

# SESSION: COMMUNICATION, DECISION-MAKING AND CRISIS MANAGEMENT

## WP 9 - Decision-making and unrest management

### The contribution of the Italian Civil Protection to the VUELCO project



**VUELCO short course: «Coping with volcanic unrest»**

***Olot, Garroxta (Spain) 21<sup>st</sup> - 25<sup>th</sup> September 2015***



**PROTEZIONE CIVILE**  
Presidenza del Consiglio dei Ministri  
Dipartimento della Protezione Civile

**Stefano Ciolli\*, Chiara Cristiani – Department of Civil Protection, Italy**

WP Number <sup>53</sup>	WP Title	Type of activity <sup>54</sup>	Lead beneficiary number <sup>55</sup>	Person-months <sup>56</sup>
WP 1	Management and Coordination	MGT	1	20.00
WP 2	Conference, workshop and summer school organisation	MGT	1	11.00
WP 3	Mathematical Modelling	RTD	4	162.00
WP 4	Experiments	RTD	6	218.00
WP 5	Relevance and Interpretation of Volcanic Unrest	RTD	8	75.00
WP 6	Monitoring Capacity	RTD	2	77.00
WP 7	Uncertainty and probabilistic assessment of the short-term evolution of volcanic unrest	RTD	4	50.00
WP 8	Communication Protocols	RTD	3	39.00
WP 9	Decision-making and unrest management	RTD	5	43.00
WP 10	Dissemination and Exploitation	OTHER	1	13.00
			Total	708.00

## *WP 9- Decision-making and unrest management*

**UNIVBRIS**

Task 9.1 - Identification of knowledge holders

**DPC**

Task 9.2 - Identification of decision makers and their needs

**UNIVBRIS**

Task 9.3 - Description of past history of social unrest in the volcanic regions

**UNIVBRIS**

Task 9.4 - Determination of the practices of securization

**INGV**

Task 9.5 - Cost benefit analysis and the link between scientist and decision makers

**DPC**

Task 9.6 - Simulation of unrest and decision-making



## WP 9- Decision-making and unrest management

- Identify relevant stakeholder in unrest episodes, such as knowledge-holders and decision-makers, and their needs; (9.1+9.2)
- Evaluate probabilistic schemes for eruption forecasting and cost-benefit analysis for their **inclusion in decision-making process** and operational chains; (WP7+9.5)
- Run simulation of emergencies (exercises) related to unrest at target volcanoes (Colima, Campi Flegrei, Cotopaxi and Morne aux Diabes); (9.6)
- Set up of protocols and procedures for the interaction between scientists and decision-makers; (9.5+WP8)
- Identify effective management of a volcanic crisis beyond a technical plan taking also into account the requirements of communities ; (9.1+9.2+9.3+9.6)
- Determine the procedures of securitization during volcanic unrest. (9.4)



- **Preliminary survey aimed to identify who decision-makers are in different Countries:**
  - survey on official websites of several governmental entities;
  - interview to Vuelco partners.
  
- **Questionnaire elaboration and distribution**
  
- **Replies collection and analysis**



# Questionnaire

## INTRODUCTION

Brief presentation of the project and the questionnaire

### SECTION 1 - General information about the decision-maker

Identification of decision-maker.

### SECTION 2 - Structure organization

General overview on the decision-maker organization and responsibility assumption.

### SECTION 3 - Volcanic risk management

Present situation: hazard maps, scenarios, emergency plan, alert levels, scientific advisory board, prevention actions, mitigation actions, population exposed, former experiences, cost/benefit analysis, false alarms.

### SECTION 4 – Communication strategies

Between scientific community and decision maker, toward the population, responsibility of official communication, risk perception.

### SECTION 5 – Decision-makers needs

Significance of different information during the crisis and of their accuracy/timeliness (hazard map, scenario, early warning, duration of phenomena, false alarm, possible mitigation actions, etc.).

**VUELCO** - Volcanic Unrest in Europe and Latin America: phenomenology, eruption precursors, hazard forecast, and risk mitigation



## Questionnaire



WP 9  
Decision-making and unrest management

### Introduction

The present questionnaire is part of the activities of the project named "VUELCO – Volcanic Unrest in Europe and Latin America: phenomenology, eruption precursors, hazard forecast, and risk mitigation" financed by the European Commission. The project aims at achieving a better understanding of volcanic processes leading to an unrest and to a possible eruption, and developing means and guidelines for better prevention practices and management of volcanic crises. (For further details please visit [www.vuelco.net](http://www.vuelco.net)).

The purpose of this questionnaire is to collect information about decision-makers and their needs in case of volcanic unrest, with specific reference to the 4 project target volcanoes: ~~Mount Vesuvius~~ (Italy), ~~Colima~~ (Mexico), ~~Cotopaxi~~ (Ecuador), ~~Las Cumbreaux~~ (Dominica, West Indies), ~~San Cristobal Hills~~ (Montserrat, West Indies), ~~Tenerife~~ (Tenerife, Canary Islands, Spain). This questionnaire is specifically addressed only to the authorities that have decision-making roles and responsibilities in case of volcanic unrest. For each one of the above mentioned countries, we asked to the partner-institutions involved in the project, to identify the organization that has decision-making responsibility in case of volcanic unrest and the possible key-person to answer to the questionnaire.

We would be very grateful if you could fill in the questionnaire, feeling free to add any information you consider useful and providing further suggestions.

Please note that the results of this questionnaire will be used only for the purposes of the project and will not be diffused or published in any way, without your previous expressed authorisation.

In case you think you are not the right person, or a part of the relevant organization, please help us, by sending back an email with the correct references.





*Volcanic Unrest in Europe  
and Latin America:  
phenomenology, eruption  
precursors, hazard  
forecast, and risk  
mitigation*

WP 9: Decision-making and  
unrest management

Task 9.2: Identification of  
decision makers and their  
needs



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## TASK 9.2 IDENTIFICATION OF DECISION MAKERS AND THEIR NEEDS

### REPORT OF ACTIVITIES AND OUTCOMES

### It is important taking into account that:

- some questionnaires were not filled-in completely;
- some questionnaires were not filled-in by DMs;
- only few Countries investigated.

Not possible to extend results to global level.

### Possible criticalities:

- Written questionnaires instead of interviews.
- Only one DM directly involved in the project.

## OUTCOMES

### Section 3 - Volcanic risk management.

- Hazard maps and emergency plans have been generally drawn-up quite everywhere, but exercises and information campaigns have been carried out only in a few Countries and for limited sample of people.
  - False alarm management appears to be under-considered.
  - Problems emerge where authorities frequently change due to political reasons.
- > It is crucial to perform exercises and train technical personnel of local administrations

that are not subject to changes.

### Section 4 - Communication strategies.

- Different institutions (from Major to Ministry) are involved in all levels of communication.
- Risk perception is generally low, even in high populated areas close to volcanoes.

-> It is important to involve people in drills and information campaigns, that should be long-term planned and frequently repeated.



## Section 5 - Decision-makers needs.

The most important information decision-makers need to be provided with are (in order of priority):

- 1) kind of expected hazardous phenomena,
  - 2) their probability of occurrence,
  - 3) areas with different hazard levels (hazard maps),
  - 4) expected evolution and duration of the phenomena (scenarios),
  - 5) possible mitigation actions to adopt (and time needed).
- } HAZARD

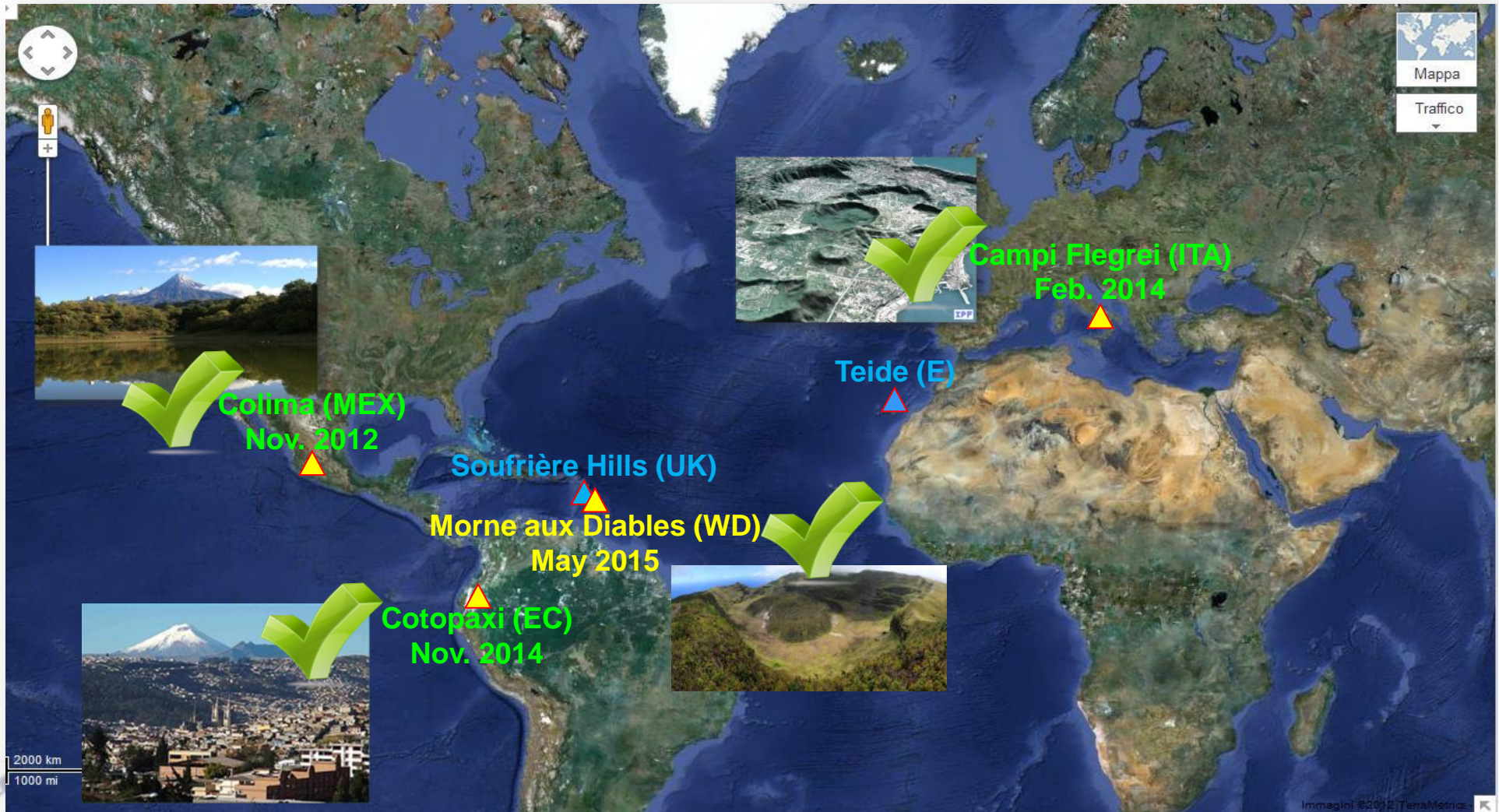
**Low importance is given to the costs of mitigation actions as well as to false alarms and associated risks.**

**In many cases the timeliness of the information appears to be preferred to its accuracy.**

Some mitigation measures (structural and not-structural) have been identified.



### TARGET VOLCANOES



## GENERAL EXERCISES GOALS

- Test existing procedures and emergency plans** (communication chain, means, emergency areas, evacuation routes, functionality of operational centers, radio- communication, displaying of forces, timing, ...).
- Improve cooperation and relationships among stakeholders.**
- Improve people preparedness.**
- Raise the attention on the spot.**
- ...**

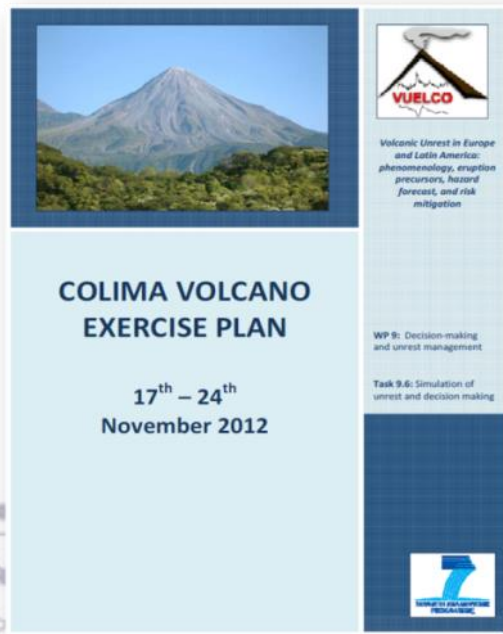
## VUELCO EXERCISES GOALS

- Explore the applicability and helpfulness of methods, models and procedures developed within the project (especially probabilistic models and communication protocols), to the decisional-operational chain in an unrest crisis.  
(as defined by Project Annex 1: “Description Of Work” -Task 9.6)
- Other goals defined at local level in agreement with local authorities.



## PREPARATION

- ✓ Work with local sc. partners and C.P. authorities.
- ✓ Definition of kind of exercise (full-scale, table-top, ...)
- ✓ Elaboration and distribution of a document on eruptive scenarios (or bibliography).
- ✓ Field-trip and visit to volcanic observatory.
- ✓ Short-course and/or briefing session.
- ✓ Elaboration and distribution of a workplan.



## DEVELOPMENT

- ✓ Organization: actors, communication flux, rules (flow-chart: volcano team, v. observatory, scientific advisory committee, decision-makers).
- ✓ Scenario definition.
- ✓ Phenomena evolution and number of phases.
- ✓ Rules for scientific assessment process (use of probabilistic models, elicitation, ...).
- ✓ Advice delivering and interaction Scientists-DM.
- ✓ Decision-making phase.
- ✓ Other activities (press conference, people information campaign, evacuation, ...).



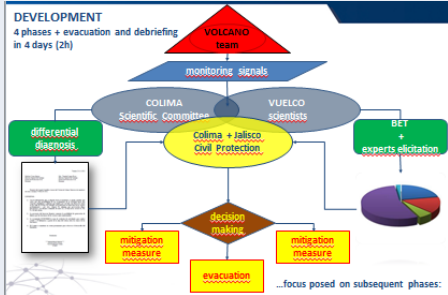
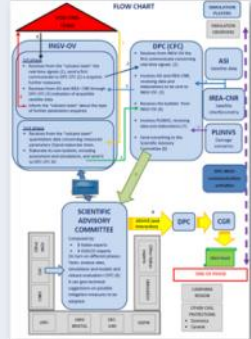
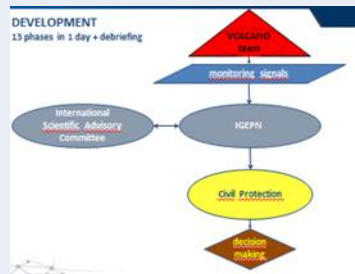
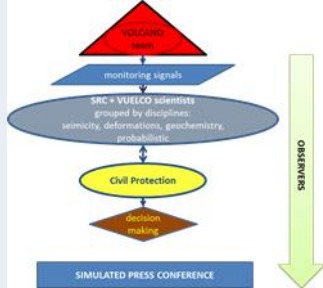


# STRUCTURED DEBRIEFING

- ✓ Hot vs. cold debriefing.
- ✓ Discussion groups.
- ✓ Feedbacks on strong and weak points under 4 themes:
  - general aspects,
  - scientific process,
  - communication and interaction between scientists and civil protection,
  - civil protection aspects (and public communication aspects).
- ✓ Presence of observers.
- ✓ Suggestions for : future exercises, local system.



<p>Volcanic Unrest in Europe and Latin America: phenomenology, eruption precursors, hazard forecast, and risk mitigation</p> <p>WP 9: Decision-making and unrest management</p> <p>Task 9.6: Simulation of unrest and decision making</p>	<p>Volcanic Unrest in Europe and Latin America: phenomenology, eruption precursors, hazard forecast, and risk mitigation</p> <p>WP 9: Decision-making and unrest management</p> <p>Task 9.6: Simulation of unrest and decision making</p>	<p>Volcanic Unrest in Europe and Latin America: phenomenology, eruption precursors, hazard forecast, and risk mitigation</p> <p>WP 9: Decision-making and unrest management</p> <p>Task 9.6: Simulation of unrest and decision making</p>	<p>Volcanic Unrest in Europe and Latin America: phenomenology, eruption precursors, hazard forecast, and risk mitigation</p> <p>WP 9: Decision-making and unrest management</p> <p>Task 9.6: Simulation of unrest and decision making</p>

	COLIMA	CAMPIFLEGREI	COTOPAXI	DOMINICA
	<ul style="list-style-type: none"> <li>• Stratovolcano</li> </ul>	<ul style="list-style-type: none"> <li>• Caldera</li> </ul>	<ul style="list-style-type: none"> <li>• Stratovolcano</li> </ul>	<ul style="list-style-type: none"> <li>• 9 volcanoes</li> </ul>
TYPE	<ul style="list-style-type: none"> <li>• Full-scale</li> </ul>	<ul style="list-style-type: none"> <li>• Table-top reduced</li> </ul>	<ul style="list-style-type: none"> <li>• Table-top reduced</li> </ul>	<ul style="list-style-type: none"> <li>• Table-top reduced</li> </ul>
PREPARATION	<ul style="list-style-type: none"> <li>• Bibliography</li> <li>• Workplan</li> <li>• Field-trip</li> <li>• 3 Civil Protection</li> </ul>	<ul style="list-style-type: none"> <li>• Report on hazard + briefing</li> <li>• Workplan</li> <li>• Field-trip + V. Obs.</li> <li>• 5 Civil Protection</li> </ul>	<ul style="list-style-type: none"> <li>• Report on scenarios</li> <li>• Short course</li> <li>• Field-trip + V. Obs.</li> <li>• 4 Civil Protection</li> </ul>	<ul style="list-style-type: none"> <li>• Report on hazard + bibliography</li> <li>• Workplan</li> <li>• Short course</li> <li>• Field-trip</li> <li>• 3 Civil Protection</li> </ul>
DEVELOPMENT	<ul style="list-style-type: none"> <li>• 5 ph. in 4 days (2h)</li> </ul>  <p>DEVELOPMENT 4 phases + evacuation and debriefing in 4 days (2h)</p>	<ul style="list-style-type: none"> <li>• 4 ph. in 3 days</li> </ul>  <p>FLOW CHART</p>	<ul style="list-style-type: none"> <li>• 6 ph. in 1 day</li> </ul>  <p>DEVELOPMENT 13 phases in 1 day + debriefing</p>	<ul style="list-style-type: none"> <li>• 3 ph. in 2 days</li> </ul>  <p>DEVELOPMENT 3 phases in 2 days</p>
END	<ul style="list-style-type: none"> <li>• Eruption</li> </ul>	<ul style="list-style-type: none"> <li>• Eruption</li> </ul>	<ul style="list-style-type: none"> <li>• Eruption</li> </ul>	<ul style="list-style-type: none"> <li>• Unrest cont.</li> </ul>
DEBRIEFING	<ul style="list-style-type: none"> <li>• Cold</li> <li>• 4 themes</li> </ul>	<ul style="list-style-type: none"> <li>• Hot</li> <li>• 3 themes + questions (1/2 day)</li> </ul>	<ul style="list-style-type: none"> <li>• Hot</li> <li>• 3 themes (1/2 day)</li> </ul>	<ul style="list-style-type: none"> <li>• Hot</li> <li>• 4 themes (1/2 day)</li> </ul>

## Things to be defined in advance:

- **Goals** ←
- **Type of exercise** (table top, full scale, ...)
- **Scenario:** type of hazard (or multihazard) and its evolution
- **Scale:** national, regional, municipal
- **Players and observers**
- **Roles and rules** (possibly according to laws in the host Country)
- **Budget**
- **Duration** (real and simulated)
- **Logistics**
- **Agenda**
- **Debriefing:** oriented to aspects that need to be analysed

can be very different according to your needs and goals

## The essential is:

- **know what your needs and goals are;**
- **Think about above listed items;**
- **inform participants.**

**GUIDELINES AND  
CHECKLISTS IN  
PREPARATION**



# WP 2: Workshops



## Cities on Volcanoes 7

Ciudad de Colima  
Colima, México

November 19 - 23, 2012

## Volcanic unrest: Interfacing science and decision-making.

...best practices  
(see [www.vuelco.net](http://www.vuelco.net))

VUELCO: Volcanic Unrest in Europe and Latin America  
2<sup>nd</sup> WORKSHOP  
"Scientific advice, decision-making, risk communication"  
7<sup>th</sup> - 8<sup>th</sup> November 2013

SESSION 1: "SCIENTIFIC ADVICE: Scientist-decision makers interaction and advice giving"  
Synthesis and best-practices retrieved

The second VUELCO Workshop, titled "Scientific Advice, Decision-Making, Risk Communication" was organized in Rome by the Italian Department of Civil Protection on November 7 and 8, 2013.

First session focused mainly on interaction between scientists and decision makers on advice giving. The chairman was Prof. Luciano Malari (President of the Italian High Risk Commission). The speakers were: Prof. Mauro Rossi (Director of the Seismic and Volcanic Risk Office, Italian Department of Civil Protection), Dr. Richard Bretton (Lawyer and Geologist, University of Bristol), Dr. Tomoyuki Kanno (Senior Analyst for Volcanic Activities, Japan Meteorological Agency).

Prof. Rossi introduced the organization of the Italian civil protection system in managing volcanic risk, explaining how scientific advice are produced and the cooperation between scientific and operational components. Dr. Bretton focused his talk mainly on the responsibilities of different actors involved in hazard assessment and decision-making, offering suggestions, particularly to scientists, on the way to continue to do their job and offer their advice with no fear of possible legal prosecution. Dr. Kanno offered an overview of the Japanese system, presenting two case-studies from recent crises occurred at Asamayama and Shimodaake volcanoes.

Presentations were followed by a round table discussion, where participants had the opportunity to share their opinions and adding further interesting comments and points of view. Here is offered a brief synthesis of best-practices which emerged from the session.

The most effective way to get adequate scientific assessment for civil protection operational activity is to have scientific advisory committees composed of experts with solid experience in volcanic processes, eruptive history and volcano monitoring, combined together.

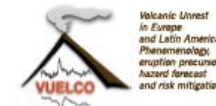
organized by

The bottom of the slide features four logos: VUELCO, the European Commission logo, the University of Bristol logo, and the Protezione Civile logo.

VUELCO Volcanic Unrest  
in Europe and Latin America  
2<sup>nd</sup> workshop

# Scientific advice decision-making risk communication

7-8 November 2013  
Dipartimento della Protezione Civile  
Auditorium "E. Di Cicco"  
via Vitorchiano, 2 - Roma



Volcanic Unrest  
in Europe  
and Latin America:  
Phenomenology,  
eruption precursors,  
hazard forecast  
and risk mitigation



organized by



- **Interaction scientists/decision-makers is essential during non-crisis periods too.**
- **Decision-making is a process that take place not only in emergency phase, but also in planning (decide where a “red-line” of an emergency plan must pass, define alert levels, thresholds, ...).**
- **Scientists and decision-makers (together with local authorities, other experts, ..) are called to play as a team...**



# The winning team

- Share data with others;
- Be interested in more disciplines;
- Install goal oriented monitoring networks;
- Provide to DMs: data, overall synthesis and interpretation, hazard (probabilities compared to familiar events), cont. updated hazard maps, scenarios, indication on possible mitigation measures to be adopted;
- Try to fix thresholds for parameters;
- Give timely information, even if rough;
- Communicate knowledge and assessment, but also limitations and uncertainties.
- Be transparent on assumptions and methods followed.
- Know Civil Protection language and system and strive to meet needs and expectations.
- Stick to roles, but be helpful as much as possible-
- Improve communication skills (related to the role).



- Understand science language and limits, respect roles;
- Provide logistic and financial support for monitoring and assessment activities;
- Protect scientists from pressure (media, politics,...);
- Share with local authorities and communities: knowledge, responsibilities and decisions on mitigation measures and emergency plans;
- Give people all the possible means to understand and decide themselves;
- Organize drills, education and information campaign in “peace-time”;
- Appoint experts not only in science, but also in sociology and in communication.

Uncertainty in science and Indecision in decision-making are always present in some measure, but we must avoid Ambiguity in communication.

*Thank you*



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