# IAVCEI News 2007 No: 1

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

#### FROM THE PRESIDENT

Dear IAVCEI Members,

This is my last letter and in mid-July in Perugia Italy, the new officers will take the leadership. This is the right opportunity to thank the 316 members that took part in the elections. This is the largest number of voters we ever had. I was glad that we had many candidates and that IAVCEI members were offered a choice for almost all positions. I would like to congratulate the elected President, Prof Setsuya Nakada from the University of Tokyo and wish him a successful 4 years. I would also like to congratulate the other officers. The Vice-Presidents, Prof Anita Grunder (Oregon State University, USA) and Dr Hugo Moreno (Servicio Nacional de Geología y Minería, Chile) are members of the present executive committee and would take care for



Three generations of IAVCEI Presidents. From Left to right: Oded Navon (2003–2007), Setsuya Nakada (2007–2011) and Steve Sparks (1999–2003).

continuity and much more. The new committee members: Dr Marta Calvache (Instituto Colombiano de Geologia y Mineria, Columbia), Dr Pierfrancesco Dellino (University of Bari, Italy), Dr Juan Manuel Espindola (Institute of Geophysics, Mexico) and Prof James D L White (University of Otago, New Zealand) are fresh and enthusiastic. The heavy load of running the everyday life of the association is shifting from Steve McNutt to Prof Joan Marti (GSIC, Barcelona, Spain). I wish all of them success and take this opportunity to thank them for their willingness to serve the community and volunteer their time. I would also like to thank the three candidates that were not elected: Prof Peter Kokelaar (University of Liverpool, UK) and Prof Hazel Rymer (The Open University, UK) who ran for the position of Secretary General, and Prof Yigang Xu (Guangzhou Institute of Geochemistry, China). I am sure that they would make fine officers, and sure also were the many members who voted for them.

Looking back, the past four years were very interesting. The IAVCEI General Assembly in Pucon, Chile was a great success, mostly due to the efforts of Jorge Clavero and the members of the scientific and the local organizing Committees. The smaller IAVCEI meeting on Continental Volcanism held in Guangzhou, China owes its great success to Yigang Xu and the corresponding committees. I had a great pleasure working with these two young scientists. I greatly thank them for their devotion. Armann Hoskuldsson is now putting a lot of time into organising the next IAVCEI General Assembly in Reykjavík, Iceland. I am happy to take this opportunity to thank him and the other member of the organizing committees and hope we will have a great meeting there, next year. Many other interesting meetings were held during these four years and it is impossible to list them all here. Most impressive was the growth of the Cities on Volcanoes conferences with successful meetings in Hawaii (2003), Quito (2005) and in soon (November 2007) in Shimabara, Japan.

Thanks to the efforts of Steve Sparks and the family of the late George Walker, a fund was built to support the George Walker young scientist award. The award will be given to young scientists that are distinguished because of their scientific achievements or because of achieving high standards under difficult circumstances. I hope that the award will allow IAVCEI to express its appreciation to those members of the community that do excellent work with minimal funds and while missing the most updated equipment, or to those that succeed despite their personal difficulties.

I would like to thank Gerald Ernst and Jean-Christophe Komorowski for their help in our efforts to raise money for volcanology in Africa. Although these efforts have not ripen yet

*Continued on page 2* 

### From the President

Continued from page 1

into a success, I hope that there will be a good end to this story and that IAVCEI and IUGG will be able to contribute their share to help our African colleagues.

I would like to thank our Mexican colleagues who activated IAVCEI by starting a fresh democratic process in electing their representatives. It sure succeeded, and I hope that many countries will follow.

Last I would like to thank the members of the present Executive Committee: Toshi and Jocelyn, Anita and Hugo, Jean-Christophe and Rene, Steve and John. I also thank Caroline Giddings, our membership secretary, for caring for all IAVCEI members.

Most of all I would like to thank our Secretary General, Steve McNutt for his endless work in keeping the association functioning and growing. It was a great pleasure to work with Steve. It would be impossible without him. Thank you Steve and thank you all the others who helped so much in so many ways. It was a great pleasure to get to know all of you - the real beauty of the volcanological community.

# **Oded Navon**

President

## **IAVCEI 2007–2011 NEW EXECUTIVE COMMITTEE**

President

Setsuya Nakada (Japan)

Vice-President Anita Grunder (USA) Hugo Moreno (Chile)

Secretary-General Joan Marti (Spain)

Members Pierfrancesco Dellino (Italy) albinad@aliceposta.it Juan Espíndola (Mexico) James White (New Zealand) james.white@otago.ac.nz

Marta Calvache (Colombia) mcalvache@ingeominas.gov.co jmec@servidor.unam.mx

nakada@eri.u-tokyo.ac.jp

hmoreno@sernageomin.cl

j.marti@telefonica.net

grundera@geo.oregonstate.edu

Past President Oded Navon (Israel)

oded@vms.huji.ac.il

Editor, Bulletin of Volcanology John Stix (Canada) stix@eps.mcgill.ca

Membership Secretary Caroline Giddings (Australia) members@iavcei.org

## **FUTURE MEETINGS**

#### August 29–30, 2007

1st Jóannes Rasmussen Conference: Evolution of Basaltic Provinces Tórshavn, Faroe Islands. Simon R Passey, Jarðfeingi (Faroese Earth and Energy Directorate), Brekkutún 1, P.O. Box 3059, FO-110, Tórshavn, Faroe Islands Phone: +298 357033; fax: +298 357001; email: simon.passey@jardfeingi.fo Website: www.jardfeingi.fo

#### November 19-23, 2007

Cities on Volcanoes 5 Shimabara, Japan. Setsuya Nakada, Secretariat, Cities on Volcanoes 5, Gamadas Dome, Shimabara City 855-0879, Japan Phone: +81 957 65 5540; fax: +81 957 65 5542; email: convension@citiesonvolcanoes5.com Website: www.citiesonvolcanoes5.com

#### November 18, 2007

IWARS (Acoustic) Workshop Shimabara, Japan. Milton Garces, Infrasound Laboratory HIGP, SOEST, University of Hawaii, Manoa, 73-4460 Queen Kaahumanu Hwy, #119, Kailua-Kona, HI 96740-2638, USA Phone: +1 808 327 6206; fax: +1 808 327 6207; email: milton@isla.hawaii.edu Website: www.isla.hawaii.edu/volcano/iwars07.shtml

#### August 18-24, 2008

IAVCEI 2008 General Assembly Reykjavik, Iceland Dr Ármann, Höskuldsson Institute of Earth Sciences, ASKJA, University of Iceland, Sturlugata 7, 101 Reykjavík, Iceland Phone: +354 525 4215; fax: +354 525 4499; email: armh@hi.is First Circular: www.iavcei.org/IAVCEI08\_GA\_ ICELAND CIRCULAR1.pdf Website: www.iavcei2008.hi.is

#### **April**, 2009

3rd International Maar Conference Malargue, Argentina Corina Risso, Buenos Aires University; Miguel J Haller, Patagonia University, Puerto Madryn; Ulrike Martin, Wuerzburg University; Karoly Nemeth, Massey University Phone: +49 931 31 6019; fax: +49 931 31 2378 (Martin); email: corinarisso@fibertel.com.ar haller@cenpat.edu.ar ceboruco@web.de k.nemeth@massey.ac.nz

#### June 6, 2012

IAVCEI 2012 Alaska Centennial of 1912 Katmai Eruption (tentative) Steve McNutt and John Eichelberger Alaska Volcano Observatory UAF GI, PO Box 757320 Fairbanks, AK 99775-7320, USA Phone: +1 907 474 7131; fax: +1 907 474 5618; email: steve@giseis.alaska.edu

More details on the IAVCEI website at www.iavcei.org

## MAG 2007 — AN OVERVIEW

# International Conference on Evolution, Transfer and Release of Magmas and Volcanic Gases

#### Introduction

MAG2007 was the first international workshop devoted to bringing together igneous and gas geochemists working on volcanology-related topics. It was held at the Institute of Earth Sciences, Academia Sinica, and at Taiwan's East Coast, from 22 to 27 April 2007, and hosted an international group of some 45 leading experts and students of volcanology and igneous and gas geochemistry. The meeting was intended to provide a learning experience for all participants. The goal of this report is to summarize the proceedings and to convey the spirit and accomplishments of the meeting.

#### Structure

The conference was organized around a thematic set of keynote presentations by leading researchers. On the first day, the focus was on volcanic gases, with presentations on [1] sources of volcanic gas emissions, [2] degassing fluxes from subduction zones, [3] satellite based monitoring of volcanic emissions, and [4] continuous degassing from open conduits; on the second day, the focus shifted to igneous processes, with presentations on [5] rates of magma generation, evolution and degassing, [6] insights on magma dynamics from Mount St. Helens, [7] processes of incremental growth of magma reservoirs, and [8] the mechanisms and timescales of crustal assimilation. Much of the meeting was devoted to moderated in-depth discussions of these topics, with scheduled three-minute presentations of the participants following each keynote talk. Poster sessions provided opportunities for participants to display current research and to interact further with interested colleagues. Lunchtime laboratory visits provided a detailed overview of the state of the art facilities available at the Institute of Earth Sciences for collaborative research. Finally, a three-day conference field trip to visit active fumaroles of the Tatun Volcanic Group and exposures of deposits from the accreted Neogene Luzon Arc in East Taiwan provided a forum for informal interaction, and enhanced the attraction of this meeting to a broad and international group. The format of the conference proved highly productive and stimulated many discussions, which will without doubt result in future collaboration between the participants.

#### Formal presentations and discussion topics

After a brief introduction by Georg Zellmer to the Institute of Earth Sciences and its facilities, the scientific part of the conference was opened with Tobias Fischer's talk on sources, variations and implications of volcanic gas emissions. Gas monitoring and sampling methods were introduced, and it was shown that systematic variations in gas species and isotopic compositions with tectonic setting provide insights into the relative contributions of volatiles from the crust, the mantle and the subducting slab. The importance of time-series data for the monitoring of changes in volcanic activity was stressed, and the advantages of integration of gas analyses with petrological studies, particularly melt inclusion and ash leachate geochemical work, was discussed.

The next keynote presentation by David Pyle was elucidating the degassing fluxes from subduction zones. The talk focused on the inferences that can be made from local studies of volcanic fluxes on global-scale volcanic emissions. It became clear that although in principle, the budget of gas exsolution from cooling and decompressing magmas and of interactions with the crust can be resolved, sparse sampling density makes it difficult to infer global-scale emissions, particularly when attempting to constrain trace gas emissions. However, recent developments of portable ground-based and remote sensing instruments for the measurements of reactive volcanogenic trace gases is currently improving our knowledge of their budgets.

Simon Carn presented the latest advances in satellite based monitoring of volcanic emissions. A variety of space-based instrumentation in principle allows the detection of SO2, BrO, HCl and aerosols, although in practice SO2 release is the only species which - to date - can be well quantified. Recent improvements in the resolution of space-based monitoring enables the tracking of evolving volcanic gas plumes in the atmosphere during passive degassing. Detection of passive, i.e. non-eruptive degassing from space is a significant step forward towards continuous monitoring of volcanoes. Satellite based monitoring also allows quantification of degassing fluxes of remote volcanoes, and helps to constrain the global volcanogenic SO2 flux into the atmosphere.

Concluding the first day of the conference, Hiroshi Shinohara elucidated the mechanisms of non-eruptive continuous degassing, as for example observed in Etna, Stromboli, Masaya, Sakurajima and Miyakyjima, amounting to more than half of the global degassing budget from subaerial volcanoes. As the gas composition indicates low pressure degassing, and as the volume of magma to supply this gas flux is significantly larger than the erupted volume, magmatic convection in the conduit is required, with volatile rich magma rising and degassed magma sinking due to its higher density. The discussion focused on problems regarding conduit geometry and changes in magma viscosity due to degassing-induced crystallization, indicating that further work is needed to improve our understanding of this process.

The second day began with Ken Sims' tour-de-force of uranium series isotope systematics and its applications in igneous and gas geochemistry, providing insights into the processes and timescales of magma generation, evolution and degassing. After a thorough introduction to the principles of the uranium series decay chain, the introduction of disequilibria through geological processes such as melting, differentiation and degassing, and how the decay of such disequilibria may be used to date these processes, results from a number of case studies were discussed. These included the timescales of melt generation and migration at ocean ridges, the rates of differentiation and magma recharge in shallow reservoirs, and magma degassing rates. New (222Rn/210Pb) data from volcanic aerosols of Masaya were also presented.

Next, Jon Blundy's presentation on magma storage and volatile fluxes beneath Mount St. Helens provided many new insights into the petrogenetic processes operating at intermediate arc volcanoes. Plagioclase hosted melt inclusions provide direct evidence for degassing-induced crystallization during decompression in a rising magma column. The latent heat of crystallization may increase magma temperatures by up to 100°C, providing an alternative explanation for many disequilibrium textures observed in intermediate arc volcanic products that are frequently attributed to heating by influx of hotter, more mafic lavas. A broad correlation of the depth of the deepest earthquakes with geobarometric constraints on magma extraction depth neatly relates petrological and geophysical observations. Finally, data on variations in the Li content of melt inclusions were discussed, indicating the condensation of a Li-rich brine at depth.

Catherine Annen drew our attention to recent advances in the understanding of magma differentiation and shallow magma storage by presenting models of incremental growth of magma reservoirs. The controlling parameters are the geothermal gradient, depth of intrusion, intruded magma volume, fertility of the magma, and the emplacement geometry and rate. It was shown that models of over-accretion, under-accretion and random accretion result in different degrees and timescales of crustal melting, and that the partial/residual melt ratio is dependent on emplacement rate. These principles can be applied to melt generation and evolution in deep crustal hot zones, as well as shallow magma chambers of different sizes, where accretion rates can be inferred by combining thermal models with a variety of external constraints. Examples were given from the Mount Pelee magma chamber, where an accretion rate of 3 cm yr-1 is inferred, and the Manaslu leucogranite, where the model predicts an accretion rate of a few mm per year.

David Peate concluded the day with a review of the mechanisms and timescales of crustal assimilation. Recent advances in the development of realistic quantitative compositional models, and the advantages in using high-precision Pb isotope data to track assimilation, were discussed. Using the East Greenland flood basalts as a case study, crustal contamination appears to increase with decreasing magma supply rate. The focus then shifted to simple and young magmatic systems (suitable for uranium series dating) and constraints on the rates of assimilation. Examples from the Paricutin monogenetic cone, Mexico, and the Ice Springs flow of SW Utah were given. In the latter, dissolution of crustal xenoliths appears to take months to years and may be responsible for the entire observed geochemical variation within the flow. The potential in using olivine hosted melt inclusions to track assimilation during early stages of crystallization was also discussed.

Finally, it is noted that a number of significant contributions were made through the many short presentations of the other participants. These contributions were thematically scheduled after each keynote talk, giving every participant the opportunity to provide insights from their current research, thereby enhancing our common learning experience.

#### Laboratory visits

To give an overview of the state-of-the-art facilities available for collaborative research at the Institute of Earth Sciences, Academia Sinica, lunch-time laboratory visits were organized. Participants had the opportunity to view the Electron Probe Microanalysis Lab, the Laser Ablation ICP-MS Lab, the Silicate Oxygen Isotope Lab, the Gamma Spectrometry Lab, the Isotope Hydrology Lab, the Thermal Ionization Mass Spectrometry Lab, and the Atmospheric Chemistry Labs. For a description of these laboratories, the available instruments, and the contact personnel, please refer to the MAG2007 program and abstract volume available from the conference website (www.earth.sinica.edu. tw/~mag2007). Other instruments available are described on the institute website (www.earth.sinica.edu.tw/index\_e.html).

#### Conference field trip

The conference field trip began with an introduction to Yangmingshan National Park, and included a viewpoint of the Taipei basin and a tour of some of the fumarolic activity of the Tatun Volcanic Group. The second day was devoted to the complex geology of Eastern Taiwan's coastal range, and had participants discuss the significance of many of the outcrops in the area, with some good examples of distal and proximal volcanic and sedimentary facies, and opportunities to investigate dolerite dikes, volcanic bombs, remainders of a fringing reef, and the Chimei fault zone. The last day included visits to the famous Taroko gorge and some of the geologically most interesting examples of Northern Taiwan's hot springs, which were thoroughly enjoyed.

A few days after the conference fieldtrip, a number of participants conducted gas monitoring and sampling fieldwork in the Tatun Volcanic Group, providing the best possible hands-on example of the collaborative spirit that characterized this meeting.

#### Conclusion

The success of MAG2007 can be attributed to the presence of a diverse group of active researchers, including a number of young scientists who brought with them novel ideas and expertise

with new approaches and technologies. The relatively small size of the group promoted active discussion and interchange. Through conferences like MAG2007, the communication and integration of expertise among disparate specialists is promoted, which is usually not possible in larger international meetings. Finally, all participants appreciated the conference setting in East Asia, which for many was an exotic location giving ample opportunities to discover a very different lifestyle.

In the end, the success of MAG2007 will be measured at least partly by the number of new collaborations formed and new ideas developed. From that perspective, it is great news that despite the relatively small number of participants, a JVGR special issue on Evolution, Transfer and Release of Magmas and Volcanic Gases is planned, which summarizes some of the most recent work in the field, with studies of Taiwanese and international topics. Also, many opportunities exist for conducting collaborative research with researchers from the Institute of Earth Sciences, which offers the use of its state-of-the-art analytical facilities for promising research projects.

#### Further information

Details of the conference, including a program with submitted abstracts and a list of participants, are available on the MAG2007 webpage (www.earth.sinica.edu.tw/ mag2007). In 2008, a compilation of thematic papers submitted by conference

participants will be published as a special volume of the Journal of Volcanology and Geothermal Research.

#### Acknowledgements

MAG2007 received major funding from the US National Science Foundation (International Programs), the National Science Council, ROC, and the Institute of Earth Sciences, Academia Sinica, as well as support from the Geochemical Society and the International Association for Volcanology and Chemistry of the Earth's Interior (IAVCEI). Many individuals assisted in many ways, but we particularly want to thank the field trip leaders (Sheng-Rong Song, Tsanyao Frank Yang and Cheng-Hwa Chen) for sharing their expertise, the graduate students from National Taiwan University for their help with logistics, and last not least Sharon Yao and the administrative staff of Academia Sinica for taking such good care of us. The meeting was co-organized by the Chinese Geosciences Union.

#### MAG2007 Conveners

Georg Zellmer, Academia Sinica Tobias Fischer, University of New Mexico Borming Jahn, Academia Sinica Cheng-Hwa Chen, Academia Sinica Sheng-Rong Song, National Taiwan University Tsanyao Frank Yang, National Taiwan University



The Executive Committee in action at Bettona, Italy 11 July 2007. Clockwise from top centre: Setsuya Nakada (Japan), Toshi Fujii (Japan), Oded Navon (Israel), Steve McNutt (USA), Jean-Christophe Komorowski (France), Joan Marti (Spain), Piero Dellino (Italy), Steve Sparks (UK), Jon Dehn (USA).

#### **IAVCEI REPORT TO IUGG FOR THE YEAR 2006**

IAVCEI ended the year with over 700 paid individual members, the third highest number yet. Thirty-nine members have chosen to become Life Members, including three members who were awarded Life Membership as Honorary Members in 2003–2004. The IAVCEI web page is frequently revised and updated. The web site URL is www.iavcei.org. The volcano listserver administered by Arizona State University remains the official IAVCEI listserver. It has >2700 people listed, which far exceeds the IAVCEI membership. Thus we hope to further boost the membership in IAVCEI. Two issues of the newsletter 'IAVCEI News' were mailed to members in 2006.

Several highly succesful meetings were held in 2006. The Cities on Volcanoes 4 meeting was held in January in Quito, Ecuador with 550 participants. IAVCEI also sponsored or co-sponsored several workshops including the International Workshop on Continental Basaltic Volcanism in Guangzhou, China in May with 150 attendees and a Walker Symposium on Ice-Volcano Interactions in Iceland in June with 98 attendees.

No medals or awards were given in 2006.

The next IAVCEI General Assembly has been scheduled for August 2008 and will be held in Reykjavik, Iceland. The first circular was printed and distributed in December 2006.

One meeting of the IAVCEI Executive Committee was held in 2006, in December in San Francisco.

Preparations are well under way for what is sure to be a successful IUGG meeting in July 2007 in Perugia. Oded Navon also attended a planning meeting for the Electronic Geophysical Year, to be held 2007–2008.

#### Officers of IAVCEI for 2003–2007

President Oded Navon (Israel) Vice-President Jocelyn McPhie (Australia) Vice-President Toshitsugu Fujii (Japan) Secretary-General Steve McNutt (USA) Members of Executive Committee: Anita Grunder (USA) Renato Solidum (Philippines) Hugo Moreno (Chile) Jean-Christophe Komorowski (France) Past President Steve Sparks (UK) Editor, Bulletin of Volcanology John Stix (Canada)

A nominations committee was formed in 2006 to determine qualified candidates for IAVCEI officers for the term July 2007 to July 2011. The committee was chaired by former IAVCEI president Grant Heiken and completed its work in early January 2007. The election will be a true contested election, with 3 candidates for the Secretary-General position and 3 for two Vice-President positions, as well as 1 for President and 4 for the four Executive Committee positions. The election will be held in spring 2007 by mail vote of IAVCEI individual members and national correspondents.

IAVCEI sold several educational products in 2006. Two videos on 1) understanding volcanic hazards and 2) reducing volcanic risk were produced professionally under contract with IAVCEI. Over 40 videos were sold in 2006. We note that video sales are down somewhat as DVD becomes the preferred format. We plan to produce the IAVCEI videos in DVD format some time soon. Also, a volcano calendar for 2007 was produced by IAVCEI members and was printed and marketed by a professional calendar company. Over 8,000 calendars were sold and an additional 800 were distributed by IAVCEI to various scientific, educational, and governmental organizations. IAVCEI received a small royalty payment (1 percent) for the calendars. IAVCEI now has tax exempt status with the IRS. This status is important so that contributions may be received with a tax benefit to contributors. 2006 was our second most successful year yet with regards to fundraising; over \$4,000 was raised with the largest portion being proceeds from the sale of books previously owned by IAVCEI member George P L Walker.

2006 was a moderately active and productive year for IAVCEI. We hope to build on the success of the 2006 Workshops and the forthcoming 2007 IUGG meeting to assure the scientific and financial health and vitality of IAVCEI in the future.

#### Steve McNutt Secretary-General for IAVCEI



The hand-over: new Secretary-General Joan Marti shakes hands with former Secretary-General Steve McNutt. Joan assumed the Secretary-General duties effective on 13 July 2007.

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

## What comes with personal membership?

- Postal voting rights for elections and changes to IAVCEI Statutes and By-Laws (your country must be an **IUGG member**)
- Discounted price for the Bulletin of Volcanology
- **Discounted registration fees at IAVCEI General Assemblies**
- Automatic mailing of IAVCEI conference circulars and registration forms
- **Receipt of IAVCEI** News
- Name added to membership list and published on IAVCEI Home Page

Please print the following details *clearly*:

Your Family name and Title (Prof, Dr, Ms, Mr etc.) Your Given name Postal address

Phone number (with international and area codes) Facsimile number (with codes) E-mail address

Can IAVCEI publish your E-MAIL ADDRESS on the web site? YES or NO?

A\$400

A\$1000

A\$2000

# **IAVCEI MEMBERSHIP 2007**

Choose membership: ONE of Regular OR Supporting OR Life OR Benefactor

#### 1 **REGULAR MEMBERSHIP**

Membership fee (either 1a, 1b, or 1c) depends on your annual income – see table below

Your annual income in US\$ before income tax:		2007 Membership Fee in AUSTRALIAN dollars		4 YEAR Membership Fee in AUSTRALIAN dollars**	
1a	Over US\$16,000	A\$75	or	A\$260	
1b	US\$8,000-16,000	A\$35	or	A\$120	
1c	Under US\$8,000	A\$20	or	A\$70	

2 SUPPORTING MEMBERSHIP

- 3 LIFE MEMBERSHIP
- 4 **BENEFACTOR MEMBERSHIP**

**\*\*Please note there is a discount for joining for 4 YEARS** 

# **BULLETIN OF VOLCANOLOGY**

I wish to order Volume 69 issues (2007) (A\$148) I wish to order Volume 70 issues (2007/8) (A\$155)\*

\* The first issue of Volume 70 is scheduled for printing in September 2007

- IAVCEI members are entitled to purchase the Bulletin of Volcanology at a special reduced price (volume 70 onwards) of A\$155 (including carriage charges) for each Volume (now 10 issues, 1100 pages increased from 8 issues, 880 pages).
- To subscribe to the Bulletin tick the box/es and add the amount/s as shown.

Add TOTAL Bulletin amount here **A**\$

# TOTAL: A\$

Add

membership A\$

fee amount here

PLEASE TURN THE PAGE>>>>

# Place a tick against the names of the following IAVCEI Commission names that relate to your specific professional interests:

**Explosive** Volcanism Volcanism & the Earth's Atmosphere Mitigation of Volcanic Disasters Remote Sensing World Organisation of Volcano Observatories Granites Chemistry of Volcanic Gases Volcanic Lakes Phys. & Chem. of Materials of Earth's Int. Volcano Seismology Volcanogenic Sedimentation Large-Volume Basaltic Provinces International Volcanic Health Hazard Network Arc Magmatism EM studies of Earthau, & Volc. (IAGA/IASPEI) International Heat Flow (with IASPEI/IAPSO) Tsunami (with IAPSO/IASPEI) Cities on Volcanoes

# **IMPORTANT**

Send this form to the address below. Payment may be made EITHER by credit card OR by international bank draft in AUSTRALIAN DOLLARS payable to 'IAVCEI Membership' - no personal cheques please:

IAVCEI Membership, PO Box 185, Campbell, ACT 2612, Australia

Telephone: +61 2 6248 7403 Facsimile: +61 2 6248 7407 E-mail: members@iavcei.org

You will be sent a membership card plus issues of the IAVCEI News.

IAVCEI encourages groups of people from individual countries to send their remittances as a single payment, together with their individual application forms

#### DATE:

Please fill in credit-card details here:

Mastercard	Visa (not Visa 'Electron')	Diners	American Express
Card number			

**Cardholder Name:** 

**Expiry date:** 

Amount in Australian dollars: A\$

Signature:

OFFICE USE	
Receipt number	
Authorisation	
Member pack sent	