## Commision on Explosive Volcanism Newsletter - March 2004

Welcome once again to the Newsletter for the Commission on Explosive Volcanism. This Newsletter includes a conference report on the Cities on Volcanoes meeting in Hawaii last July by Costanza Bonadonna. In addition Guido and Kathy Cashman include a piece on Science, Mythology and Volcanic Hazard in which they argue the importance of Mythology in volcanology and suggest a dedicated session in the next Cities on Volcanoes conference on this theme.

The last CEV field workshop was held between the 15 and 17 September 2003 on Milos Island in Greece, with the theme 'Shallow submarine felsic volcanism'- Lisa Thompson provides a report on that event.

Work on the 'Large Volume Database Project' continues! Ben Mason is the person doing all the work or encouraging people to submit their data. Ben provides an update on what has happened over the last year and the current status with data input. There will be a CEV evening meeting on this topic at the IAVCEI General Assembly at Pucon in Chile in November of this year. Come along!

Clearly for many the event of 2004 will be the IAVCEI meeting in Chile. The program of the meeting is vast and interesting, and various sessions have been proposed by CEV. There are also a number of very attractive pre and post meeting fieldtrips on offer. At the Pucon meeting we will be stepping down as co-leaders of the Commission on Explosive volcanism. Therefore in the meantime we will be looking for volunteers to take over from us.

Paul Cole

Guido Giordano

#### **Conference reports**

# CITIES ON VOLCANOES 3 Report (July 14-18, 2003; HILO, HAWAΓΙ)

by Costanza Bonadonna

Lava fountain at Pu`u `O`o vent, Kilauea Volcano, Hawai`i

Lava fountain and flow, Pu'u 'O'o vent, Kilauea Volcano, on June 30, 1984, from http://www.uhh.hawaii.edu/~cov3/

Cities on Volcanoes conferences mainly represent the international forum for specialists in every area of natural hazards to discuss the impacts of volcanic activity on society. Unlike many very specialized meetings, Cities on Volcanoes typically provides a unique opportunity for experts to gather from different disciplines, such as volcanologists, engineers, civil authorities, civil defense officials, land managers, city-planners, psychologists, sociologists and media representatives who share common interests but who historically have had only limited interactions with each other. Cities on Volcanoes 3 (COV3) held in Hilo (Hawaii) followed the successful Cities on Volcanoes 1 and 2 held in Naples (Italy; 1998) and Auckland (New Zealand; 2001) respectively. Like Naples and Auckland, Hilo and the whole state of Hawaii have a vigorous volcanic past and future. Parts of the city of Hilo are built on the 1881 Mauna Loa lava flow, and the 1984 flow reached within 7 km of the outskirts of the city. Other Hawaiian communities have been severely impacted by eruptions as recently as 1992, and still others have developed in zones of high risk from future eruptions. Moreover, the 1983-2003 eruption of Kilauea volcano is continuing in spectacular fashion and Mauna Loa is showing signs of renewed unrest.

COV3 delegates had the possibility to enjoy first hand an erupting volcano and see the measures employed for hazard mitigation in Hawai'i. Informative field trips were organized to visit the active lava flows and delegates also had the chance to reach the flows themselves for an exciting "by night" experience. Field trips were also organized to see the lava flows and vents for the 1955, 1960, and Pu'u'O'o-Kupaianaha eruptions and some of the lava flows that have threatened Hilo during the last 150 years. But maybe the most amazing and touching experience provided by COV3 was "Kalapana Dreaming", an evening of reminiscence among people affected by the ongoing Kilauea eruption. When pahoehoe flows through an area, it burns and buries everything along the way, leaving only few tangible reminders. That is why it is so important to the people of Hawai'i to hali'a aloha, to cherish the memories. Tari Mattox, a former HVO geologist with close ties to the Kalapana community, presented a slide show about the current eruption to introduce the personal experiences of the people of Kalapana told through the words and stories of former and current residents. "Kalapana Dreaming" provided a unique and thought provoking opportunity of direct interaction between scientists, people and strong traditions. COV3 was also the ideal place to discuss "volcanoes and traditions" and compare the evolution of hazard mitigation and its strong link with human legends.

COV3 also provided a unique opportunity for scientific discussion during scheduled talks and posters. Experiences of emergency management were shared amongst scientists from Hawai'i, Caribbean,

Japan, New Zealand, Italy, USA, Central America, Indonesia and Africa; new data from recent eruptions and new monitoring techniques were presented; and some of the latest progresses in computer simulations aimed to hazard mitigation were also shown. But the most lively scientific discussion and interactions were provided by the numerous workshops that "dominated" COV3 and were nicely integrated within the meeting schedule. Workshops included: the first meeting of the International Volcanic Health Hazard Network (IVHHN), the first meeting of the IAVCEI Working Group on Modeling Volcanic Tephra-Fall Hazards, a highly successful NSF-funded student field workshop, which also permitted a large group of graduate students from the mainland to participate in the conference, and meetings focused on New Techniques for Volcano Surveillance, Lava Flow Mitigation and Outreach and Education.

Cities on Volcanoes conferences are very important for all those involved in volcanic risk and emergency management to share different experiences, see the same situations from different perspectives and keep up-to-date with new research and techniques used for hazard mitigation. The success of the 2003 meeting can be determined by the fact that the number of registrants was double that of Cities on Volcanoes 2. Therefore, we all look forward to Cities on Volcanoes 4, which will be held in early 2006 in Quito (Ecuador), another mega city tightly entangled in volcanic phenomena.

Costanza Bonadonna, Department of Geology and Geophysics, School of Ocean and Earth Science and Technology, University of Hawaii at Manoa.

# Science, Mythology and Volcanic Hazard: a bid for dedicated session in the next Cities on Volcanoes conference

By Guido Giordano and Kathy Cashman

It was 1995 when I [GG] attended the CVS workshop in New Zealand and ended up in the house of a Maori family who told me stories of their volcanoes. At that time I listened to them as if they were telling fairy tales, mythological legends, wherein Taranaki, Tongariro, Ngaruhoe and Ruapehu took the semblance of gods to justify the fear of humans. Only when I later lived in Australia and had the chance and fortune to meet Aboriginal people from the Gove peninsula and to listen to their stories did I realize that aboriginal stories and legends are far more than stories; they are the cultural and historical memory of the people. For example, the people from Cape York still retain in their legends knowledge of when Australia was bridged with Papua New Guinea during the last low stand of the sea level and of the great environmental changes caused in part by the changing climate, and in part by the unsustainable exploitation of game that led to the extintion of marsupials like the Diprotodon.

Culture is about developing languages that are used to describe nature (physical and psycological

nature) and to convey messages that can be commonly understood. Science, as we know it, is a language, the common language of the people who share our culture, and a language used to describe, manipulate and forecast natural phenomena. The precision of scientific language often makes it hard for us as scientists to accept that other languages (i.e. other ways to describe, manipulate and forecast) may be as "true" as ours. In the field of natural hazards, in general, and volcanic hazards, specifically, our ability to interpret evidence of past events, predict future events, and communicate this knowledge in a way that improves the hazard resistance of local communities requires that we expand our knowledge base to include oral traditions.

One excellent example is the case of the Colli Albani volcano near Roma. A story told by the Roman historians Titus Livius and Plutarcus about the sudden overflow of the Albano maar lake during a war between the Romans and the Etruscan city of Veio in the IV century b.C. was discarded as a legend first by Cicero and later by many other historians. The fact that the Romans dug a 1.5 km long tunnel drain (still operating!!!) through the maar wall to rule the lake at 70 m below the maar rim was never fully considered in evaluating the veracity of the story. In fact, modern scientists have considered the Colli Albani volcano to be extinct on the basis of the age of the eruptive products, the youngest known being dated at 25 ka. However, during the last three years, roadworks and archaeological trenches have revealed deposits that are clearly related to the Albano maar volcanic activity and lake overflows that have interferred with human settlements since the Bronze age. In the Roman area, these lake overflows prompted the development of containment technologies that involve an amazing network of artificial channel drains. Now we know that the Albano maar erupted much more recently than the previously believed 25 ka, and that several times during the Holocene the lake level oscillated dramatically to produce catastrophic overflows. Similar events still threaten Roma. With this in mind the tunnel drain dug by the Romans may be the first volcanic hazard mitigation measure. The amazing part of this story is that such a well known and well studied territory as Roma and its hinterland has mantained such a secret for so long! And yet, it wasn't a secret at all. There are pages and pages in ancient Greek and Latin written about that event, and more importantly, the tunnel is there.

The moral of the story presented above is that in order to fully understand the natural hazards posed by a region it is important to know its legends in addition to its geology, not just for folkloric reasons, but because they contain "truths" of capital importance just spelled in a different language...which does not make them lesser truths. The Romans believed that Poseidon's anger, god of waters and of the undergound and patron of the Etruscans, provided the reason for the sudden overflows of the Albano maar. We now name Poseidon a volcanic system able to trigger its geothermal system to produce oscillations of the ground water table. However, with their version of the system, the Romans were able to develop technologies and to mitigate the hazard in a way that still is unparalleled today.

How many other such examples exist? It is difficult to know, as the study of oral traditions is commonly based in the field of cultural anthropology, where stories are commonly collected without the benefit of a geological context. And scientists, with some notable exceptions, too rarely seek out cultural information. We suggest that greater knowledge can be achieved by looking carefully, respectfully and with scientific curiosity at information contained in the local natural history, conceiving with this term the History as we know it, as well as what we call legends and myths. If we open our minds to the notion that there is little difference between different languages developed by humans in different places and times, we may be able (1) learn more about ways in which people have managed to co-habit with natural hazards, and (2) develop multiple strategies for community

education and hazard management. In this context, we propose a session at the next Cities on Volcanoes meeting that would be devoted to an examination of both oral histories and oral traditions related to volcanic activity.

# CEV Field workshop: Shallow submarine felsic volcanism, Milos, Greece September 15-17, 2003

by Lisa Thompson

This CEV field workshop preceded a conference on the South Aegean active volcanic arc (SAAVA) on Milos Island, Greece. The workshop was led by Jocelyn McPhie and Andrew Stewart (both of the University of Tasmania) and presented the results of volcanological research focussing on the products of shallow submarine explosive eruptions and the facies architecture of the island. This research builds on previous work by Michael Fytikas (Aristotle University of Thessaloniki) and complements the ongoing investigations by Georges Vougioukalakis (IGME). There were 15 participants, from Italy, Switzerland, Greece, Germany, Australia, Portugal, Mexico and the USA.



Filakopi Pumice Breccia at Filakopi.

Spectacular exposures as well as great company and food, made my stay on Milos unforgettable. After all, didn't we all become geologists to travel to exotic islands and look at rocks? Milos, the

island of colors, is almost completely composed of Pliocene and younger volcanic rocks. These deposits are excellently exposed along the coasts, creating the unique beaches that sunbathers and swimmers flock to. At a closer look, however, these volcanic rocks provide more than just a nice backdrop for a day at the beach.

The workshop began with an afternoon of PowerPoint presentations that included an introduction to the volcanic geology of Milos and an overview of the submarine pyroclastic deposits to be examined during the workshop. On the first field day, it rained. Yes, it actually rained on Milos, and I didn't pack a rain jacket. Being geologists, though, we bared the weather and set out to look at the Filakopi Pumice Breccia (FPB), a Pliocene coarse pumiceous volcaniclastic deposit approximately 45 m thick. The FPB consists of three main units: 1) a basal lithic breccia, 2) a poorly sorted pumice breccia and 3) a grain-supported, coarse pumice breccia. One of the most striking outcrops was of the coarse pumice breccia (unit 3). This unit lacks lithic clasts, and consists of very large (up to 1.5 m in diameter), reversely graded, randomly oriented pumice clasts with normally jointed margins in a diffusely stratified to laminated ash matrix. The presence of large clasts of pumice in a fine ash matrix is not unusual. However, the bimodal nature of the deposit suggests both the large pumice clasts and fine ash were hydraulically sorted, settling out of the water column simultaneously. This pyroclastic deposit is a spectacular example of the products of an explosive felsic volcano erupting in a shallow submarine setting.

On the second day, we took a much anticipated boat trip along the southwestern coast of Milos. Luckily, the weather was much drier and sunnier than the day before. From the boat, we cruised by more very thick pumice breccias, hyaloclastite derived from felsic domes, and dacitic/andesitic intrusions into unconsolidated sediment. Because we didn't leave the boat, we couldn't scrutinize any outcrops in detail. However, the boat trip along the coastline was a fun and quick way to view the diverse volcanic and sedimentary lithologies on Milos. After a hard half a day's work, we took a break, ate lunch on board, and went for a dip in a nice, secluded cove carved into felsic pumice breccia, near Kleftiko.



Keleftiko

My main purpose for attending this workshop was to learn to distinguish the deposits from explosive

submarine volcanic eruptions from their subaerial counterparts. Although explosive submarine eruptions produce the same material as subaerial eruptions, the depositional setting is significantly different. Foremost, the presence of ambient water strongly influences where and when pumice clasts are deposited, creating unique textures. In addition, the nature of the deposit is distinct due to varying settling rates for pumice and ash and shoreline processes. My experience in Milos surpassed my expectations. I left feeling more confident in pursuing my own research on submarine volcanic eruptions. In addition, and equally valuable, I left with new friends and colleagues, great memories, and an appreciation for the beauty of the Greek Isles. Thanks to Jocelyn McPhie and Andrew Stewart for a most wonderful field trip.

Lisa Thompson, Northern Arizona University, Flagstaff, USA

### \*\*update\*\* The Large Volume Eruption Database\*\*update\*\*

The IAVCEI Large Eruption Database project has been accumulating data on the largest volcanic events on Earth. Since the inception of the project, the database has accumulated almost 300 calderas greater than 5 km in diameter, and more than 80 deposits larger than 10 km<sup>3</sup>. In 2003, the database was advertised at the EGS conference in Nice, the IUGG meeting in Sapporo, Japan, the Cities on Volcanoes 3 conference in Hawaii and the Long Valley Caldera workshop.

We would very much appreciate any help that CEV members can give to this project. Clearly it is through your participation that this dataset will be a success.

The website can be found <a href="http://www-volcano.geog.cam.ac.uk/database/">http://www-volcano.geog.cam.ac.uk/database/</a> Do not hesitate to contact me at bgm21@esc.cam.ac.uk if you have any queries or data in spreadsheet format.

We hope to present the first data on the website soon for public access and present an overview at the IAVCEI General Meeting in Pucon, Chile in November. There will be an evening workshop on the Large eruption database project on Monday 15th November (between 18:30 to 20:00). Please contact the website through the email address: bgm21@esc.cam.ac.uk if you have any questions about the project.

yours

Ben Mason

#### **Book Announcement**



#### Vesuvius erupting in 1944

### 'Volcanoes of Southern Italy.

#### by J.E. Guest, P.D. Cole, A.M. Duncan and D.K. Chester

The volcanoes of southern Italy show a wide diverstiy in the type of volcanism. In concequence, the products and the resulting landforms illustrate most of the known volcanic phenomena, all within a small geographic area. Because the area was the centre of western civilisation in classical times, there is a longer, more continuous record of observed volcanism than in virtually any other part of the world. Thus studies of volcanoes in southern Italy have played a central role in the development of ideas in earth science.

The volcanic history, eruptive activity and the products, petrology and hazard, are described for seventeen volcanic centres, nine of which have been active in historical time. In addition, the human history of those living on the volcanoes is described, as well as some key sceintists and thier ideas developed from studies of these volcanoes and their activity.

This book is aimed at providing a background fro those visiting sothern Italian volcanoes on fieldtrips, to start new research or just for general interest, as well as those wanting to find out more about them

- 284 pages,
- over 100 illustrations including many maps and photographs
  - 16 colour plates

For further information go to <a href="http://bookshop.geolsoc.org.uk/cgi-bin/geosoc.storefront">http://bookshop.geolsoc.org.uk/cgi-bin/geosoc.storefront</a>

European
Geosciences
Union

1st General Assembly Nice, France, 25 - 30 April 2004

The deadlines for pre-registration and for pre-hotel booking are 08 April 2004

www.copernicus.org/EGU/ga/egu04



The 32nd International Geological Congress (32IGC) 20 to 28 August, 2004 Florence, Italy

## From the Mediterranean Area Toward a Global Geological Renaissance

Geology, Natural Hazards, and Cultural Heritage

http://www.32igc.org/home.htm

Second International Maar Conference, 15–29 September 2004, Hungary – Slovakia – Germany
An official workshop of

http://www.mafi.hu/2IMC\_Homepage/2IMC\_Homepage\_Files/WelcomePagePictures/2IMC.html

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IAVCEI 2004 General Assembly Volcanism and its Impact on Society Pucón, Chile November 14-19 2004

http://www.sernageomin.cl/iavcei

Cities on

**Volcanoes** 

The **Fourth Cities on Volcanoes Conference**, Quito, Ecuador on 23 – 27 January 2006.

The Organizing Committee invites you to visit the COV-4 web site,

www.igepn.edu.ec/citiesonvolcanoes/

In January 2005 a formal circular will be sent to you with greater details and planning arrangements.

We would like to thank the contributors to this newsletter.

Dr Costanza Bonadonna

Dr Kathy Cashman

Lisa Thompson and

Ben Mason