Integrative efforts for DRR: experiences from the Workshop “Knowledge Sharing and Collaboration in Volcanic Risk Mitigation at Galeras Volcano, Colombia”

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Galeras Volcano

- South-western Colombia, Department of Nariño.
- Altitude: 4,270 masl
- Most active volcano in Colombia
- Active Vent: 9 km from the city of Pasto
Some of the affected populations

- Persons possibly affected:
  - In the ZAVA (high risk zone): ~8,000
  - In the potential impact zone: ~500,000

- Populations possibly affected:
  - La Florida (mostly farmers)
  - Mapachico (indigenous & farmers)
  - Genoy (indigenous farmers)
  - Pasto city
  - ...
Volcanic Hazards

Bombs

Shock wave

Pyroclastic Flows

Pyroclastic fall

Secondary mud flows
Third version – based on geological records (INGEOMINAS, 1997)

- **Red Zone** - high volcanic hazard (ZAVA in Spanish):
  - > 20% probability for events VEI 5
  - Major pyroclastic flow hazard
  - No survivors and property completely destroyed
  - Maximum reach: 9.5 Km from the crater

- **Orange Zone** - medium volcanic hazard:
  - 10-20% probability for events VEI 3-5
  - 200 m buffer around ZAVA. Heat wave, secondary mud flows, pyroclastic flows and shock wave

- **Yellow Zone** - low volcanic hazard:
  - < 10% probability for events VEI <2
  - Deposition of pyroclastic fall material
Historic Activity


Since 1988:

- Degassing and seismicity
- Emplacement of lava dome (1991);
- Last eruption 30 September 2009 (ash column of 11 km)

Pyroclastic Flows

Impact craters, from the January's explosion 1936

Impact craters, from the January's explosion 1993

15 metros

1936

1993

2009

Photo by Stanley Williams, 1993
After its re-activation in 1988:

- INGEOMINAS (Geological Survey of Colombia) established an observatory in Pasto in February 1989
- Nevado del Ruiz crisis in 1985, > 20,000 deaths
- Defined in 1992 as a ‘Decade Volcano’ - IDNDR
- Focus on collaborative, interdisciplinary research:
  - International workshops
    - 1989 (first hazard maps)
    - 1993 (plan future research): terrible tragedy in the crater, 9 deaths
    - ...
- 2009
Risk management 1989: over-estimation of risk → panic, economic crisis → reluctance to future prevention activities

Public information about Galeras was banned; the “Friendly Volcano” culture.

Tragedy of 1993: indigenous people blamed scientists: “they disturbed it”, “its their fault…”, no respect

Evacuation of 8000 people in 2006 → no big eruption, shelter conflicts

Almost no evacuation in the latest eruptions → “false alarms”
Government decisions

Increase of activity + high risk for the communities in the ZAVA

- 2005 Decree 4106: “existence of a disaster situation in the Municipalities of Pasto, Nariño and La Florida”. Main implications:
  - Evacuation order of the ZAVA during Alert Level Two or One
  - Long term program of relocation of the inhabitants of the ZAVA
  - Construction and house improvement banned within high and medium hazard zones

- 2007: Plan Galeras. Mandatory relocation of inhabitants of the ZAVA. Offers:
  - Payment for the houses in hazard zones (at low price)
  - Relocation to unsettled area (who pays the lot?)

- Shelters are located in “safe” zones
- Cycle: evacuate-return-evacuate
- Monthly income support given during evacuation periods

3 families of the 10,000 inhabitants have moved
Workshop: Knowledge Sharing and Collaboration in Volcanic Risk Mitigation at Galeras Volcano, Colombia
Residents of the ZAVA

Colombian technical-scientific personnel

Local and national decision-makers

International scientists (from USA, UK, Italy, Central America, Chile and Ecuador)
Different views for conflict resolution

- **Scientists - technicians**
  - Need to Understand the Hazard - Risk
    - Local
      - Know reality
      - In between population and politicians
    - International
      - Experts from developed countries → external reality
        “Magic formulas”
- **Local and national decision makers - politicians**
  - Need to evacuate
- **Population Residents of the ZAVA**
  - Polarized - Good life conditions
Workshop program

- 4 days of presentations from all the different stakeholders

- 1 day: Geologic Fieldtrip + indigenous ceremony within high risk zone (INGEOMINAS could not attend)

- Closure: Division into 2 groups
  - Expert elicitation workshop
  - ROUNDTABLE with representatives of every group
  - Conclusions (all together)
ROUNDTABLE
Communication exercise (Frustrating but effective)
Social scientist - moderator

Points of agreement on current Risk Management policies

Points of disagreement

Future actions for conflict resolution

Starting point in creating new and meaningful dialogue and build better relationships

Ongoing phase of dialogue
Scientists role in DRR?

- Produce and transmit **clear** hazard information for risk management decisions.
  - Explaining
  - Discussing
  - Education: two-way process
- Address limitations of science (e.g., Uncertainty)
- **BUILDING COMMUNICATION BRIDGES** – “impartial” moderators in PARTICIPATIVE process
Final Comments

- Volcanic eruption – erratic volcanic behaviour
- Lack of awareness, differences on risk perception
- Social, political and economic conflicts
- Language conflicts: scientists – community
- Traditions, belief and cultural issues of the community (Taita Galeras)
- Conflictive laws
- Conflictive current risk management policies and their execution

COMMUNICATION in order to reach an agreement
All stakeholders are experts

Workshop - Not solve the problem but set a base

“Solution” takes time, commitment and patience
For those gone:
Geoff Brown, Fernando Cuenca, Nestor Garcia, Igor Menyailov, Carlos Trujillo and Jose Arles Zapata
(14 January 1993)

For those still with us, working passionately:

Even during coffee breaks!!!!
THANK YOU!