environment”</li> </ul>	<p><i>Moderator: F. Viveiros</i></p> <p><i>Rapporteurs: J. Phillips; A. Fries (UNIGE)</i></p>
<b>10:00 – 10:30</b>	Coffee Break - Posters	
<b>10:30 – 12:00</b>	Breakout sessions	
<b>12:00 – 12:30</b>	Plenary, Poster presentation	
<b>12:30 – 13:30</b>	<i>Lunch</i>	

# Program

## 28 June, Afternoon

	<b>THEME 3: How to combine hazard and vulnerability in a volcanic context</b>	
<b>13:30 – 15:00</b>	<p><i>Talks:</i></p> <ul style="list-style-type: none"> <li>➤ Cees Van Westen (ITC, Netherlands) “Changing multi-hazard risk assessment after major disasters”</li> <li>➤ Jenni Barclay (Univ. of East Anglia, UK) “The Ultimate Volcanic Risk Equation: Myth or Reality? Risk in practice in the STREVA study regions”</li> <li>➤ Sebastien Biass (EOS, Singapore) “Scenarios in volcanology: causes and implications of deterministic and probabilistic choices”</li> <li>➤ Adriana Galderisi (Univ. of Campania, Italy) “Scenario-based approach to understand the multi-temporal and multi-scale consequences of volcanic eruptions”</li> </ul>	<p><i>Moderator: M. Kervyn</i></p> <p><i>Rapporteurs: J. Crummy ; P. Jarvis (UNIGE)</i></p>
<b>15:00 – 15:30</b>	Coffee Break - Posters	
<b>15:30 – 17:00</b>	Breakout sessions	
<b>17:00 – 17:30</b>	Plenary	
<b>17:30 – 18:00</b>	Future workshops / Workshop Closing	



## Breakout sessions

- More infos provided after coffee breaks (come back to main room!)

## Posters

- 2 min presentation at the end of plenary Day 1 and 2 + coffee breaks

## Consensual document

- ...based on results of plenary and breakout sessions + replies to pre-workshop questions + feedback post workshop
- Workshop infos (participant list, program, presentations (?)) and workshop product (consensual document) will be uploaded on workshop website:  
<http://www.unige.ch/sciences/terre/CERG-C/iavcei-gvm-workshop-2018/>

# SCIENCE FOR DISASTER RISK MANAGEMENT, 2017 EXECUTIVE SUMMARY

(Joint Research Centre – JRC: European Commission's science and knowledge service)

The Disaster Risk Management Knowledge Centre has produced this flagship science report as a contribution to the Science and Technology Roadmap of the Sendai Framework for Disaster Risk Reduction. This report is the result of the multi-sectorial and multi-disciplinary networking process and represents the combined effort of more than two hundred experts.

- Current status of disaster risk management and policy frameworks
- Understanding disaster risk: risk assessment methodologies and examples
- Understanding disaster risk: hazard related risk issues (Geophysical, Hydrological, Meteorological, Technological risk)
- Communicating disaster risk
- Managing disaster risk
- Future challenges of disaster risk management