

Plan y bajo que supuestos además de la labor de asesoramiento que deben tener los científicos en una emergencia de este tipo. Este Plan se activó por primera vez en Canarias en el año 2011 a consecuencia de la crisis sismo-volcánica de la isla de El Hierro que acabó produciendo la erupción submarina de La Restinga y que puso a prueba la idoneidad y ajuste a la realidad del citado Plan. Para hacer frente a la emergencia generada fue necesaria la movilización de numerosos medios y recursos a la isla además de la redacción de un Plan de Actuación expreso para la isla de El Hierro amparado en el propio Plan Especial.

LIVING IN A VOLCANIC NATURAL NATIONAL PARK: THE CASE OF CHÃ DAS CALDEIRAS, FOGO ISLAND, CAPE-VERDE. The Film Making Approach to Enhance Dialogue and Communication

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In many practitioners handbooks as in many scientific publications or international directives about disasters and development, has arisen a consensus about disaster risk reduction (DRR). It should firstly better integrate socio-economical factors from daily pattern to strengthen livelihoods. Secondly, it should adopt context-appropriate measures to develop local communities' capacities in facing risks.

Thirdly, it should be based on real collaboration between the different scales of action (institutional and upper levels stakeholders, local stakeholders, communities) to merge scientific, technical, political and local knowledge. If things are theoretically well-established, practically speaking difficulties remain to develop this collaboration and to find a research methodology which could combine all knowledge to help practitioners to find better solutions in DRR and in resources management.

Within the MIAVITA European research Program, the case of Fogo volcano Natural Park is highlighting specific difficulties in achieving these goals of shared management. The community living within the caldera is facing thus both volcanic risk and institutional strategies of biodiversity protection. These constraints, especially on farmlands but also on tourism development (being the second source of income), induce some conflicts between the community and external stakeholders such National Civil Protection, Natural Park Direction and the municipality of Santa Catarina.

This communication will present the main findings of Fogo case study, (1) by analyzing the complexity of natural and human context, (2) by highlighting vulnerability and capacities of different social groups living in the caldera, (3) by discussing the specific methodology applied, aiming at enhancing collaboration between researchers, practitioners and the community. It will focus on documentary film as a tool of dialogue. It will finally address the scientific and action perspective for the next years, post to MIAVITA program.

Control and Study of the Hierro Volcanic Eruption Impacts Over Restinga-Mar de Las Calmas Marine Reserve

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The volcanic submarine eruption that took place in the Mar de Las Calmas Sea-El Hierro affected in a direct way the La Punta de La Restinga marine reserve. Between the principal effects that it had on the marine reserve and the resources that it protects, the following ones are: massive mortality of thousands of fish of different species, the decrease of the quality of the waters, the affection to the benthic communities of algae and invertebrates and affection to the habitat of species of mammals and marine tortoises. Another immediate consequence was the paralyzing of the fishing professional activity and others, as the subaquatic activities, both economic engines of the population of La Restinga.

As a part of the biological and environmental control of these impacts on marine reserve and its consequences on the fishing professional sector, the Fishing General Secretary elaborated a plan of follow-up and control that began to develop from October/November, 2011. Nowadays there have developed four campaigns that include labors for the control of species, of waters quality, state of benthic communities, between other parameters. Likewise, there has been obtained submarine images of the evolution of the impact of the volcano on the marine reserve and the processes of marine regeneration that they are taking place later to the finish of the volcanic activity.

La Noche de los Volcanes – Raising Public Awareness for the Work of Volcanologists and Geologists

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People have been fascinated by volcanoes ever since the dawn of mankind and treated them with utmost respect. The word 'volcano' originates from the island of Volcano in the Mediterranean Sea near Sicily. The volcanic cone of the island was believed to be the chimney of Vulcan, the Roman god of fire who said to have been making weapons for other gods¹. Our modern life has brought a change and there are no longer religious elements associated with volcanoes in Western societies. The connection between plate tectonics, earthquakes, and volcanoes has been studied and understood. Four-dimensional models are being developed to simulate eruptions, cutting edge equipments are used to record even the tiniest seismic events and a broad array of remote sensing sensors are used on a routine basis to monitor volcanic activities from space.

At the same time a dramatic gap has formed between the professionals and the public. Research and studies on volcanism use more and more specialised language, which does not translate into popular science or public communications. The media often delivers inaccurate information, going for sensational facts, when they should be factual and failing to report findings, when they should use their power to disseminate information. It seems that in our world there is no longer time for explanations, only for just some quick quotes in the news if some exciting developments need to be broadcast. As a result, in today's world, the work of volcanologists is nearly as mythical as the work of volcanoes in ancient times.

Volcanoes' Night² is a project funded by the 7th Framework Programme of the European Commission to address the above social demands and to bridge the gap between researchers and the public. A key event was organised on 28 September 2012, in Fuencaliente de La Palma as part of European Researchers' Night activities that took place on the same day at several locations all over Europe³. Fuencaliente is a small town of only about 2000 inhabitants, and yet it is a municipal capital that sees volcanoes as an opportunity to bring national and international attention to the region's natural beauty and potential. It is also the municipality that is perhaps the most „associated” with volcanoes on the island – the last eruption of Teneguía occurred here in 1971. This backdrop provided excellent visibility for the project's national and international awareness campaign – resulting in media interest for the objectives of the project and the event itself. At the same time mobilising the inhabitants of La Palma Island to participate in the activities organised in this

remote community proved to be a challenge. Results of a random poll via questionnaires show that the decisive majority of the participants believed that the idea of bridging the gap between scientists and the public via such an event was very good or excellent (96.7% of respondents) and that their understanding of the work of volcanologists/geologists has improved as a result of participating at the event (60.7% of respondents).

1. <http://www.noaawatch.gov/themes/volcanoes.php>

2. Project full title: „La Noche de los Volcanes, an awareness raising Night for the work of volcanologist and geologist scientists., Grant Agreement No. 316558

3. http://ec.europa.eu/research/researchersnight/index_en.htm

Monitoring Active Basaltic Volcanoes: New Techniques and Novel Results

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The first, most common and widespread monitoring system applied to active basaltic volcanoes comprises a seismic network, used especially for detecting volcano unrest, the opening of eruptive fissures, or magma movement within the crust. This might be integrated by ground deformation systems such as tiltmeters, GPS (Global Positioning Systems) and/or EDM (electro-optical distance measurements). All together, these instruments allow a characterization of the shallow feeding system where persistent explosive activity might concentrate. They are also used to detect, localize and follow dikes emplacement, and their rise through the crust. Seismicity and ground deformations can also be useful to identify volcano instability, such as spreading, sliding or collapsing. After the 2001 and 2002-03 eruptions at Etna, forecasting lava fountains for air traffic safety became essential. Important information on impending lava fountain events at Etna and Stromboli volcanoes (southern Italy) have been recently furnished by a network of UV scanners, that allows us a continuous detection of the SO₂ flux released by the summit craters during the day. The accumulation of a foam of gas-rich magma at depth is in fact forecasted by a significant reduction of the SO₂ flux released by the summit craters a few hours before the start of the explosive event. SO₂ flux then increases by a factor of 10 or more after the conduit is opened by the emission of the gas-poor magma accumulated at the top, giving rise to the start of a fountain event. Once that the magma has found its way to the surface, it is important to follow its spreading in the air or on the ground when it forms lava fountain jets, sustained eruptive columns or lava flows. This is essential in order to describe the event, quantify the erupted material, and thus prepare the population to face the hazard and forecast its evolution. Significant results to this aim have been obtained by thermal imagery, using either portable or fixed cameras, and more recently especially from thermal sensors installed on satellites. Remote sensing thermal imagery allows a fast and safe update of the eruptive phenomena, a quantification of the erupted volume, and the collection of data that can be used in models predicting lava flow spreading or ash plume dispersion. Based on lava flow cooling curves, we have also developed a method of retrieving lava volume from satellite thermal images even when ash clouds obscure these. Low-cost radiometers installed in fixed positions close to the eruptive vents have also provided an important first alert, suggesting the possible start of explosive activity. Electric devices installed at Stromboli close to the eruptive vents have provided a quantification and characterization of the erupted ejecta, allowing recognizing the contribution of magma-water interaction in producing powerful vulcanian-type events. But the most striking results up to date have been obtained by the recently installed strainmeters, that on both Etna and Stromboli volcanoes evidenced deep processes occurring in the plumbing system, detecting medium to deep magma storage zones and allowing also an estimation of the speed of rising magma.

Learnings And Facts From The 5 Year Long Educational Program “Canary Islands: A volcanic window in the Atlantic Ocean.”

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The Canary Islands are the only land in our country that hosts active volcanism, as it was clearly stated last year 2011 when a submarine eruption took place offshore El Hierro island. In the last 5 years, ITER as well as INVOLCAN have been performing an educative program focused on teaching the benefits of a volcanic territory, the different volcanic hazards, how to reduce volcanic risk, and the management of that risk in the Canary Islands. This educative program has been roaming all around the 88 municipalities of the archipelago, and every year the audience gets bigger. When this initiative started back in 2008, we got a total of 3.003 people attending the program. since then, the increase has been constant, with annual percentages of 7.83, 17.13 and 20.89 respectively. This trend shows that we are on the right way, and that people is really interested about their environment, as well as about the threats they should face in the case of an emergency. Despitng the heterogeneity of the audience, we have to say that our main audience is clearly that related to the population aged from 45 in advance. That should be related to the memories of the eruptions in La Palma island, back in 1949 and 1971. About the audience interests, there is a big coincidence when questions are raised. Teide volcano and La Palma alleged future collapse are the most common of them. In addition, a volcanic trivia is provided to the people before the program starts. They have to fill it both before and after, so we can estimate the impact of the program. We have learnt that after the program is given, the rate of success in the answers sharply increase. Regarding the timing, this program is made through three consecutive days, the first two dedicated to the IAVCEI/UN videos “Understanding Volcanic Hazards” and “Reducing Volcanic Risk”, and the third one dedicated to the management of volcanic risk in the Canary Islands, as well as some other aspects.

Volcanic Tourism: Proposal of a Geomorphosites Itinerary in El Hierro (Canary Islands, Spain)

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Sun and beach tourism is the most relevant economic sector in the Canary Islands (Spain). Hiking tourism, which combines other activities with the appreciation of volcanic landscapes, is today one of the main economic activities of sustainable tourism in several Canarian enclaves. El Hierro is a recent and active volcanic island and a volcanic paradise rich in spectacular forms: landslides, cinder cones, craters, pahoehoe, aa, block and balls lavas, etc. The aim of this paper is to propose a geomorphosite itinerary in El Hierro, using for it the main net of paths of the island. This itinerary is based on geomorphological and geomorphosite resources and we have selected five volcanoes: Orchilla, Corona del Lajial-Restinga, Hoya Fileba, El Golfo and Las Playas. These volcanoes represent the variety of the volcanic landforms of El Hierro. The methodology relies on different aspects such as bibliographical research, aerial photos, topographical and geological maps and field survey. The geomorphosite landforms are obtained from geomorphological maps with a triple evaluation (scientific, cultural, socioeconomic and scenic values).