

**4th Meeting of IASPEI/IAGA/IAVCEI Inter-Association Working  
Group on Electromagnetic Studies of Earthquakes and Volcanoes  
(EMSEV)**

**July 3 and July 7, 2003, Royton Hotel, Sapporo, Japan**

Meeting started at 19:30

**Participants:**

**EMSEV WG members**

M. Gokhberg, Russia

Malcolm Johnston, USA ( IASPEI, IAVCEI Liaison )

J. Y. Liu, Taiwan

Oleg Molchanov, Russia

Toshiyasu Nagao, Japan ( Secretary )

Yasuo Ogawa, Japan (IAGA WS1.2 Liaison)

M. Parrot, France

Sergy Pulinets, Mexico

Yoichi Sasai, Japan

Birbal Singh, India

V. Spichak, Russia

Dumitru Stanica, Romania

M. K. Tuncer, Turkey

Seiya Uyeda, Japan (Chair)

Jacques Zlotnicki, France (IAGA Liaison)

**EMSEV corresponding members**

Bartdome C. Bautista, Phillipines

M. L. P. Bautista, Phillipines

Ha Duyen Chau, Viet Nam

Gilda Currenti, Italy

Crisan Demetrescu, Romania

E. Gordeev, Russia

Hendra Grandis, Indonesia

Rhommel Grutas, Phillipines

Harsh Gupta, India

T. Harinarayana , India

K. Hattori, Japan

N. Isezaki, Japan  
Tsuneo Ishido, Japan  
Jun Izutsu, Japan  
M. Kamogawa, Japan  
Panayiotis Kapisiris, Greece  
Mauro La Manna, Italy  
Ana Lillian Martin, Mexico  
T. Matsumoto, Japan  
Toru Mogi, Japan  
Yutaka Murakami, Japan  
Oleg Novik, Russia  
Naoto Oshiman, Japan  
Jane Punongbayan, Phillipines  
N. Sarlis, Greece  
Alexander Sidorin, Russia  
Ramesh Singh, India  
E. Skordas, Greece  
Wahyu Srigutomo, Indonesia  
Toshiaki Takano, Japan  
Makato Uyeshima, Japan  
K. Veeraswamy, India

## **[1] Introduction and Background**

The meeting was opened by Johnston (Acting Chair due to the initial absence of EMSEV Chair (Uyeda)). The growing number of attendees (40+) forced the meeting to be immediately moved to a larger room (~70 capacity) where, following a general welcome and circulation of a attendance/email list, the Acting Chair outlined the General Frame of Reference agreed to by IUGG and supporting Associations IASPEI, IAGA, and IAVCEI for the formation of EMSEV. The essential features are included in Appendix 1. The needs to promote cooperation and collaboration between different disciplines and to provide a forum for discussion and critical science commentary were again identified as fundamental reasons for the existence of the working group.

A vote of thanks to Seiya Uyeda and Toshiyasu Nagao for their very successful organizational efforts in [1] developing smooth working relationships with the various IUGG Associations, [2] raising money and [3] setting up the email system and web pages was carried with acclamation.

## **[2] Membership, Communication and Association Liaison Reports.**

Nagao (Secretary) reported on the EMSEV membership and our attempts to generate a membership distribution that reflects the distribution of countries working in this field and not the numbers of people from particular countries. We now have 34 WG members and about 300 corresponding members representing 20 countries. During the past year we have had 102 email exchanges.

Suggestions regarding the mailing list included ensuring closer ties to the international magneto-telluric group (MTNET: email:mtnet@mtnet.info, website:<http://www.mtnet.info>) and vice versa, particularly in relation to meetings. A suggestion later in the meeting by O. Norvik was made regarding setting up a Web group discussion capability. This suggestion sparked interest and it was agreed that Nagao-San would try to implement it.

Zlotnicki, as IAGA Liaison, mentioned that IAGA is pleased with the operation of the working group. Both David Kerridge (IAGA President) and Bengt Hulquist (IAGA Gen. Sec.) are impressed by the scientific focus of the EMSEV Working Group. IAGA will support the Working Group and will fund its operation in 2004. Cooperation with the Induction Working Group has worked well. One problem that has surfaced concerns a possible timing conflict between meetings of MEEMSV in France and the Induction Working Group in India, both in September, 2004. There is an attempt to move the Induction Working Group meeting to October. More coordination will be needed in the future to optimize meeting times.

Johnston, as IASPEI and IAVCEI liaisons, reported that both IASPEI and IAVCEI were pleased with the role of EMSEV. We appear to be fulfilling the role, as outlined in the Terms of Reference. Engdahl (Gen. Sec. of IASPEI) mentioned that he would like to have some information on what particular aspects of Seismology are covered in EMSEV. Johnston responded mentioning that details of earthquake mechanics, nucleation, source mechanics, and fault interaction are common to both fields and both seismology and electromagnetism have common constraints. Engdahl (now the new president of IASPEI) says he will continue to support EMSEV at levels obtained previously. Support for IUGG2003 included Travel Grants. McNutt (Gen. Sec. of IAVCEI) also is pleased with the professional science-based operation of EMSEV. We are fulfilling our objectives and he will continue to support our operation. Cross-association interaction is an important part of both IASPEI and IAVCEI.

## **[2] Report on Activity in 2002-2003**

- Sept., 2002 MEEMSV Workshop. Slava Spichak reported that this workshop and its format worked well. There were 100+ participants who attended 7 sequential sessions. With no parallel sessions, it was possible to listen to all talks. Two post meetings were held, one on Data Processing and the second on Instrumentation. One of the conclusions of the meeting was a recommendation for a joint cooperative study on a volcano or in an active fault zone.
- Jan., 2003 Manilla Meeting on Initiating Seismic and Volcanic EM Monitoring in Asian countries was reported by Zlotnicki also to have been a success. It was well organized with lots of fruitful discussion. Sessions focused on both seismic and volcano geophysics were covered in 2 days followed by a field trip on the third day to Taal volcano which has had 33 eruptions since 1572 with the largest in 1749, 1754, 1911, 1965, and 1977. PHIVOLCS would like to start a monitoring program and both Japanese and French researchers are willing to start an EM monitoring program. Networks desired would include a proton magnetometer network, a continuous resistivity network, a telluric/magnetic station and an acoustic emission network associated with a tilt station. Jane Punongbayan from the Phillipines would also like to discuss a broader monitoring on Phillipine volcanoes. Sasai from Japan said this might also be possible but funding and maintenance are big problems. Unfortunately EMSEV has no money to support such operations. The budgets have to be found by bilateral cooperation. Possible funding sources might be JICA (Japan Int. Coop. Agency) but JICA focuses on early warning systems. Another option comes from the French side since both national funds and support from the French Embassy is likely.
- Jan., 2003 PIERS Meeting in Singapore has produced 7 papers on EM. Michel Parrot was an invited participant at this meeting.
- April, 2003 EGS/AGU meeting was reported by Molchanov. This meeting was very crowded with more than 10,000 persons. The EM sessions occurred over three days and were well attended. More than 100 papers were presented, 20 oral and 80 posters. Publication is planned of perhaps 40 papers of the 50 submitted.
- At IUGG2003, Sapporo, Japan, the second EMSEV business meeting is held on two evenings: July 3 and 7. Several EMSEV related sessions are being held and over 200 papers are presented. A fund from the Tokyo Club (USD 20,000) was available to help attendance to EMSEV Meetings and related sessions

Some discussion concerned the problem that when EMSEV supports a meeting, it may not always be possible to always have many EMSEV representatives attend this

meeting. Realistically, it may not be possible to have more than one EMSEV sponsored meeting per year.

### **[3] Activity Planned for the Near Future**

- November 4-7, 2003, there will be the Third Asia-Pacific Conference on Environmental Electromagnetics (CEEM 2003) in Hangzhou, China. M. Hayakawa is Chair of Technical Paper Committee.
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- AGU Fall Meeting 2003, Abstracts due 9 Sept. No formal EM sessions are planned. However, according to Dr. Dimitar Ouzounov's information, there is a session. T12: Ground and Space Methods for Monitoring EM Pre earthquake Phenomena. His mail [EMSEV 00103] is attached herewith. Abstract deadline was 28, August, 2003.

Dear Colleagues:

Please you can find latest announcement about the session T12 of AGU meeting in San Francisco

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AGU Fall Meeting, 8-12 December, San Francisco, USA, 2003

[www.agu.org](http://www.agu.org)

Description: This session will consider the existence and cause of the electromagnetic (EM) phenomena related to the occurrence of earthquakes. We encourage abstracts describing EM signals caused by changes in the state of stress in the Earth's crust prior to earthquakes with main focus on electrical, electromagnetic, and infrared (IR) phenomena and methods for their monitoring. EM signals related to the strong earthquake are still widely debated in the science community. Several reasons contribute to the cautious assessment, among them a lack of understanding the link between the seismo-mechanical processes on the ground and the ionospheric and electromagnetic events. Contributions are solicited on all potential EM earthquake related phenomena and their precursors in different frequency ranges observed and documented by lab measurements, ground-based and remote sounding methods, and satellite probes.

Sponsor: Tectonophysics  
CoSponsor: Geomagnetism and Paleomagnetism  
Seismology  
SPA-Aeronomy  
Mineral and Rock Physics

Conveners: Dimitar Ouzounov [ouzounov@eosdata.gsfc.nasa.gov](mailto:ouzounov@eosdata.gsfc.nasa.gov), Friedemann Freund [fffreund@mail.arc.nasa.gov](mailto:fffreund@mail.arc.nasa.gov), Carol Raymond [carol.a.raymond@jpl.nasa.gov](mailto:carol.a.raymond@jpl.nasa.gov), Patrick Taylor [ptaylor@ltpmail.gsfc.nasa.gov](mailto:ptaylor@ltpmail.gsfc.nasa.gov)

Deadline:

28 August 2003: deadline for abstract submissions by postal or express mail.

4 September 2003, 1400 UT: deadline for electronic online abstract submissions.

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- April, 2004 EGS/AGU Meeting in Nice. A session “Seismo Electromagnetics and Related Phenomena” (Same title as 2003) has been proposed. Conveners: P. Biagi, M. Hayakawa, O. A. Molchanov and F. Vallianatos. Note that with the planned amalgamation of the Spring AGU and EGS in Nice each year and since many researchers are close to Nice, this Spring meeting may be a good place to concentrate sessions on EM.

The Third International Conference on Continental Earthquakes, originally scheduled for July 2003, has been postponed to July 4-11, 2004 because of the SARS. It will be held in Beijing. Details : <http://www.icce.ac.cn/>.

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- July 5-9, 2004, Asia-Oceania Geophysical Society (AOGS) Meeting in Singapore will have a Seismo- EM session. Main conveners: M. Hayakawa and J.Y. Liu, Co-conveners: Birbal Singh, T. Nagao and K. Hattori
- 2004 MEEMSV Meeting is set to occur on 5-9 Sept., 2004 in La Londe les Maures, France. Jacques Zlotnicki is in charge of the organization of this meeting and has obtained some funding from CNES and CNRS. Some funding may also be obtained from COSPAR. A local committee including Michel Parrot will be formed. The meeting program will focus on all active EM work on volcanoes and with earthquakes with no parallel sessions. The organizers also plan to have general keynote talks on
  - [1] Earthquake Seismology,
  - [2] Volcano Seismology
  - [3] DeformationFor each of these talks the names of the best potential speakers were discussed. EMSEV supports this meeting and has plans to hold the Third 2004 EMSEV Working Group Meeting in conjunction. In future, we will attempt to combine EMSEV and MEEMSV meetings whenever possible.

September 30, 2004 IWSE Workshop (Int. Workshop on Seismo Electromagnetics) in Sankt Peterburg, Russia was summarized by Molchanov. Organizers are looking for sponsorship. First announcements are expected in August, 2003.

- November, 2004 IAVCEI General Assembly in Chile will have an EM session that will attempt integration of Induction Monitoring, EM Topography of Volcanoes, and Remote Sensing. J. Zlotnicki is convenor.
- Mexico Workshop, 2005 was summarized by Pulinets. Some money has been obtained for location. Winter season is best. Location still uncertain. Possibilities are Puerto Vallarta, Oaxaca and Mexico City. Maybe this meeting is a good option for the 2005 EMSEV Meeting [See Note].
- India Workshop, 2004 or 2005: A proposal to organize a workshop in Agra or Hyderabad was presented by B. Singh. Support of living and accommodation can be obtained but no support for travel into India [See Note]
- [Note – It seems important that to ensure consistency and agreement on scientific objectives for these and future meetings, the EMSEV Bureau should work with the meeting organizers on the content, planning and logistics of the meeting before engaging the broader community.]

#### **[4] Publications.**

It was generally agreed that we should have a proceedings volume of IUGG2003. The issue concerned how this might be done. Options include:

[1] IUGG Special Issue

[2] J. Appl. Geophysics

[3] EPS

The problem is that more than 200 papers were presented at IUGG2003 and this far exceeds what could be included in a special issue. It was not agreed how this could be handled. It was proposed that some exploratory work be done to find out how many papers we really have by sending an email to all presenters requesting interest in submitting a paper. Other options will be investigated by the conveners of the EMSEV related symposia.

Some recent publications related to the activity of EMSEV members include:

"Seismo Electromagnetics- Lithosphere-Atmosphere-Ionosphere Coupling" (Edited by M. Hayakawa and O. Molchanov), TERRAPUB., 477pp, 2002

"Recent Investigations of Electromagnetic Variations Related to Earthquakes" ( Edited by

S. Uyeda and S. Park), Special Issue, Journal of Geodynamics, 33, 4-5, 2002.

"A Multi-Disciplinary Study of Volcanoes" (Edited by. V. Spichak, T. Dixon and A.L. Martin), Special Issue, J. Volcanology and Geotherm Res., 113, N 1, 2002.

"Seismo Electromagnetics" (Edited by M. Hayakawa), Special Issue, Journal of Atmospheric Electricity, 22, 113-300, 2002.

#### **[5] Support from IUGG Bodies 2004**

Johnston outlined the level of support largely obtained by Uyeda including: [1] IASPEI - an unknown amount from IASPEI for 2004, [2] IAGA - \$2000 for 2004 and [3] IAVCEI - \$1000 for 2004. [3] \$2000/year from IUGG for the next four years.

#### **[6] Next EMSEV Meeting was Discussed in [3]**

#### **[7] Reconsideration of Membership, including Chairmanship.**

Seiya Uyeda outlined a problem with EMSEV WG membership from China. China has 4 representatives but they all come from the same Institute. Uyeda proposed that Ruan Aigo be replaced by Qinghua Huang who is a young and very enthusiastic scientist who had some of his training and research in Japan. There were no objections to this proposal.

Seiya Uyeda opened up the possibility that he step down. It was generally agreed that EMSEV would like to retain Seiya Uyeda as chairman. Seiya agreed to remain in the post of chairman for 2 more years.

#### **[8] New Initiatives and Proposals**

##### **8-1) Thermal Anomalies with Earthquakes**

Ramesh Singh (ITT Kanpur) made a brief summary of satellite measurement of thermal anomalies, which he suggested were related to earthquakes. A fuller discussion of this issue was planned for the EMSEV meeting to be held on July 7.

##### **8-2) Integration of Global Networks**

Michail Gokhberg (Inst. Phys. Earth in Moscow) proposed integration of EM measurements with multi-parameter borehole monitoring sites world wide that currently make seismic, deformation, pore pressure, heat flow and other measurements. Gokhberg planned to meet with consortia such as IRIS who run some of these networks to gauge interest and possible support.



## **[9] Conclusion**

The meeting adjourned at 21:50, with a final remark by Johnston that the rest of the Agenda would be completed on July 7, in particular a more complete discussion of thermal anomalies and any other proposals or ideas that were not covered adequately in this first part of the 2003 EMSEV meeting.

## **APPENDIX 1**

### **The Terms of Reference set by the IUGG Executive Committee:**

#### **1. Purpose of the Working Group**

- a. To promote co-operation and collaboration between individuals and research groups, internationally, on observations and research into electric and magnetic effects associated with earthquakes and volcanoes.
- b. To promote the dissemination and discussion of relevant data and research results.

#### **2. Scientific Objectives**

- a. To critically assess data providing evidence for electrical and magnetic effects associated with earthquake and volcanic activity.
- b. To investigate the physical mechanisms responsible for substantiated electrical and magnetic effects associated with earthquake and volcanic activity.
- c. To provide interpretations of the observed effects to advance understanding of earthquake and volcanic processes.
- d. To design experiments to optimize the collection of data critical to the understanding of mechanisms and processes.

#### **3. Relationship of the Working Group to the Associations**

- a. The Executive Committees of the sponsoring Associations shall each appoint one member to the Working Group who will be responsible for liaison with the relevant Association.\*

\*Johnston (IASPEI and IAVCEI) and Zlotnicki (IAGA) are liaisons.

- b. Annually, in December, the Working Group shall submit a report on its activities and achievements to the Secretary-General of each of the sponsoring Associations.
- c. The status of the Working Group shall be reviewed by the sponsoring Associations every two years.