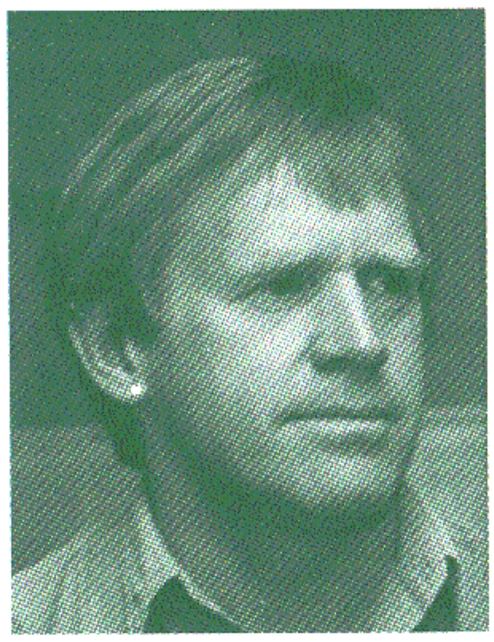
IAVCEI *News* 1998 No: 2

INTERNATIONAL ASSOCIATION OF VOLCANOLOGY AND CHEMISTRY OF THE EARTH'S INTERIOR

CONFERENCE NEWS CALL FOR NOMINATIONS

FROM THE SECRETARY GENERAL

The IAVCEI International Volcanological Congress (IVC) that took place in Cape Town, South Africa, from 11 to 17 July was a great success. Thanks and congratulations must be extended to Andy Duncan, Chris Harris, Goonie Marsh, their Organising Committee, and the conference management team - especially Karin Diederichs - for their planning, hospitality, and assistance. A great effort! The number of participants was down on previous IAVCEI meetings and we all speculated on what the reasons for that might be.



Wally Johnson - Secretary General IAVCEI

However, the quality of many of papers presented in Cape Town and the excellent field trips made up for the reduced number of registrations. The participation of people from the International Lithosphere Program (ILP) was a feature of this IAVCEI meeting and we appreciated the opportunity to develop links with ILP.

Disaster struck before the IVC: Andy Duncan (Chair of the Organising Committee and IAVCEI Vice President) developed a serious back ailment, was hospitalised for surgery, and was unable to attend any of the Congress. Then Grant Heiken (IAVCEI President) had to cancel his attendance because of a serious illness in the family (this is also the reason why I

Continued on page 7:>>

LESSONS FROM THE PAST
GRAHAM ISLAND

When a new volcanic island broke surface halfway between Sicily and Pantelleria in 1831, it offered a splendid opportunity to command the gateway to the eastern Mediterranean. France, Britain, Italy and Spain all laid claim to it. In all, it ended up with seven names: Nerita, Ferdinanda, Hotham, Graham, Corrao, Sciacca and Julia. Here, I use the recognised British name, Graham Island, which commemorates Sir James Graham, First Lord of the Admiralty.

Fire and water

First signs of actual eruption were reported on July 10 by Captain Corrao of the schooner *Theresina*. He observed vigorous steaming jets of "water" about 100 metres across and 20 metres high, which "impregnated the atmosphere of its vicinity with a sulphurous odour". Dead fish floated in an area of discoloured water, and there were violent thunderous reports. When Captain Smith of the brig *Philomel* saw it on July 22, the new island was 25 metres above sea level, and about 200 metres in diameter.

G W Smythe, "cavalry officer in the service of H M the King of Sardinia", watched the fireworks on August 6 from the decks of the *Melville*. He was struck by the contrast between the continuous emission of a white steam plume, and violent eruptions of "innumerable masses of black cinders and stones... propelled with the velocity of lighting from this apparent bed of snow". He described these soaring masses of ejecta as resembling "a cluster of cypress trees, shooting into existence from a common centre". Smythe's is a faithful description a style of surtseyan activity, named after the 1963 Surtsey eruption off Iceland.

Graham Island never grew as large as Surtsey. Its eruption was much shorter lived, reaching its climax sometime between August 7 and August 15. On August 17, when a party of officers landed, it was merely steaming quietly. No subsequent eruptive activity was recorded, and the sea immediately began to reclaim the new island.

For modern volcanologists, an interesting issue is whether or not the Graham Island eruption ever got beyond violent hydrovolcanic explosions to achieve strombolian status. Circumstantial evidence suggests that it probably did, albeit briefly. Smythe described "perpendicular torrents of flame" and "a lurid glare of crimson" showing through the jets of fragmented, chilled ejecta in his 'cypressoid' plumes. Secondly, the way the volcano eroded away, leaving a resistant rocky knoll, suggests that dense magma had reached the throat of the volcano, without being explosively disrupted. Finally, a painting by an unknown hand, probably executed after August 7, shows Graham Island in apparent strombolian vigour, with abundant incandescent scoria, and without the dense white steam plume characteristic of hydrovolcanic eruptions.

Continued on page 5:>>

PART 1 - CITIES ON VOLCANOES

Throughout much of world history the Earth's human population has lived in rural settings. However, since the end of World War II there has been a trend toward concentration of the growing population into urban centers. As of today nearly half of Earth's five billion people live in cities, and projected trends indicate that by the year 2025 five out of eight billion people will live in cities. This trend towards urbanization is particularly acute in developing nations where weak economies result in minimal investments in infrastructure. All cities become increasingly coupled with, and vulnerable to, their environment as they grow larger; this is particularly true in the developing nations. And as cities' roles in the global economy grow, a natural disaster or collapse from bad planning in one city can affect us all. It is time for all earth and environmental sciences to focus on reducing the vulnerability, and increasing the sustainability, of cities around the world.

Because of the proximity of volcanoes such as Popocatépetl (Mexico) and the Campi Flegrei (Italy) to densely populated urban areas, the volcanology community is in many ways already leading the charge of earth scientists 'into the city'. There is a growing focus in volcanology toward the integration of volcanic hazard studies with data and models on urban infrastructure (such as transportation, telecommunications, water and sewage distribution), and with the social and political structures of cities, in order to mitigate the effects of eruptions on populations. The 'Cities on Volcanoes' conference, convened 28 June-4 July, 1998, is a good example of this new focus within IAVCEI. This article summarizes this extremely productive conference.

The mission of the 'Cities on Volcanoes' conference is stated by the organizers: "An international meeting to bring together volcanologists, sociologists, economists, and city planners to evaluate volcanic crises preparedness and management in megacities and densely populated areas". The Osservatorio Vesuviano and Gruppo Nazionale per La Volcanologia are to be congratulated for achieving this goal and for their leadership in this interdisciplinary approach to volcanic hazards. In addition to several interdisciplinary groups that are focused on particular volcanoes or regions, representatives of insurance companies, municipalities, and structural engineering communities participated in the conference. These latter participants brought valuable new perspectives to the volcanologists attending the meeting.

After a plenary session with informative lectures by Chris Newhall and Franco Barberi, the conference consisted of several sessions with the following themes:

* *Eruption scenarios, maximum expected eruption, and volcanic hazards mapping.* Here we heard presentations on the volcanology and hazard assessment of Campi Flegrei, Mt. Vesuvius, and Vulcano (Italy); the Auckland volcanic field (New Zealand); southern Andes volcanoes in Chile; Popocatépetl (Mexico). Additional talks were given on the application of numerical modeling and crystal size variations to volcano system prediction and also on the general hazards associated with maar volcanoes.

* *Volcano monitoring, eruption precursors, and alert levels.* Several talks in this session were focused on the latest techniques for monitoring the degassing of volcanoes as indicators of potential eruptions. These include infrared remote sensing (e.g., FTIR). Other talks described observations of gas and ash emissions in Japan, Italy, and at the Long Valley caldera, as well as geophysical monitoring at various volcanoes.

* *Information and education.* In this session the true

interdisciplinary flavor of the conference began to really show. Two of the talks in the session were concerned with general issues of conveying information to society and preparing for disasters, and on using volcanology as a way to communicate scientific culture. The remaining three talks provided case studies on education in the Mount Rainier (USA), Machin volcano (Columbia), and Auckland areas. A large portion of these education efforts are targeted at children, partly because they are the most vulnerable members of society but also because they are good 'messengers' who can motivate their parents to take more active roles in planning and preparedness.

* *Volcanic risk evaluation and mitigation, land management in hazardous areas, geographic information systems (GIS), and the insurance industry.* Talks in this session tended to move toward making the critical step of combining event probabilities with consequences, and therefore true risk assessment. This implies consideration of infrastructure, economic, and social resources in vulnerable areas.

Examples of major dams and highways in Chile and Columbia, respectively, that are threatened by potential eruptions were described. Several talks focused on the use of GIS techniques for 'overlaying' lava flow, fallout, and pyroclastic flow predictions on land use/infrastructure data for more accurate prediction of consequences. An important step in this link is quantifying the response of buildings and other structures to volcanic phenomena; this topic was also discussed. Case studies of threatened urban centers in Italy, New Zealand, Mexico, and Peru were presented. Four representatives of the insurance industry discussed the financial side of volcanic hazards.

* *Emergency planning, alert levels, and crisis management.* Here presenters discussed methods for defining alert levels leading up to and during crises, and the interactions between scientists and emergency managers. The method of expert elicitation was described for combining the opinions and interpretations of individuals in a team that is handling a volcanic crisis, with an example of recent application of the technique at Montserrat. Health effects of volcanic ash, and the implications for emergency management, were discussed, as were scenario models for Vesuvius.

A final session focused on the emergency plans and education efforts in the Naples region, with input from local political leaders.

One half day was spent in three discussion groups on the topics of: maximum expected eruptions and hazards mapping; eruption precursors and alert levels; and risk evaluation, uncertainty, and GIS. The thoughts and recommendations of each of the groups were then discussed in an open forum involving all conference participants. The results are being compiled by the organizers and discussion leaders, and will be published in a future newsletter.

A post-conference field trip combined the geology of the Naples region with interesting information on archeological history and modern infrastructure and education efforts.

The public importance of volcanic hazards in urban areas was demonstrated by several newspaper articles about the conference as it unfolded. This level of visibility is a sign that the volcanological community is headed in the right direction in terms of educating people and saving lives. Again, congratulations and thanks to the organizers for an excellent conference!

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BRINGING VOLCANOLOGY INTO THE CITY

PART 2 - IUGG ACTIVITIES

IAVCEI is part of the International Union of Geodesy and Geophysics (IUGG), the umbrella organization for many different geophysical disciplines. The purpose of this article is to briefly describe one of the possible directions that IUGG might take with regard to urban problems, so that we can begin thinking of contributions that we might make to the larger picture.

IUGG has established a Megacities Council (Chair: Uri Shamir, Water Research Institute, Haifa, Israel) that will plan conferences and activities for the Union. We proposed the following action for the Council and for the Union in general: designate the first decade of the new millennium to be a time when IUGG focuses its interdisciplinary resources on urban issues. The approach to this would be partially modeled after IAVCEI's highly successful Decade Volcano program (led by Chris Newhall, USGS), but much larger in scope. In our proposal, each IUGG member nation would nominate an urban center as a 'Decade City'. Our suggested goals, selection criteria, and the role of IUGG in the Decade City program are:

Goals:
* Focus the geophysical, atmospheric, hydrologic, and geological sciences on interdisciplinary approaches to solving urban problems of sustainability and vulnerability.
* Build bridges to the infrastructure community, the economic and social sciences, and to decision makers, that strengthen the relevance of the earth sciences to society.

Criteria for selection of Decade Cities:
* Existing or impending severe environmental and/or natural hazard problems.
* Large population and related infrastructure.
* High potential for focused study to have significant impact on quality of life and sustainability.
* High potential for positive response and collaboration between researchers, agencies that develop and maintain infrastructure, decision makers, and the public.
* Local researchers propose, participate in, and help lead the program for their city.

An extensive series of workshops and documents would result from this plan, as well as symposia at IUGG General Assemblies. IAVCEI members should play a critical role in Decade Cities that are threatened by nearby volcanoes, and also in those that depend on volcanic materials. We would like to hear your ideas and criticisms of the Decade Cities proposal, which at this point is just in the initial stages of discussion.

IUGG's approach to urban issues will be rolled out during the 1999 IUGG General Assembly in Birmingham, UK, in special Union Symposia that will be led by the Megacities Council. Because of this, as well as the many sessions that will address basic volcanology, we strongly encourage all IAVCEI members to attend and participate in the Birmingham conference.

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IMPORTANT - NOMINATIONS DUE FOR IAVCEI EXECUTIVE

IMPORTANT! NOMINATION OF THE IAVCEI EXECUTIVE COMMITTEE FOR 1999 TO 2003

Now is the time to nominate people to serve on the IAVCEI Executive Committee for the years 1999 to 2003. Nominations are required for the following office bearers of IAVCEI:

* President
* Vice President (two positions)
* Secretary General
* Deputy Secretary
* Members (four positions)

Look at your copy of the IAVCEI Statutes and By-Laws and you will see how to nominate and vote!

All nominations must be sent by mail, facsimile, or e-mail to the Chair of the IAVCEI Nominating Committee at the following address: Professor S Aramaki, Department of Earth Sciences, Nihon University, Sakura-josui, Setagaya-ku, Tokyo 156, JAPAN Fax: +81 3 5317 9430 E-mail: aramaki@chs.nihon-u.ac.jp

SECURE THE FUTURE OF IAVCEI BY SENDING IN YOUR NOMINATIONS SOON!

The following conditions apply:

1. You must be an IAVCEI National Correspondent or a fully paid-up member of IAVCEI to be eligible as a nominator.
2. The person (or people) you nominate also must be an IAVCEI National Correspondent or a fully paid-up member of IAVCEI.
3. Each of your nominations, must be accompanied by the names of three people who (1) agree to second your nomination(s), (2) are themselves National Correspondents or fully paid-up members of IAVCEI, and (3) are from a country that is (a) different from that of the nominee and (b) is a member of the IUGG.
4. Your nominations must reach the Chair of the Nominating Committee before 15 January 1999.

The Nominating Committee will select candidates for a postal vote to be completed by National Correspondents and paid-up members (see Statutes and By-Laws). Ballot papers will be distributed before 15 April 1999 and must be returned before 15 June 1999.

The Nominating Committee consists of the following members:

Prof S Aramaki (Chair, Japan)
Dr P Francis (UK)
Dr J Lockwood (USA)
Dr I Nicholls (Australia)
Dr M Rosi (Italy)
Dr J Stix (Canada)

MODERN PREPARATION RESPONSE SYSTEMS FOR EARTHQUAKE, TSUNAMI, AND VOLCANIC HAZARD

INTERNATIONAL CONFERENCE Santiago, Chile 27-30 April 1998

The Chile National Committee on the International Decade of Natural Disaster Reduction (IDNDR) organized the Conference under the auspices of IASPEI and IAVCEI. The lead work in Chile was undertaken by the Instituto Geografico Militar de Chile (the national mapping agency) and internationally by the IASPEI Commission for the IDNDR. The meeting began on the 27 April in the Centro Convenciones Edificio Diego Portales in Santiago, Chile. Leading figures in the fields of disaster reduction and emergency response in Chile attended the opening and closing plenary sessions.

The two hundred participants rated the Conference as very valuable. These included leading figures in the social and technical aspects of preparation and warning of natural hazards from North America and Europe. Some thirty countries were represented. A feature of the conference was the opportunity to discuss integrated mitigation of the three related geological hazards.

The Conference was opened by an address by Philippe Boull, Director of the United Nations Secretariat for the IDNDR. He spoke on 'Towards Natural Disaster Reduction in the 21st Century' and stressed that the most effective approach to reducing losses is prevention. "There is an unfounded tendency to consider that investigation to strengthen the existing infrastructure before disasters will cost much more than the cost of response after disasters. It is exactly just the reverse."

Some ninety papers were presented during the regular sessions of the conference and the abstracts of most of them are contained in a book published by the Instituto Geografico Militar and are available on request by e-mail: seisvolc@conf.dgf.uchile.cl. These papers contain many up-to-date statements of the hazards, particularly in the Americas, and the present technical status of warning and alert systems. During these oral lectures, simultaneous English and Spanish translations were provided. As an example, one of the topics included the unacceptable disruptions in customer service and threats to human life caused when gas and electrical utilities are exposed to significant geological hazard. Another topic covered modern instrumentation systems that have been placed successfully in a number of countries: these systems collect, analyze, distribute, and archive data on earthquakes and associated hazards. Modern instrumentation systems improve the accuracy of long-term forecasts of future hazards - including tremors and tsunamis - and the speed of emergency response through the rapid determination of earthquake location and the extent of earthquake damage.

Another highlight was the effort of five Working Groups with membership drawn from conference participants representing diverse countries and expertise. A set of recommendations from the Workings Groups is now being prepared in a separate conference manual, that will be distributed to participants at the IUGG Assembly in Birmingham, England in 1999. It is believed that these

recommendations will provide a strong and lasting conclusion to IASPEI's and IAVCEI's contributions to the International Decade of Natural Disaster Reduction.

At the end of the Conference, Dr H Moreno Roa led a field trip to the Observatorio Volcanologico de Los Andes del Sur, Villarrica Volcano, and Puerto Saavedra (ruined by the great 1960 tsunami).

Special thanks for their sustained efforts are due to Brigadier Sergio Matus, IUGG representative for Chile, Crl Juan Gutierrez, Secretary of the Local Organizing Committee, and Professor E Kausel of the IDNDR Commission. The Conference was supported financially by participant fees, grants from the IUGG and IASPEI, Kinemetrics Inc. and Risk Management Solutions, Inc. The Instituto Geografico Militar made substantial contributions to expenses and Conference staff.

Bruce A Bolt
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Participants on conference excursion to Ovdas and Villarrica

LESSONS FROM THE PAST

>>Continued from page 1:

Lessons from Graham Island

Charles Lyell was one of the leading figures in establishing geology as a science in the mid-19th century. In his Principles of Geology, Lyell devoted a great deal of space to discussing important contemporary controversies, such as how are volcanoes formed?

Few 18th or 19th century scientists had the opportunity to see erupting volcanoes. They were thus impressed by what they could see in extinct volcanoes, where central craters are apparently surrounded by outward dipping beds of lava and scoria. This disposition lead to the notion, espoused in particular by Leopold von Buch (1774-1853), that volcanoes are essentially craters of elevation; formed by the swelling or arching up of the crust of the earth in response to pressure from below. Von Buch bolstered his argument with the observation that many volcanic cones clearly rise from the sea floor to form islands. Such islands could not, he argued, have been formed by magmatic activity, because this would immediately have been quenched by seawater.

Many of Lyell's contemporaries were convinced by the 'craters of elevation' hypothesis. Some of their arguments still sound plausible today. What is more natural than to suppose that infinite amounts of seawater flooding into a vent would permanently quench subterranean volcanic fires? Or that the radially symmetrical massifs, designated 'volcanoes', composed of outward dipping layers were formed by initially flat-lying strata being heaved up by a central intrusion?

Lyell used contemporary accounts of Graham Island to undermine the 'craters of elevation' theory. First, the birth of the island proved that volcanic fires could conquer the ocean water. Second, the outward-dipping layered structure described by visitors coincided exactly with what would be expected from the accumulation of successive layers of ejecta blasted out from a single central vent. Lyell was particularly interested in whether the volcano exhibited both outward dips, on its flanks, and inwards, towards the crater. He realised that such inward dipping beds should be formed in appropriate circumstances, but had seen none during a visit to Vesuvius.

Lyell noted some inward dipping beds on sketches of Graham Island made on September 29, and queried their nature with his contact, the distinguished French geologist, M C Prevost. Prevost replied that the inward dips were merely artistic licence on the part of M Joinville, who made the sketches, but to a modern volcanologist's eye, they look plausible. In its eroded state, the profile of the volcano resembles deeply eroded tuff rings exposed on dry land, whose inward dipping beds are sometimes amongst the last features to be preserved.

The only visitor with any scientific credentials to visit Graham Island in person was Dr John Davy "Assistant Inspector of Army Hospitals", and brother of Sir Humphry Davy. Dr Davy came close enough to the volcano on August 5 to be enveloped in a cloud of vapour; so dense that it was completely dark, and he was obliged to hold his breath, expecting the cloud to be hot and acid. When he could hold out no longer, he found, to his surprise, "no inconvenience from it". He later obtained rock, water and even gas samples from the crater, which he carefully analysed. His gas analyses must surely be amongst the first ever of volcanic gases. He concluded, as his brother had previously, that the chemistry of volcanic gases demonstrated that "ordinary combustion was nowise concerned" in driving the volcanic phenomena, discrediting earlier popular notions that subterranean fires were responsible. Burning coal seams, had, naturally enough been widely supposed to fuel the fires beneath volcanoes. He also argued that the absence of inflammable gases meant that the heat of volcanism could not have been caused by the "decomposition of water by the metallic bases of the earths and alkalis". Instead, he suggested that "our globe having once been in fusion, and still being so at a certain depth below the surface, liable to be acted upon by water flowing in from above, the phenomena of the volcano do not seem to be of difficult explanation". Modern volcanologists would agree.

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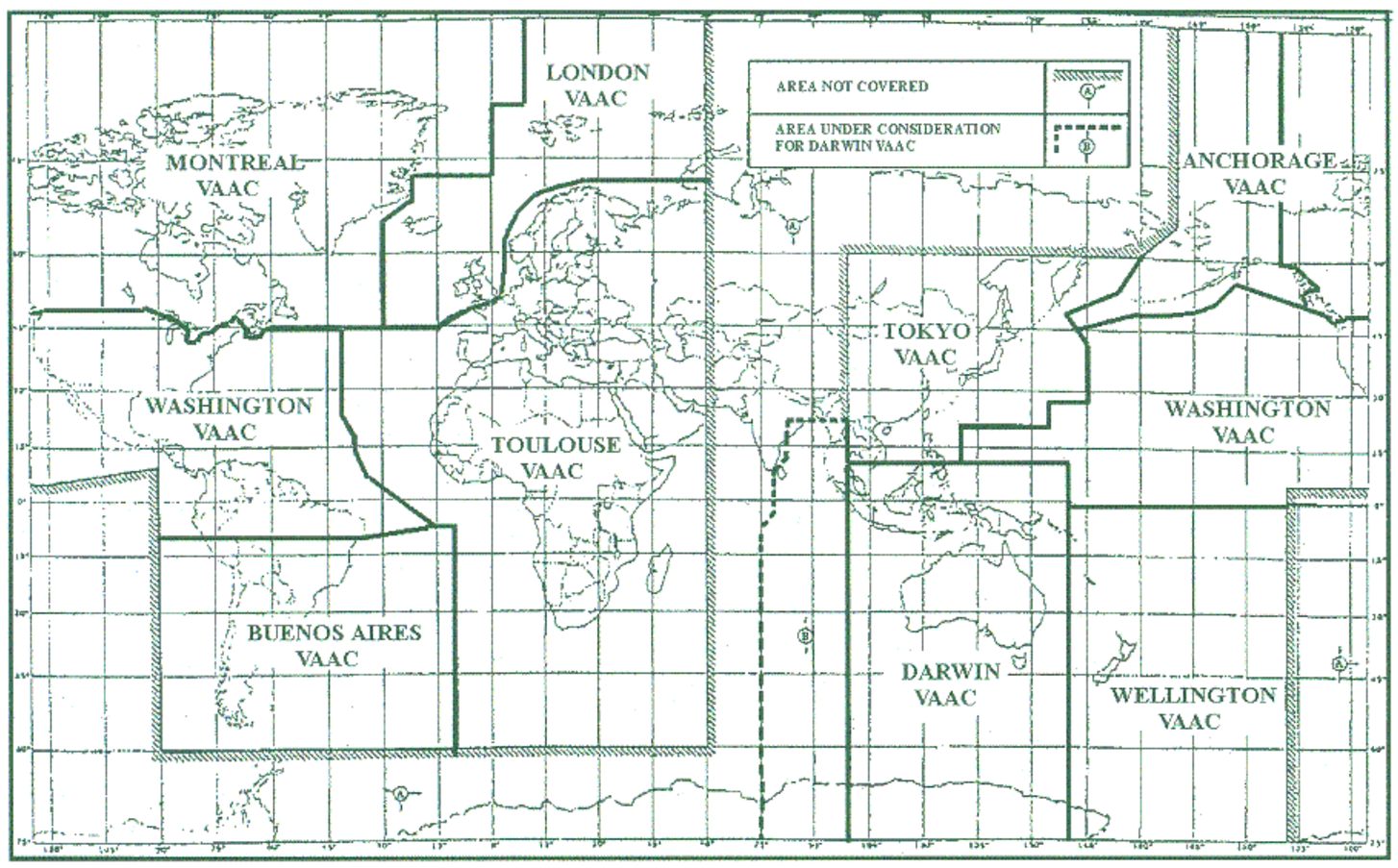
HAZARDS TO AVIATION
WORKSHOP ON VOLCANIC ASH; TOULOUSE, FRANCE, 11-15 MAY 1998

In the past two decades, more than 100 jet aircraft have had damaging encounters with drifting clouds of volcanic ash in air routes and at airports, placing thousands of passengers at risk and resulting in tens of millions of dollars in damages. The consequences of these encounters have resulted in major disruption of commercial air traffic around the world during many eruptions. The recognition of this emerging hazard has produced international cooperation among the meteorological, volcanological, and aviation communities, and led to the establishment of the International Airways Volcano Watch (IAVW) under the auspices of the World Meteorological Organization (WMO) and the International Civil Aviation Organization (ICAO). The purpose of the IAVW is to address the threat to aviation safety and the economic loss resulting from aircraft encounters with volcanic ash clouds. As a key part of the IAVW, nine regional Volcanic Ash Advisory Centers (VAACs) have been established around the world (see Figure below) under ICAO auspices to advise Meteorological Watch Offices (MWOs) on the issuance of volcanic ash warning to aircraft. VAACs are located in Darwin (Australia), Wellington (New Zealand), Tokyo, Anchorage (Alaska), Washington D.C., London, Montreal, Toulouse, and Buenos Arias (Argentina). The VAACs have been specifically tasked with the detection, monitoring and forecasting of the movement of volcanic ash clouds around the globe.



To further foster the VAAC efforts, the WMO and the ICAO co-sponsored an international workshop in Toulouse, France on 11-15 May, 1998 in order to provide a forum for interaction between providers and users of volcanic ash advisories and warnings. Similar meetings in Anchorage, Darwin, and Tokyo in the past few years had proved helpful in improving operations. The goal of this workshop was to optimize the activities of VAACs and to improve standardization, accuracy and timeliness of the information provided to users. Meteo-France, under the direction of Jean-Marie Carriere, ably hosted the workshop at its large campus on the outskirts of Toulouse and Tom Fox of ICAO and Nouhou Tata Diallo of WMO served as the general chairpersons.

About 35 people participated in the workshop including: representatives from 7 of the 9 VAACs, pilots, dispatchers, and meteorologists from 7 airlines, the FAA (Federal Aviation Administration), NOAA (National Oceanic and Atmospheric Administration), NASA (National Atmospheric and Space Administration), CSIRO (Commonwealth Scientific and Industrial Research Organization, Division of Atmospheric Research), Meteo-France, and volcanologists from the US Geological Survey. The agenda items included such items as:

* the detection of volcanic eruptions and volcanic ash by satellite-based remote sensing techniques;
* the initialization, operation, and presentation of trajectory and dispersion models;
* communication of volcanic events to VAACs by the volcanological community;
* improved coordination with MWOs;
* world-wide test of communication of volcanic ash hazards information; and
* standardization of VAAC products, communication by Internet, VAAC back up, inter-VAAC coordination as ash clouds move from one VAAC area to another, coverage of unassigned areas of the globe, and individual VAAC operations.

The workshop successfully highlighted both advances in mitigation of the hazards posed by airborne volcanic ash and continuing problems. Tracking of ash clouds by satellite imagery continues to improve but much remains to be done in terms of determining ash cloud density, separation of ash and gases, availability of adequate orbital platforms, and transfer of satellite data between VAACs and to other users. The NASA representative discussed a demonstration mission being proposed under the Earth Science Systems Pathfinder program where by ultraviolet and thermal infrared sensors would be used for ash detection and automated detection of explosive eruptions by SO_2 content. At least five different dispersion models are currently being used, each with their own perceived merits. Modelers agreed to run simultaneous tests on hypothetical eruptions in order to examine differences; they specifically requested that the volcanologists provide a list of hypothetical initial eruption parameters for specific volcanoes in order to improve their models in the critical first few hours of an eruption, at least for experimental purposes.

Airline representatives presented their operational procedures, experiences, and needs with particular reference to the North Atlantic (Icelandic volcanoes), the North Pacific (Alaska, Kamchatka, and the Kurile Island volcanoes), Southeast Asia (Indonesia and Papua New Guinea volcanoes), Mexico (Popocatepetl) and Montserrat (Soufriere Hills).

The above discussions dovetailed closely with those devoted to VAAC issues and the discussion throughout the workshop was interactive. Many VAAC issues reflected the short ramp-up time for some of the newly established VAACs, language difficulties, lack of common information transfer procedures, and similar problems. The scope and scale of the volcanic ash hazard to aviation was made clear throughout the workshop. Anticipated increases in aviation traffic globally and changes in equipment type and operational procedures will serve to increase the possibilities of aircraft and volcanic ash encounters. However, the successful start in volcanic ash hazard mitigation, together with the awareness of the assembled multidisciplinary group provides encouragement that the hazard can be mitigated.

Several items of interest to volcanologists were discussed at the workshop. Certainly the need for immediate eruption information is paramount: name of the volcano, Smithsonian identification numbers, location, start time of eruption, duration, plume height, and wind direction are critically important elements. ICAO has urged the adoption of a simple color code (see Table above) similar to that already in use by the Alaska Volcano Observatory and the Kamchatka Volcanic Eruption Response Team (KVERT) for North Pacific volcanoes to quickly call attention to changes in a volcano's activity.

The need for knowledgeable volcanology groups to serve as contacts for any particular eruption is also very important. Herein lies a problem for volcanologists; at many volcanoes, knowledgeable volcanology groups are understandably deeply involved in the proximal hazards posed by the eruption. In some cases, hundreds of thousands of people may be living within a few tens of kilometers of an explosively erupting volcano and the potential for catastrophic loss of life is high. Concern for possible aircraft encounters with the erupting ash plume up to hundreds of kilometers downwind and over other countries, while often recognized, gets lost in the immediate local response. However, the threat to life and property in terms of aviation hazards is also serious, with potentially hundreds of lives at risk along with millions of dollars of aircraft costs, schedule disruptions, cancellations, and reduced payloads. Clearly, the only way to truly mitigate this hazard is to avoid encounters, and to do this the international volcanology community needs to work more closely, perhaps through IAVCEI, with the airline community and ICAO.

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AVO LEVEL-OF-CONCERN COLOR CODE

Color	*Intensity of Unrest at Volcano*	*Forecast*
GREEN	Volcano is in quiet, 'dormant' state.	No eruption anticipated.
YELLOW	Small earthquakes detected locally and (or) Increased levels of volcanic gas emissions.	An eruption is possible in the next few weeks and may occur with little or no warning.
ORANGE	Increased numbers of local earthquakes. Extrusion of a lava dome or lava flows (non-explosive eruption) may be occurring.	Explosive eruption is possible within a few days and may occur with little or no warning. Ash plume(s) not expected to reach 25,000 feet above sea level.
RED	Strong earthquake activity detected even at distant monitoring stations. Explosive eruption may be in progress.	Major explosive eruption expected within 24 hours. Large ash plume(s) expected to reach at least 25,000 feet above sea level.

FROM THE SECRETARY GENERAL

>>Continued from page 1:

am writing this column in place of Grant's normal 'From the President' feature). Ray Cas (IAVCEI Deputy Secretary) also cancelled at the last moment because of a serious illness in the family. We missed them in Cape Town but here extend our best wishes for full recoveries to Andy and to Grant and Ray's respective family members.

Marta Mantovani (Brazil) and I were the only ones of the 11 Executive Committee members who were able to attend the IVC. We held two meetings anyway! But we expanded the numbers at the meetings by inviting all Commission leaders as well as IAVCEI stalwarts Shigeo Aramaki (former Past President) and Bob Tilling (former Vice President). The attendance and input of all these people was greatly appreciated, especially as both meetings were held at breakfast time, starting at 7.00 a.m. in the darkness of cold, southern hemisphere, winter mornings. Now that's dedication! We addressed many agenda items including: approval for the establishment of two new Commissions (Arc Volcanism, Ocean Island Volcanism); confirmation of the membership of the Nominating Committee for election of the 1999-2003 Executive Committee; review of the work of four IAVCEI Sub-Committees, and creation of another Sub-Committee on Volcano Public Awareness and Education; ways in which members could more easily subscribe to the Bulletin of Volcanology (we are currently devising a method whereby members will be able to pay their membership fees at the same time as paying their

Continued on page 8:>>

THE 1999 IUGG GENERAL ASSEMBLY BIRMINGHAM, UNITED KINGDOM SELECTION FROM THE SCIENTIFIC PROGRAM OF LIKELY INTEREST TO IAVCEI PEOPLE

The Second Circular for the 1999 General Assembly has been distributed (see also the web site at: http://www.bham.ac.uk/IUGG99/). Following is a selected list of the symposia and a Union Lecture that may be interest to intending IAVCEI participants in the 1999 IUGG General Assembly. The seven Associations of IUGG have worked hard, productively, and in a spirit of true partnership in generating a strongly interdisciplinary scientific program for this General Assembly. IAVCEI has been no exception in that the great majority of the symposia we are sponsoring are in partnership with at least one other IUGG Association. The general emphasis in planning has been on inter-Association co-operation aimed at linking traditionally separate scientific disciplines in the IUGG context. We are hopeful that this IUGG General Assembly will be different from previous ones in permitting the activities of IAVCEI to be seen in the wider global landscape of international geoscience. Be there!

THE ABSTRACT DEADLINE IS 15 JANUARY 1999

Union Lecture:
UL3: Volcanic Hazards, Cities, and Public Awareness - Franco Barberi (Italy, IAVCEI Vice President)
Union Symposia:
U1: Geoscience in the Service of Society
U4: Megacities and Geophysics
U5: Geophysical Hazards and Risks: Predictability, Mitigation and Warning Systems
U6: Volcanism - Mechanisms and Consequences
U7: Integrated Global Monitoring Networks
Inter-Association Symposia:
JSS02: Physics and Chemistry of the Earth's Interior
JSS07: Anisotropy: from Mountain Building to Geodynamo
JSA09: Polar Geophysics
JSA10: Planetary Exploration
JSS13: Constraints on Global Mantle Circulation
JSA15: Electromagnetic Methods for Monitoring Earthquakes and Volcanic Eruptions
JSA17: Mantle-Core Structure, Properties, Coupling, and the Geodynamo
JSV22: Oceanic, Continental and Continental Margin Volcanic Provinces
JSP23: Geophysical Hazards: Risk Assessment, Mitigation, and Warning Systems
JSP26: Chemistry and Transport in the Upper Troposphere and Lower Stratosphere
JSV29: Magma Physics versus Volcano Physics
JSV30: Arc Magmatic Rocks as Building Blocks for the Continents
JSV36: Understanding Volcanoes by Geodesy, Seismology, Electromagnetics and Geochemistry
JSM41: The Contribution of Satellite Observations to Global Climate, Ocean, and Terrestrial Monitoring
JSS42: Tsunami Observations, Modelling and Hazard Reduction
JSS44: Structure of the Continental Lithosphere from Integrated Geophysical, Geological and Geochemical Studies
JSS46: Seismic Tomography on Volcanoes and Volcanic Fields
JSV47: Volcano Seismology
JSA48: Characterization of the Lithosphere-Asthenosphere Boundary
JSP49: Small-scale Flow, Turbulence, and Mixing
IAVCEI Symposia
VS1: Volcaniclastic Sedimentation in Iceland
VS2: Magma Fragmentation and Explosive Eruptive Flows
VS3: Environmental Forcing of Volcanic Eruptions*

*Stop Press! Please note that information on IAVCEI Symposium VS3 was inadvertently omitted from the Second Circular. However, details concerning this symposium on environmental forcing of volcanic eruptions (its convenors are W J McGuire, C R J Kilburn, and G Zielinski) will be included in the Third (Registration) Circular and on the web site (see above for the address).

FROM THE SECRETARY GENERAL

>>Continued from page 7:

Bulletin subscription); and arrangements for the 1999 IUGG General Assembly in Birmingham (UK) and the IAVCEI General Assembly to be held in Indonesia in the year 2000.

Giovanni Macedonio (Italy) and Jon Davidson (USA) were joint winners of the Wager Medal which was presented in the final plenary session of the IVC by Peter Wyllie, the IUGG President (more of that in a subsequent issue of IAVCEI News). Congratulations to both Jon and Giovanni, and thanks to the IAVCEI Awards Sub-Committee (chaired by Grant Heiken) for all their hard work in sifting through and assessing the nominations. Thanks also to petrologist Peter Wyllie for coming to the IVC. Peter has made a resolution to attend all major IUGG Association meetings during his tenure as IUGG President. He has worn his corporate IUGG President's hat very effectively, but I feel sure his heart still belongs to IAVCEI!

Springer-Verlag kindly produced for us in time for the IVC - and at no charge - an updated version of the leaflet 'IAVCEI: who we are what we do', a copy of which you should find enclosed with this issue of the IAVCEI News. Please watch out for the next issue of the News (number 98/3) as it will be accompanied by a personalised invoice to renew your membership and subscribe for the Bulletin of Volcanology for 1999. IAVCEI needs your support.

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