



## Commission on Explosive Volcanism

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2001

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With this issue of the Newsletter we pass the torch to the new co-leaders of CEV, Guido Giordano and Paul Cole. In fact, most of this issue is composed by Paul and Guido and lays out their backgrounds and where they hope to take CEV over the next four years. In addition, they have provided a report on the IAVCEI congress that took place in Bali during the summer of 2000.

It seems appropriate to assess where CEV has been in the last four years, and where it may be going. During the past four years, the study of explosive volcanic phenomena has flourished. New data from deposits and eruptions around the world are being collected and published. Advances are being made in quantifying these field observations and tying them to theory. Field geologists and modelers are working together to use real eruptions as the basis for models. During the past four years, much has been published about the Mt. Unzen and Mt. Pinatubo eruptions of the early 1990s. The activity at Montserrat provided (and continues to provide) many new data on the dynamics of pyroclastic density currents and resulting deposits, and on the complex interplays between magma rise, dome growth, and explosive eruptions. Advances in theory have accompanied the new observations, and the application of numerical modeling to both understand phenomena and to predict them has continued to grow. The application of these models to hazards prediction is only limited by the type of eruptions studied - for example, we have yet to experience a large-volume eruption. New efforts are being aimed at specifically addressing the hazards of volcanoes in or near major urban areas, as manifested in meetings such as "Cities on Volcanoes" (first held in Italy, soon to be followed up in New Zealand) and in

efforts to bridge between volcanology and the civil engineering/architecture communities.

In one of our issues of CEV Newsletter, we visited the history of the Commission, going back to some of the records from when it was formed in the early 1980s. At that time, explosive volcanism was a very specialized field of study with few active workers. We think it is safe to say that explosive volcanology has now grown into a full-fledged discipline that draws on a large number of sciences, including geology, remote sensing, fluid dynamics, computational physics, petrology,

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engineering, and even the social sciences. We hope that CEV, during its approximately twenty years of existence, has helped to facilitate this evolution.

The past four years have seen a number of activities where CEV played a role, but we want to emphasize that it is the individuals within the Commission (but, of course, not limited to members!) that make things happen. The leaders of the Commission serve mainly as communication and integration conduits and help to raise the awareness of emerging research issues. Our focus has been particularly on publishing the Newsletter on a regular basis (although we skipped the Spring 2000 issue because of the interruption caused by a major wildfire in Los Alamos) and on organizing symposia. In the Newsletter, we have provided an informal forum for exchanging and debating ideas in topics such as kimberlites and maars. We have tried to publicize upcoming meetings of interest to volcanologists and to provide summaries of the major conferences.

Another goal that we have had is to use CEV as a place where different research groups around the world can provide a summary of the work that

Numerical modeling is not a stand-alone capability in that it must be interwoven with observational and experimental studies, but we hope that members of the commission will continue to think about and discuss ways in which it can be more effectively brought into the mainstream of our science. This may happen through a Numerical Modeling Working Group, as we proposed recently, or through more loosely-organized mechanisms.

In summary, we have had a lot of fun as leaders of CEV and hope to continue to see it grow. We are confident that Guido and Paul will see to it that the Commission remains vibrant! And finally, we want to thank Paula Geisik for her work over the past three years in handling the logistics of the CEV Newsletter without her help we would have had great difficulty in keeping the Newsletter going!

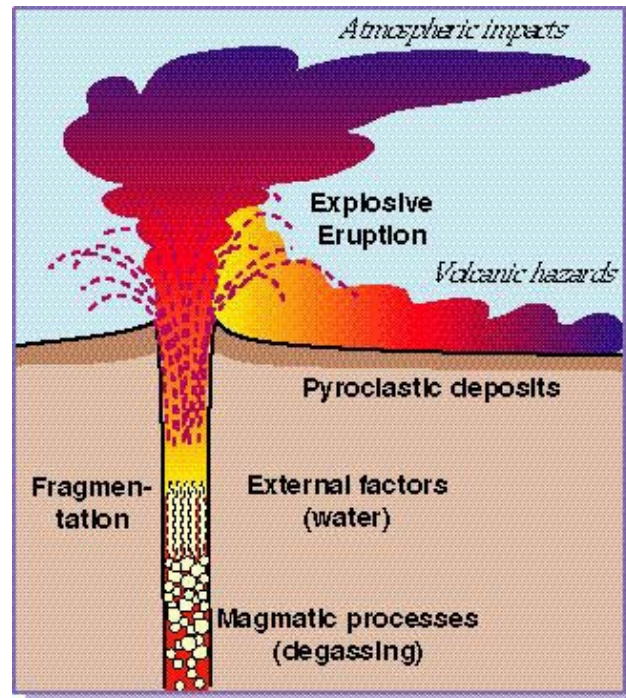
G. A. Valentine and

M. H. Ort, Co-Leaders

they are doing and planning, in order to promote collaborations and a higher level of awareness of events in the community. At times, dragging articles out of others (or even out of the co-leaders) is difficult, and we encourage all of you to contribute any informal notes you might have, without needing a request.

CEV has sponsored sessions at conferences on issues ranging from peperites to eruption physics. In addition, CEV sponsored field workshops that have been received very positively, although again we must emphasize that it is the workshop leaders who should get all the credit for initiating and organizing these events.

One issue that we have raised, but that for a combination of reasons has not been really addressed, is the need for numerical modeling to be further integrated and promoted as an important tool for understanding eruption phenomena. This is especially true from a prediction and planning perspective, where simulation of eruption scenarios is very important.



## Introduction to our new Leaders

**Paul:** I am currently based at the University of Luton where I teach Geology and related subjects. My research interests cover a number of aspects of explosive volcanism. One of my favourite controversial research topics has been the emplacement of pyroclastic flows and surges. I am also interested in hydrovolcanism and have recently completed a study on the 1957-58 surtseyan eruption of Capelinhos in the Azores. One of my current areas of research is the study of persistently active explosive volcanoes, the nature of their explosions and associated activity.

Like Guido, I studied for my PhD on Roccamonfina volcano in Southern Italy. I have also worked on pyroclastic and volcanoclastic deposits elsewhere in Italy on Campi Flegrei, Monte Vulture and Lipari Island. I worked with a large interdisciplinary team in the Azores, mainly on Furnas Volcano, one of the European Laboratory volcanoes. The results of much of this work were recently published in *JVGR* in 1999. Between 1996 and 1998 I was heavily involved in the monitoring of the current eruption of Soufrière Hills volcano, Montserrat. This provided me with the fantastic opportunity of observing actual pyroclastic flows and surges and then, safety permitting, studying their deposits.

**Guido:** I am based at the Università Roma 3 where I teach Geology of Volcanism. I am also currently involved in the coordination of the geological survey of volcanic rocks for the new 1:50,000 geological sheets of Roma and Albano, which cover a wide area across the Colli Albani and Sabatini volcanic complexes. My main research interests are related to pyroclastic flow and lahar transport and emplacement, as well as the structural geology of volcanoes and calderas. In the last three years I have also worked in multidisciplinary research project concerning CO<sub>2</sub> hazard in the Roman region, together with geochemists and hydrogeologists.

Paul and I met the first time at Roccamonfina where he was about to finish his PhD studies and I was about to start mine. After defending my thesis, I spent two years in Melbourne at Monash University for my post-doc, working with Ray Cas on the structure of the Devonian Boyd Volcanic Complex and the phreatomagmatism of the Newer Volcanic Province in Southeastern Australia. At present I am involved in several international research projects related to explosive volcanism with Monash University (phreatomagmatism and large volume ignimbrites), Universitat de Barcelona (peri-mediterranean Quaternary volcanism), Changchung University (Changbaishan volcano, NE China), University of Cergy Pontoise (dike emplacement).

### Proposed future developments for CEV

We would like to take this opportunity to thank Greg and Michael's for their efforts over the last 4 years. We have inherited a lively commission from them and only hope we can maintain their high standard.

One of the first things that we would like to do is to transform the CEV newsletter to a web only based communication. We feel that this is timely and appropriate given that this is almost totally an academic based group and as far as we know everyone who receives this newsletter has web access. If there is someone who does not have web access please let us know and we can arrange for a hard copy to be sent to them.

We are happy to promote workshops, particularly within so-called less developed countries and would appreciate suggestions for any such workshops. If you have any suggestions and / or are willing to organise a field workshop please do not hesitate to contact us.

Paul Cole and Guido Giordano, Co-Leaders

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## WORKING GROUP ON LARGE MAGNITUDE EXPLOSIVE VOLCANISM

Eruptions of VEI magnitude 7 (30 km<sup>3</sup>) or greater are likely to have serious global consequences. At the request of the IAVCEI president we would like to propose the development of a working group on 'large magnitude explosive volcanism'. The primary aim of this working group would be to attempt to establish the periodicity of such VEI 7 eruptions. This would involve collation of data (both terrestrial and marine) on all explosive eruptions of VEI 7 magnitude or greater for the last 2 million years. It is likely that this will be a joint effort between the commission for explosive volcanism and the atmospheres commission. We will, in the near future, be contacting people to compile databases for specific regions. It is likely that these regions will be the 19 regions used by the Catalogue of Active Volcanoes of the World. Any volunteers would be welcome!

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### *Montagne Pelée 1902 - 2002:*



### **Explosive volcanism above subduction zones.**

A workshop will be organised in 2002 by the Institut de Physique du Globe de Paris sponsored by IAVCEI, the territorial authorities of French Antilles, the Institut National des Sciences de l'Univers (CNRS), to commemorate the 1902 eruption of Montagne Pelée. This workshop will be located in Martinique (French Antilles) the week before or after May 8, 2002. It will be preceded and followed by field trips.

To receive the first announcement, you must express your interest and send your co-ordinates to:  
 Obs.volcanologiques@ipgp.jussieu.fr

Due to space limitations, the workshop will be limited to about 150 people.

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**IUGG 2003** is to be held in Sapporo Japan.

For information, see:



<http://www.jamstec.go.jp/jamstec-e/IUGG/indexe.html>

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## **IAVCEI 2004 General Assembly**

Further details will be forthcoming.





## IAVCEI GENERAL ASSEMBLY - BALI 2000 CONFERENCE REPORT

The IAVCEI General Assembly 2000 was held in Bali between 18 and 22 July 2000. About 490 geoscientists from 39 countries met in the International Convention Center at Nusa Dua, surrounded by the beautiful scenery of Bali Island with its active volcanoes and coral reefs. The aim of the General Assembly was to gather the volcanological community around the central topics of volcanic hazard mitigation and volcanic resources utilisation, themes that are particularly important to Indonesia, the country with the greatest number of active volcanoes in the world.

The Assembly was successful in allowing exchange of experiences and knowledge among scientists throughout the twelve organised symposia and concerning the following topics: Structure of Island Arcs; Volcano Seismology; Volcano Geophysics; Magmatic Processes; Magmatic related mineralisation; Volcanogenic sediments; Hazard Mitigation; Volcanic Gases; Crater Lakes; Physical Volcanology; Utilisation of Energy and other volcanic resources; and Surtseyan Volcanism.

A little less than the 489 accepted abstracts were presented during both the oral and poster sessions. The General Assembly also offered the opportunity to visit some of the most famous and hazardous volcanic areas of Indonesia. Three pre-Symposium field excursions were taken to the volcanic areas of Merapi, Dieng-Kelud-Ijen and Bromo-Semeru-Lamongan. On the 20th a daytrip to Batur caldera and Agung Volcano observatory was organised, giving the opportunity to all participants to visit the active volcanoes of Bali and discuss, in the field, problems concerning monitoring and hazard mitigation with the Indonesian colleagues. After the meeting 50 participants attended a field excursion to Krakatau.

In addition, two post-conference short courses were held about "Improved understanding of increasingly used Satellite-based volcano monitoring tools" and "Database of volcanic unrest" giving volcanologists the opportunity to catch up with the latest advances.

Personally I attended oral and posters presentations given in the Physical Volcanology, Volcanogenic Sediments sessions. The Physical Volcanology session (the largest of the meeting) comprised 93 contributions. Many topics have been discussed, including recent eruptions of Etna, Italy (1999), Cerro Azul, Galapagos (1998), many aspects of the eruptions at Soufriere Hills, Montserrat (1995-2000), Merapi, Indonesia (1994 and 1997), Anak Krakatau, Indonesia (1992-1999), the unrest at Dominica, West Indies (1998-1999), Arenal, Costa Rica

(1987-1999), Unzen (1991-1999). Interesting discussion arose from the many papers presented on analogue and numerical experiments, as well as conceptual models of bubble nucleation and growth, and conduit flow dynamics. Analogue and numerical models have also been presented on dome growth and collapse, caldera formation, pyroclastic flow dynamics and sedimentation, tephra dispersal and lava flow eruptions. New techniques of volcano monitoring have been presented such as satellite remote sensing and interferometric radar, as well as results from the drilling

project at Unzen volcano. One paper also dealt with extraterrestrial volcanism at Io (Jupiter).

The Volcanogenic Sediment session involved 17 contributions. Topics included debris avalanche deposits, lahars and their lateral transition to the fluvial environment, volcaniclastic sediments in marine environment and tsunamis, erosional features, volcanic ash dispersal in monsoonal environments, as well as papers about pyroclastic flow deposits and hyaloclastite formation.

Guido Giordano

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## **BROMO-TENGER-LAMONGAN FIELD EXCURSION REPORT**

This pre-conference field excursion was attended by around 20 people from a variety of countries. The first day involved a marathon 13 hour drive across Bali and east Java. Although tiring, the journey was by no means boring as the breathtakingly beautiful countryside provided excellent visual stimulation. The short ferry ride between Bali and Java was an exercise in patience but made easier by some nifty hat/bag demonstrations by the crew. By the end of day 1 we eventually arrived at the Bromo caldera rim where, due to the altitude, the tropical temperatures had taken a nose dive.

Day 2 involved an early (3:30 am) start and a jeep drive across the 'sand-sea' caldera to watch sunrise from a vantage-point on the caldera rim. The view, at sunrise, southwards across the partially mist-filled caldera with the intracaldera cones and the imposing Semeru to the south exploding every 30 minutes has to be one of the most incredible volcanic panoramas in the world. Following a brief breakfast we descended into the caldera stopping at some caldera wall exposures comprising alternating scoria and ash beds. Later we climbed and circumnavigated the Bromo tuff cone. There are many excellent exposures through the flanks of the largely phreatomagmatic products of this cone. Cowpat bombs were observed plastered against the inner walls of the tuff cone that probably represent magmatic phases during cone building. The rest of the day was spent examining exposures of pyroclastic deposits north west of the caldera.

Day 3 started off with a brief white-knuckle bus ride down the Ngadisari valley. The first stop was a small quarry in Sukapura ignimbrite cut by the locals for building stone. The ignimbrite was incipiently welded with characteristically dense pumices. Eastwards from this locality there are fine views eastwards toward Lamongan, our next stop. Before lunch we transferred to small Bemo vans, the Indonesian equivalent of minibuses and a reminder that most Indonesians are shorter than us. Lunch was taken on the rim of one of the many maar craters that litter the flanks of Lamongan and followed by examination of some nice exposures through the rim of another of these structures. We made a particularly interesting trip up through the villages on the flanks of Lamongan to one of the historical lavas formed in the 19th century. The overnight stop was in Lumajang a relatively prosperous town, although quite clearly not a place that many westerners visit given the interest in our presence.

Day 4 - From Lumajang we travelled to the southern flank of Semeru volcano. The group waited patiently amid paddy fields for a view of an explosion from Semeru, eventually we were rewarded. Next we visited a sabo dam in the Kobokan river, one of the major drainages of Semeru volcano and examined lahar deposits and some possible primary pyroclastic flow deposits formed in 1995. We continued to the Semeru Volcano Observatory where we observed seismic signals of explosions being recorded, even if we didn't see them, as the volcano was now obscured by clouds. In the afternoon we saw some amazing construction work replacement bridge destroyed by the 1995 pyroclastic flows. The management of Indonesian

vast amount of work that has been put in to construction of sabo dams. The last night of the excursion was marked by some fantastic Javanese dancing given by local schoolchildren. At the end of the show some of the participants were invited to dance. Unfortunately some participants dancing skills left a lot to be desired. I personally, on behalf of all the participants, would like to thank the organisers for such a fantastic trip.

Paul Cole

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## FIRST INTERNATIONAL MAAR CONFERENCE REPORT

The first (!) International Maar Conference was held in Daun, Germany, in August, 2000. Daun is a small town in the heart of the West Eifel volcanic field, famous for its maar volcanoes. The conference's goal was to bring together people working on the many aspects of maars, from physical volcanology to fossils to paleoenvironment to limnology and aqueous geochemistry. The organizing committee, chaired by Georg Buchel, did an admirable job bringing the meeting to life. They managed to drag money out of a number of sponsors, and used that to create a small, workshop-like meeting of about 150 participants, including well-known experts and up-and-coming students in the aforementioned subjects. Evening events, commonly fueled with food and beer ("Bitte ein Bit" was a common refrain), allowed people to informally critique ideas in small impromptu groups. The organizers are to be commended for quickly setting a tone of informality in which no ideas were sacred.

Four field trips were organized, with emphases on the volcanology of the Quaternary West Eifel maars, the Tertiary Ohre rift maars, the Tertiary Eifel maars and East Eifel District, and fossils of the Tertiary maars. I attended the Quaternary West Eifel maar excursion, which for four days provided about 30 of us with a bottom-to-top view of the exposures of maars and the upper parts of their underlying diatremes. Discussions at the outcrops were vigorous and always good-humored. I was impressed by the ability of the leaders to accept questioning of their long-held ideas, and to admit when they were unsure of answers (and when they were ABSOLUTELY sure!).

The meeting was marked by some excellent talks, in both German and English. Posters were presented in a prominent location, so that attendance was excellent. Some of the best presentations were via posters, which also allowed people to reach across language barriers. The number of student presenters was impressive, and bodes well for future research on maars and phreatomagmatism. Several studies made real strides toward linking field data on actual eruptions with models and experiments. The combination of field and experimental work is well-shown by the work that combines Bernd Zimanowski's experimental laboratory in Wurzburg with Piero Dellino's field and particle studies of La Fossa di Vulcano (and Iris Gehring, the student who is doing much of the work!). Their work, some of which is published in a recent Nature article, has found that they can re-create natural particle shapes and textures in the laboratory using certain magma-water interaction constraints. This work may move us closer to understand how the two fluids actually interact to produce explosions. Ken Wohletz and Bernd Zimanowski (or was that Ken Zimanowski and Bernd Wohletz?) gave an excellent demonstration of how field data can be used to create models of eruptions, and how these models can then be tested in the laboratory and field. As in explosive volcanology in general, much of the future gains in knowledge will likely come from such combinations of field and laboratory/simulation work. The added complication of magma/water interaction to the general explosive dynamics may delay accurate computer modeling of phreatomagmatism for a time, but it will eventually happen.

In summary, the meeting and field trips were a success, in that they brought researchers together to present their ideas and bang around new thoughts in a cordial atmosphere. The organizers did a great job, and are now pushing for the second International Maar Conference to occur - elsewhere, please.

Michael Ort

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