

**9th Meeting of IASPEI/IAGA/IAVCEI Inter-Association Working Group
on Electromagnetic Studies of Earthquakes and Volcanoes (EMSEV),
November 22, 2006, Holiday Inn, Agra, India**

Meeting started at 18:30

Participants:

Uyeda, Seiya (Chairperson)
Nagao, Toshiyasu (Secretary)
Johnston, Malcolm (IASPEI and IAVCEI liaison member)
Zlotnicki, Jacques (IAGA liaison member)
Bhattacharyya, A., IIG, Navi Mumbai
Das, A.C. PRL, Ahmedabad, India
Gwal, A. K., Barkatullah Univ., Bopal, India
Hattori, K., Chiba Univ., Japan
Hayakawa, M., Univ. Electro-Comm., Japan
Hughes, A.R.W., Univ. KevaZulu-Natal, South Africa
Jun Izutsu, Tokai Univ., Japan
Kolvankar, V.G., Bhabha Atomic Energy Res. Center, Mumbai, India
Kumar, N., Barkatullah Univ., Bopal, India
Mogi, Toru, Hokkaido Univ., Japan
Ohta, K., Chibu Univ., Japan
Prakash, Ram, BB College, Jhansi, India
Parrot, Michel, CNRS, Orléans, France
Parashar, A. R.B.S. College, Agra India
Karimov, F.H., IEES, Dushambe, Tajikstan
Korepanov, Valery, LVIV Center of Space Research, Ukraine
Sehgal, A.K., R.B.S. College, Agra, India
Singh, A.K., Bundhelkhand Univ., India
Singh, B., R.B.S. College, Agra, India
Singh, R. IIG, Navi Mumbai, India
Singh, R.P., IIT, Kanpur, India
Shrivastava, A., Barkatullah Univ., Bopal, India
Spichak, Vjacheslav, Geoelectromagnetic Res. Inst., RAS, Russia
Total ~ 37

[A] Chairman's Report (S. Uyeda)

The meeting was opened by Toshiyasu Nagao EMSEV Secretary who introduced the EMSEV Chairman, Seiya Uyeda. Following a general welcome, Uyeda thanked the Indian colleagues for success of the Agra

IWEMSEV meeting and participants for the lively discussions and proceeded to summarize the history of EMSEV since its first meeting in 2001.

2001 –Organizational Business Meeting during IASPEI/IAGA General Assembly, Hanoi, Aug. 2001

2002 - Intn. Workshop on Earthquake Prediction, Taipei, organized by J-Y Liu, March, 2002

- MEEMSV Workshop organized by V. Spitak, and Business Meeting, Moscow, Sept, 2002.

2003- Workshop on EM monitoring in SE Asia, and Mini-Business Meeting at Philippine Institute of Volcanology and Seismology (PHIVOLCS). Jan., 2003, which resulted in the EMSEV-PHIVOLCS cooperative investigation on Taal Volcano.

- Sessions as part of URSI General Assembly, Maastichit.

- Sessions, at EGS/AGU, Nice, April 2003.

- Sessions as part of IUGG General Assembly, and Business Meeting, Supporo, organized, July 2003

- Sessions as part of Fall AGU meeting, San Francisco, Dec. 2003

2004- Sessions as part of the Ist Asia-Oceania Geoscience Society (AOGS) meeting, Singapore, July 2004

- EMSEV Workshop organized by J. Zlotnicki, and Business Meeting in La Londe, France Sept. 2004

- Sessions as part of Asian Seismological Commission (ASC) meeting and Mini-business Meeting at Yerevan, Armenia, Oct., 2004

- Session at IAVCEI, Puçon,Chile, Nov, 2004

- Meeting at ICSU organized by V. Lapenna

2005- Initiation of Taal Volcano Monitoring program with PHIVOLCS by Y. Sasai and J. Zlotnicki

- IWSE (Intl. Workshop on Seismo-electromagnetics), Chofu, Japan organized by M. Hayakawa, March 2005.

- Sessions as part of IAGA General Assembly and Business Meeting, Toulouse, France, July 2005

- EMSEV Workshop 2005 organized by S. Pulinets as part of Mexican Geophysical Union (UGM) and Business Meeting, Puerto Vallarta, Mexico, Nov.,2005

- Session at Fall AGU, San Francisco, convened by D. Ouzounov, S. Pulinets, M. Parrot and S. Uyeda, Dec, 2005

2006-Workshop iSTEP (integrated Search for Taiwan Earthquake Precursors), Taipei, Taiwan organized by J-Y Liu, March 2006

- DEMETER meeting at Toulouse organized by M. Parrot, June 2006.

- Session on Seismo-Electromagnetics : Lithosphere – Atmosphere Ionosphere Coupling, convened by M. Hayakawa, J.Y. Liu and R. Singh, at AOGS, Singapore, July 2006
- Session on Observation, Methodology, and Theory of Electromagnetic Signals Associated With Earthquakes, convened by Q. Huang, D. Ouzounov, L. Telesca, T. Nagao, at the Western Pacific Geophysics Meeting (WPGM), Beijing, CHINA, July 2006
- IWEMSEV Workshop organized by B. Singh, and Business Meeting, Agra, India, Nov., 2006
- Session at Fall AGU convened by D. Ouzounov, **who-else?**, San Francisco, Dec., 2006,.
- Continuation of Taal Volcano Monitoring program by PHIVOLCS team. Participation of foreign teams was postponed to 2007, because of cyclone hit.
- 2007-** Four Sessions of Integrated EMSEV Symposium and business meeting at IUGG General Assembly, Perugia, Italy, July, 2007.

Session 1: “VOLCANIC STRUCTURE AND ACTIVITIES”

Convenor: Viacheslav V. Spichak;
 Co-convenors: Jacques Zlotnicki, Yoichi. Sasai, Domenico Patella and Ciro Del Negro

Session 2: “ELECTROMAGNETIC FIELDS ASSOCIATED WITH EARTHQUAKES AND ACTIVE FAULTING”

Convenor: Malcolm Johnston;
 Co-convenors: Naoto Oshiman, and Antonio.Meloni

Session 3: “CRUSTAL INSTABILITIES AND EARTHQUAKE PRECURSORS”

Convenor: Pier Francesco Biagi;
 Co-convenors: Masashi Hayakawa, Jann-Yenq Liu, Toshiyasu. Nagao

Session 4: “SEISMO- ELECTROMAGNETIC STUDIES USING SPACE TECHNOLOGY”

Convenor: Ramesh Singh;
 Co-convenors: Sergey Pulnits, Michael Parrot, Dimitar Ouzounov, and Valerio Tramutoli

2008 -EMSEV received an official invitation letter from the Institute of Geodynamics of Romania Academy of Sciences, for organizing the next EMSEV Workshop. Dimitru Stanica (Deputy Director) would be responsible for the local organization and it was proposed to have the meeting early in September 2008 (Email: dstanica@geodin.ro). The proposed location of the meeting is a resort centre (Sinaia) in the Romanian mountains.

It was noted that a formal proposal for this workshop was previously discussed at EMSEV meetings at Moscow (2002) and La Londes des Maures (2004). J. Zlotnicki proposed, on the behalf of EMSEV, to discuss with D. Stanica of the 2008 meeting as he visits Romania in Dec. 2006.

R.P. Singh, from Institute of Technology of Kanpur, proposed to hold an EMSEV meeting in USA also in 2008. He suggested that he could organize it at George Mason University in Washington DC. After some discussion, it was suggested that, because of the number of meetings in 2008, this proposal could be accepted in 2009. R.P. Singh agreed.

[B] Secretary Report (T. Nagao)

T. Nagao discussed the organization and structure of EMSEV working group. As it stands, EMSEV is supported by the three IUGG associations: IAGA, IASPEI and IAVCEI.

EMSEV WG is composed of three bodies:

The EMSEV bureau (Chairman: S. Uyeda, Secretary: T. Nagao, IASPEI & IAVCEI liaison member: M. Johnston, IAGA liaison member: J. Zlotnicki, IAG WS1.2 representative: Y. Ogawa (MT group)),

The EMSEV members. There are 35 members (14 countries) with generally not more than five per country to ensure international and interdisciplinary balance.

The corresponding members, about 220 in number, include all (i.e. any number per county) who are interested in EM aspects of earthquakes and volcanoes and have joined the EMSEV mailing list.

Since 2005, the EMSEV web-site links to the IUGG web site with a maximum 2 Gb size. The EMSEV site is : <http://www.emsev-iugg.org/emsev/>
At this time, T. Nagao pointed out that email should not exceed 50 Kb in size, and should not include attached files. Larger size email should be sent to T. Nagao: nagao@scc.u-tokai.ac.jp

[C] IASPEI, IAVCEI, IAGA liaison reports

[a] IAGA Report (J. Zlotnicki)

J. Zlotnicki pointed out that IAGA strongly supports EMSEV activities.

During the last few years, important work has been done to improve the value and the reliability of our work. The presentations at meetings have reached high level of quality. However, it seems important to keep as guideline that, up to now, there is still a large debate – even between us – on reliable EM precursor events to Earthquakes. Therefore we should better integrate different EM approaches and intercorrelate the EM observations with others techniques (seismicity, ground deformation, satellite observations, etc).

[b] IASPEI and IAVCEI Reports (M. Johnston)

M. Johnston pointed out that, within both IASPEI and IAVCEI, EMSEV is one of the most active international research working groups. Even though budgets in both associations are very tight, we have still been able to get some support. This support is critical particularly for providing travel help for participants from countries with small budgets for research and help for meeting organizers to obtain matching and other funds.

It is also particularly important that EMSEV stay within its role as a forum for discussion and international cooperation. M. Johnston said it is very important that EMSEV not become a forum for teams who want to make earthquake predictions and that Chairman Uyeda and Secretary Nagao should be commended for keeping EMSEV within its IUGG mandate. As pointed out by Zlotnicki, much of our work will benefit from integration with data from other geophysical disciplines, particularly seismology, geodesy and general geophysical knowledge of structure and material properties.

[D] EMSEV BUDGET

The 2006 IUGG & association support for EMSEV is as follows:

Income:

IUGG \$2,000 (for general EMSEV activities);

IAGA \$2,000

IASPEI \$500

IAVCEI \$2,000

Saved funds from Mexico meeting by S. Pulinets \$800

TOTAL = \$7,300

Outgo:

EMSEV Agra Meeting \$3,000 (\$2,000 from IAGA + \$500 from IASPEI + \$500 from Pulinets saving) Actually, \$2,977 (\$3,000 – cashing commission \$ 23) was handed over to Birbal Singh on Nov. 20, 2006 in Agra.

Work on Taal Volcano \$2,300 (\$2,000 from IAVCEI + \$300 from Pulinets saving) . Actually, \$2,283 (\$2,300 – cashing commission \$17) was handed over to Sasai in late September in Tokyo. However, this fund is left over to 2007 because the field campaign was postponed due to cyclone in the Philippines.

Reserve for IUGG Meeting in Perugia \$2,000 (Funds from IUGG)

Total = \$7,300

[E] REPORTS**IWEMSEV (International Workshop) Agra report presented by B. Singh**

B. Singh reported that about 100 participants attended the IWEMSEV meeting (November 19-22, 2006; Agra). This was comprised of 23 foreigners and 55 Indian researchers together with 15 to 20 students from India. Most of the institutes of universities in India involved in the EM fields were represented. So, B. Singh will take this opportunity to expand EMSEV activities in India. 95 research papers were submitted and 80 of them were presented. Posters were presented in the adjoining room during and after the sessions. It was noted that new students presented several good papers.

[F] General comments

A.K. Gwal expressed his wish to become EMSEV member. S. Uyeda responded that the request was accepted as a formal request and will be duly considered by EMSEV Bureau. S. Uyeda reiterate that the membership of the working group is designed to provide optimum representation from different countries and disciplines. Of course, any one interested in EMSEV can become an a corresponding member by joining the EMSEV e-mail system.

[G] Reports on Activity**[a] Activity in 2007.**

T. Nagao informed the 2007 budget:

We will have \$2,300 for Taal field campaign as it was not used in 2006.

We will also have \$2,000 (IUGG support for 2006) funds for Perugia.

(See [D])

For 2007:

\$2,500 from IUGG (Including additional \$500 for Rumanian or Indonesian meeting.)

\$1,500 from IAGA (Notice from IAGA SG on Dec. 14, 2007). Support from other associations has not been decided yet.

T. Nagao informed the major EMSEV activity in 2007 will be at the **XXIV IUGG General Assembly to be held in Perugia (Italy) from July 2 to July 13, 2007**(Web:www.IUGG2007Perugia.it).

EMSEV integrated symposium “Progress in EM studies on Earthquakes and Volcanoes”, consisting of four sessions, is scheduled, under IASPEI program, as already described in [A].

Postal submission of abstracts: January 15, 2007;

Electronic submission of abstracts: January 31, 2007;

[b] Report on EMSEV activity on Taal volcano (J. Zlotnicki)

J. Zlotnicki reported on the joint activity between EMSEV and the Philippine Institute of Volcanology and Seismology (PHIVOLCS). A first meeting was held at PHIVOLCS in Manila in 2003 under the scope of EMSEV. It was decided that EMSEV WG will help PHIVOLCS to start EM studies on volcanoes and to teach PHIVOLCS teams and students to use EM methods. Taal volcano was chosen as target; Unrest of this volcano can seriously impact Metropolitan Manila with ejection products. A formal agreement between EMSEV and PHIVOLCS was signed in 2003.

Since that time, two fieldwork visits, managed by Japanese (directed by Y. Sasai) and French teams (managed by J. Zlotnicki) were organised. A third campaign, initially planned in October 2006, was postponed to early January 2007, due to a huge cyclone, which hit the Philippines at this time.

J. Zlotnicki explained how this cooperation is financially supported. EMSEV supports just the PHIVOLCS teams during combined campaigns, providing consumable materials and contingencies. The Japanese and French teams obtained funding from their own national supporting programmes.

For the last two years, observations and results were presented at international meetings (IAGA-2005; DEMETER-2006; IWEMSEV-2006; IUGG-2007).

One paper has been published in the Proceedings of Japan Academy (“Magnetic and Electric Field Monitoring of Taal Volcano, Philippines Part I: Magnetic Measurements”; Harada et al., 2005). A second paper “Taal volcano (Philippines): Gearing toward a new eruption? Combined land based self-potential, magnetic, ground temperature and CO₂ soil degassing surveys with the Crater Lake temperature monitored by satellite imagery” is under submission (J. Zlotnicki et al.).

[c] Report on EM Research Activity in Indonesia

K. Hattori described an ongoing project “Ground-based monitoring program of swesimo-electromagnetics” in Indonesia. He obtained funds for 2005-2007 from JSPS (Japan Society for Promotion of Science) to start EM studies on active faults in Indonesia. This three year program has Research Center for Geotechnology, Indonesian Institute of Science as counterpart. They are planning to hold an International Workshop, either in Indonesia or in Japan, in 2007, to wrap up the project and prepare for future research program. EMSEV may make significant contributions to this activity.

[d] Mini - EMSEV meeting in Romania in 2007

Following D. Stanica’s proposal to welcome EMSEV meeting in Romania in 2008, S. Uyeda proposed to hold a small EMSEV planning meeting in Romania, just after IUGG-2007 meeting. Two objectives could be targeted: (1) a visit to Vrancea seismic zone and the monitoring networks and (2) preparation of the 2008 EMSEV meeting in Romania. However, it was later found that the objective 1) may be achieved in 2008 and 2) may be by Zlotnicki’s scheduled visit to Romania in December 2006.

[H] Free discussion

[a] Second International DEMETER meeting

M. Parrot reported that CNES will organize a second DEMETER meeting in 2008. This meeting may be held in Paris. Regarding the date, some care should be taken to avoid overlapping with Romania-2008 EMSEV meeting.

[b] Special issue on EMSEV 2004 meetings.

M. Parrot requested information on the status of the last special issue of Electromagnetic Studies of Earthquakes and Volcanoes in Annals of Geophysics. The papers were those presented during La Londe-2004 EMSEV meeting. J. Zlotnicki answered that some

reviews have taken much time. Since September 2006, all accepted papers have been sent to the printer. B. Singh indicated that the special issue should be available before the end of 2006.

[c] S. Spichak comments

S. Spichak reported that:

- In October 2006, a book MT data processing was published by Elsevier,
- In September 3- 7, 2007, he will organize a school on EM in Moscow.

[d] Ramish Singh comments

Ramish Singh suggested that the EMSEV web site could include an updated list of papers published in our field of interest. These papers could be downloadable. The site could also include and make available other data such as GPS, satellite and land surface data. NASA could host a workshop on these issues.

[e] Seiya Uyeda comment

Seiya Uyeda suggested that answers to two basic questions are still needed:

[1] Does EM have real relevance to earthquakes and volcanic eruptions?

[2] Can earthquakes and volcanic eruptions really be predicted by EM? If so, what needs to be done to convince others ?

[f] T. Nagao comment

Toshiyasu Nagao pointed out that no clear EM signals have been observed at the origin time of earthquakes (true co-seismic signals) when most of elastic energy is released. We need to explain this fact to convince the community at large. Furthermore, the occurrence of EM activity before earthquakes is not supported by observation of deformation or micro seismicity activity. He suggested we may need new theory and models that are not be in conflict with such facts.

The meeting adjourned at 20:00.