15th Business Meeting of IASPEI/IAGA/IAVCEI Inter-Association Working Group on Electromagnetic Studies of Earthquakes and Volcanoes (EMSEV)

October 3, 2012, Gotemba, Japan

1) Participants

<Bureau Members>

ZLOTNICKI, Jacques (Chairperson, CNRS, France)
JOHNSTON, Malcolm (Vice Chairperson, IASPEI liaison member, USGS, USA)
NAGAO, Toshiyasu (Secretary, Tokai Univ., Japan)
SASAI, Yoichi (IAVCEI liaison member, Tokai Univ., Japan)
Liu, J. Y. (IAGA liaison member)
SINGH, Ramesh (Chapman Univ., USA/India)
LAPENNA, Vincenzo (CNR-IMAA, Italy)
UYEDA, Seiya (EMSEV past chairperson)

<CHINA>

GUANGMENG, Guo (Nanyang Normal Univ., China)

<GREECE>

VAROTSOS, Panayiotis (Univ. Athens, Greece)

<ITALY>

BIAGI, Pier Francesco (Univ. Bari, Italy)
ERMINI, Anita (Univ. Tor Vergata - ROMA, Italy)
TRAMUTOLI, Valerio (Univ. Basilicata, Italy)

<INDONESIA>

GRANDIS, Hendra Institut Teknologi Bandung

<JAPAN>

ENOMOTO, Yuji (Toyama Industrial Res. Cent., Japan)
EZAWA, Hiroshi (Univ. Tokyo, Japan)
HAN, Peng (Chiba UNIV.,, Japan)
HASE, Hideaki (Univ. Tokyo, Japan)
HOBARA, Yasuhide (UEC Tokyo, Japan)
ICHIKAWA, Takashi (Chiba UNIV.,, Japan)
KAMOGAWA, Masashi (Tokyo Gakugei Univ., Japan)
KODAMA, Tetsuya (JAXA, Japan)
OGAWA, Tsutomu (Univ. Tokyo, Japan)
OTSUBO, Hiroshi (Chiba Univ., Japan)
SAITO, Yoshiharu (Kanagawa Inst Tech, Japan)
SAYANAGI, Keizo (Tokai Univ., Japan)
SUZUKI, Takayuki (OPUS, Japan)
TAKAHASHI, Kozo (Formerly Commun. Res. Lab, Japan)
TAKEUCHI, Akihiro (Tokai Univ., Japan)
TSUTSUMI, Rika (Chiba Univ., Japan)
UYESHIMA, Makoto (U Tokyo, Japan)

YAMANAKA, Chihiro (Osaka Univ., Japan)

<KYRGYZ>

BRAGIN, Vitaly (Research Station of RAS, Kyrgyz)
RYBIN, Anatoly (Research Station of RAS, Kyrgyz)
VORONTSOVA, Ekaterina (Research Station of RAS, Kyrgyz)

<MEXICO>

CERVANTES DE LA TORRE, Francisco (UAM-AZCAPOTZALCO, Mexico)
MARTIN-DEL POZZO, Ana Lilian (National U Mexico - UNAM, Mexico)

<PHLIPPINES>

ALANIS, Paul (PHIVOLCS/Tokai Univ., Philippines)

<POLAND>

BLECKI, Jan(Space Research Centre, Poland)

<RUSSIA>

CHERNIAK, Iurii (WD IZMIRAN, Russia)
DEPUEVA, Anna (IZMIRAN, Russia)
KOSSOBOKOV, Vladimir (Russian Acad. Sci., Russia)
NOVIKOV, Victor (Russian Acad. Sci., Russia)
PILIPENKO, Slava (Inst. of Physics of the Earth/Nagoya Univ., Russia)
ROZHNOI, Alexander (Inst. of Physics of the Earth, Russia)
RUZHIN, Yuri (IZMIRAN, Russia)
SARAEV, Alexander (St. Petersburg State Univ., Russia)
SHEBALIN, Peter (Russian Acad Sci., Russia)
SOLOVIEVA, Maria (Russian Acad Sci., Russia)
SOROKIN, Valery (Russian Acad Sci., Russia)
ZAKHARENKOVA, Irina (WD IZMIRAN, Russia)

<TAIWAN>

LEE, Chao Shing (Inst. Applied Geoscience, Taiwan)
TSAI, Ho-Fang (National Central University, Taiwan)

<UKRAINE>

ROKITYANSKY, Igor (Inst. Geophysics NAS, Ukraine)

<USA>

DAHLGREN, Robert (SETI Institute, USA)
FREUND, Friedemann (NASA, USA)

2) Opening Remarks: Zlotnicki : Chair

The EMSEV 2012 meeting was a high level meeting during which 75 participants from 13 countries have presented their latest results and have debated on the relationships between electromagnetic signals and fore coming earthquakes and volcanic eruptions. For the first time, a session was entirely focused on laboratory experiments and the physical mechanisms leading to electromagnetic signals in the crust, in the atmosphere and in those induced anomalies in the ionosphere.

This scientific approach of the mitigation of earthquakes and volcanic eruptions is well considered by IUGG, IAGA, IASPEI, and IASPEI. All of them consider that EMSEV is one of the most active associations, dealing with difficult topics, but having a significant scientific and societal impacts.

EMSEV is also recognized for the efforts done in implementing inter-disciplinary

researches. A more consequent effort might still be done for including more clearly other disciplines as seismology, ground deformation and geochemical data, etc.. In this way, it is proposed to EMSEV to include as "EMSEV collaborators" some key researchers working on similar field of researches, but by the means of other techniques.

3) Reports from liaison officers

a) Report from IASPEI: Malcolm Johnston

Discussions with Peter Suhadolc, the Secretary General and Treasurer of IASPEI, indicate good relations and Peter has very kindly send a letter of greeting and encouragement that was introduced at the Business Meeting along with letter from other Associations (IAGA, IAVCEI, and IUGG) pointing out the importance of international cooperation and exchange efforts from working groups such as ours. Following the very successful IUGG meeting in Melbourne, Australia, efforts for the next joint meeting involving IASPEI/EMSEV are being focused primarily on the next IUGG to be held in Prague, Czech Republic in 2015. Because of the busy meeting schedule in 2013, and because the sessions are already determined, EMSEV will not participate heavily in the IASPEI Assembly in Gothenburg, Sweden, in July, 2013. However, some EMSEV members (Toshiyatsu Nagao and maybe others) may give papers in some sessions. The next joint EMSEV/IASPEI effort efforts will be focused on the IUGG in 2015. We would expect that at least four joint sessions on various aspects of electromagnetic studies of earthquakes and volcanoes will be proposed. Equipment for joint studies of electromagnetic, seismic and deformation of Taal volcano near Manila in the Philippines has been partly supported by IASPEI.

b)Report from IAVCEI: Yoichi Sasai

After IUGG 2011 GA held in Melbourne, Australia, the first scientific meeting of IAVCEI related to EM study of volcanoes is this EMSEV 2012 workshop. It has been announced at the top page of IAVCEI homepage. The next one is 'Cities on Volcanoes 7' (COV7), which will be held in Colima, Mexico, from Nov. 18-23, 2012. In the previous COV6 (Tenerife, Canary Island, Spain, 2009), we had several participants from EMSEV and EMSEV had a specific session. But in COV7 we did not propose an EM-related session. However, Ana Lillian Martin-Del Pozzo from Mexico offered to do some work for EMSEV (such as put up an EMSEV poster). 'Cities on Volcanoes' is a unique scientific meeting, which emphasizes the connection of the volcanologists with local people surrounding volcanoes as introduced by Dr Martin-del Pozzo. Topics on the volcanic risk mitigation are important, and EM methods are effective not only for volcano monitoring but for estimating the damages due to landslides and so on. IAVCEI Scientific Assembly-2013 will be held in Kagoshima City, Japan, in July 20-24, 2013. EMSEV has proposed a session entitled 'Land and satellite multi-parameter observations of active volcanoes and geothermal fields: Electromagnetic and other geophysical methods for imaging and monitoring on going activity' (Conveners: Zlotnicki, Sasai, Johnston, Tramutoli, Currenti, Hashimoto). This session has been accepted by IAVCEI.

c) Report from IAGA: Jacques Zlotnicki

Next IAGA meeting will be in Merida, Mexico on July 22-24 in 2013 but there will be no EMSEV sessions. It is now well past the time where one could be included. Mioara Mandea, the IAGA Secretary General, has offered to make time to include us in some of the existing sessions. Because of the importance of IAGA for EMSEV, at least two EMSEV people will attend and will be presenting invited papers within these existing sessions.
Among invited talks, one might be done in Volcanology and one on Earthquakes. In Volcanology, joint research program made with the Philippines Institute of Volcanology and Seismology could contribute to get more powerful contacts and cooperation with teams working in Central and South America. On earthquakes, a review paper could be easily presented pointing out the recent progresses of the electromagnetic methods.
Another possibility would be to present EMSEV activities in a session, or at a IAGA business meeting.
The invited talks will come in addition to the talks presented by other authors.

4) State of EMSEV and communication between members: Toshiyasu Nagao (Secretary)

Toshi Nagao reported that EMSEV now has 290 members. He questioned whether we should do some reorganizing in order to have the most active committee.
Toshi Nagao suggested that we change one member of the EMSEV Working Group. Because Masashi Hayakawa has moved to the business community, we should replace him with Yasuhide Hobara (Professor of the University of Electro-Communications, Japan). It was accepted.

On the issue of communication between members, Jacques Zlotnicki pointed out that it would be useful to have some members of EMSEV who come from fields other than the EM community so that we broaden our discussion base and further include other disciplines. Malcolm Johnston strongly supported this, pointing out that provision of a discussion forum was the most important purpose of EMSEV in its founding document. It was decided to search for possible candidates from other fields (seismology, geodesy, etc).
Vladimir Kossobokov has kindly accepted this position in regard to the fact that he would be able to guide some fruitful discussions between global seismology and EM phenomena, as well as on statistical methods.
Jacques Zlotnicki proposed asking Alain Bernard (Université Libre de Bruxelles), well-known geochemist and specialist on craters lakes, to joint this new board called "EMSEV collaborators".
It was also suggested that we have a new Working Group member from Mexico. Anna Lillian Martin-Del Pozzo was suggested as a possible candidate.

5) Report of EMSEV activities : Toshiyasu Nagao (Secretary)

a) 2011 activities

T. Nagao pointed out that EMSEV was involved in several international meetings in 2011. The highest number of participants was at the IUGG 2011 General assembly in Melbourne

(Australia, June 27 to July 8, 2011), following by the December Fall AGU meeting at San Francisco.

The list of main meetings is as follows:

EGU, Vienna, 3-8 April, 2011

• NH4.1/SM5.8: Seismo electro-magnetic phenomena and earthquakes precursors
Convener: P. F. Biagi ;Co-Conveners: M. Hayakawa, O. Molchanov, T. Maggipinto
• NH4.2: Deformation processes and accompanying mechanical and electromagnetic phenomena, for rocks and other materials, from the laboratory to the geophysical scale
Convener: K. Eftaxias; Co-Conveners: C. Nomicos , Q. Huang
• NH4.3/SM5.1: Seismic hazard evaluation, precursory phenomena and reliability of prediction
Convener: M. E. Contadakis; Co-Conveners: J. Zschau, T. Xenos , P. F. Biagi

IUGG GA, 27 June – 8 July 2011, Melbourne, Australia

Four sessions were under EMSEV responsibility and one session was organized by one EMSEV member:
• J-S09: Electromagnetic Studies of Earthquakes, Active Faulting and Tsunamis
Lead Conveners: M. Johnston (United States of America), T. Harinarayana (India)
• J-S10: Electromagnetic studies of active processes using space technology
Lead Conveners: M. Parrot (France), Y. Hobara (Japan)
• J-S11: Imaging and monitoring active volcanoes and geothermal fields by ElectroMagnetic (EM) and other geophysical techniques
Lead Conveners: J. Zlotnicki (France), Y. Sasai (Japan), V. Spichak (Russia)
• J-S12 : Towards short-term earthquake prediction - Electromagnetic and other possible precursors and their generation mechanisms
Lead Conveners: T. Nagao (Japan), K. Eftaxias (Greece), F. Freund (USA)
• J-A04 : Electromagnetic oscillations from space to Earth: Celebrating 150 years and recent developments in ultra-low frequency wave research
Convener: Brian J Fraser (Australia), Co-conveners: Malcolm Johnston (USA).

DEMETER meeting, 10-12 October 2011

DEMETER mission was discontinued at the end of 2010, in spite of the good functioning and the low maintaining cost of the satellite. More than 180 papers were published in international journals during the mission (June 2004-Decembrer 2010). French commissions decided to stop and kill the satellite in spite of the good operation of this latter. An international workshop on the latest results was held in Paris in October 10-12, 2011.
Contact: Michel Parrot: mparrot@cnrs-orleans.fr

URSI GA, Istanbul, Turkey, 13-20 August 2011

Several researchers linked with EMSEV presented papers based on Demeter mission:

Detection of ionospheric perturbations associated with earthquake using data of IAP and ISL instruments of DEMETER satellite (Sharma et al.)
Ionospheric perturbations observed by DEMETER in relation with the seismic activity (Parrot)

AOGS GA, Taipei, Taiwan, August 2011

One session was organized.
• IWG13: Seismo-Electro magnetic Phenomena
Conveners: Katsumi Hattori, Chiba Univ., Japan; Jann-Yenq Liu (National Central University, Taiwan)

AGU, San Francisco, USA, December 2011

• NH24A: Multidisciplinary Research for Validation of Earthquake Precursors: Case Studies and Statistics I (joint with A, NH, S, SM, T, G)
Presiding: K Hattori, Chiba University; J Y Liu,; D P Ouzounov; S A Pulinets; M Parrot

b) 2012 activities

EGU, Vienna, 22-27 April, 2012

• NH4.2/NP7.4/SM5.3/TS8.7
Fracture and earthquake physics: modeling precursory phenomena and seismic hazard also with nonlinear seismology
Convener: F. Vallianatos, Co-Conveners: P. Sammonds, V. Lapenna, G. Marmureanu, R. Madariaga, GF Panza
• NH4.5
Electro-magnetic phenomena and connections with seismo-tectonic activity
Convener: P.F. Biagi,| Co-Conveners: T. Maggipinto, M. Hayakawa

EMSEV 2012, Gotemba, Japan Sept. 30 - Oct 3, 2012

A very successful meeting EMSEV2012 was organized by the Japanese LOC and support was provided for six young scientists :

47 talks were distributed along the three days of meeting, while two posters sessions stood in nearby conference room. 41 posters were initially scheduled.
5 sessions were completed with much discussion on many subjects. 16 new young researchers gave presentations. The meeting included the following sessions and topics.

Session I
Electric, magnetic, and electromagnetic phenomena associated with active processes: earthquakes, tsunamis, volcanoes, active fault movements, landslides, geothermal activities, etc.

Session II
Electromagnetic imaging based on land and space monitoring techniques.

Session III
Pre-seismic, co-seismic and post-seismic phenomena related to the Lithosphere-Atmosphere-Ionosphere Coupling using multi-parametric observations to ensure reliable interpretations.

Session IV
Generation mechanisms of electromagnetic signals related to active processes: Theoretical and laboratory studies

Session V
Seismic, Geodetic and Electromagnetic studies related to the off Tohoku M9 Earthquake and tsunami on March 11, 2011

AGU, San Francisco, USA, 3-7 December 2012

Sessions for the 2012 AGU will be as follows:
• NH016: Multi-Sensors Observations of Pre-Earthquake Signals and Their Connection with Major Seismicity. Conveners: Dimitar Ouzounov, Sergey Pulinets, Katsumi Hattori.

6) IUGG Grants in Underdeveloped Countries, 2012

a) Taal Volcano, Philippines

EMSEV started to cooperate with PHIVOLCS on Taal volcano in November 2004. (http://www.phivolcs.dost.gov.ph/) At present, the international cooperation involves teams from Japan, France, USA, Greece, Italy, and Belgium. A report on the state of the cooperation, discussions of network maintenance encountered and the latest results was presented during EMSEV 2012 meeting by J. Zlotnicki who pointed out that the current responsibility of EMSEV is to help PHILVOLCS to monitor the volcano. Current plans for 2012 and 2013 are to upgrade stations and make the data collection more reliable, and to install some tiltmeters in order to be able to determine the location of ground deformations.

Jacques Zlotnicki suggested that much of the new data obtained on Taal should be published together in an IUGG monograph.

Field trips were conducted in February and March, 2012 by groups from France, USA, and Japan with the collaboration of PHIVOLCS. New joint field works should take place in November 2012, one in magnetism by Japanese colleagues, and one by CNRS, France, for repairing and upgrading the telemeter network. The EMSEV project on Taal volcano (Philippines) which now involves many teams from the international community in cooperation with PHIVOLCS has clearly shown its effectiveness.

a) Bishkek, Kyrgyzstan

In 2011, the EMSEV working group has started a new research effort. We propose to develop cooperation with Kyrgyzstan (Bishkek Research Station) where some outstanding researches on the relation between EM phenomena and electrical resistivity changes with earthquakes are in processed in the last past 30 years. Previous discussions and visits confirm the great interest of this new cooperation:

- First, in 2009, S. Uyeda and T. Nagao visited at the Bishkek Research Station (RS) in Kyrgyz where scientists use a powerful current system injecting an electric current which can be detected tens of kilometers away from the station. Based on this system, information on electric channeling, current distortion, tectonic structure and active faults systems can be studied in detail.
- During the EMSEV XIIIth business meeting held at Chapman University in 2010, T. Nagao presented some new results and the envisioned studies. The assembly warmly accepted this new activity and asked the EMSEV bureau to go further in this direction.
- In March 2011, a new visit in Kyrgyzstan was made by S. Uyeda and M. Kamogawa.
- In November 2011, teams from Japan, France and Greece visited Bishkek Research station. A meeting was held in which a synthesis of the past results was described. Furthermore, one Japanese and one French passive EM stations were installed at new field stations 40 and 30 km away from the current system used by Kyrgyz colleagues (600 A, length of dipoles 4 km). Joint data processing systems are now implemented.
- An agreement of cooperation was signed between EMSEV and Bishkek Research Station during this first meeting. The main purpose is described as followed:

"The purpose of this Agreement is to provide scientific and technical interaction between the two Sides during collaborative research on active faults and physical processes generating earthquakes in Central Asia, to promote new investigations with electromagnetic and other geophysical methods, and to enhance data processing and analyses.
The Agreement will promote the development of scientific relations between participants for solving fundamental problems on the generation of earthquakes and the way to monitor and mitigate them along different active faults of Central Asian continental lithosphere."

The Agreement is valid for a 4 years period starting from November, 2011.

- First data from this installation were shown at the present meeting and it is clear that signal to noise at these distances is good. The data volumes are large. The Japanese recording system alone recorded 170 Gbytes of EM data in six months. Some discussion followed on funding support for this project. Funding is unclear but small support may be obtained from several sources.

A presentation was made by Anatoly Rybin concerning the Bishkek station operation and obligations. He pointed out that Bishkek Station is responsible for field work, safety of equipment, servicing support and provision of technical material. Some of this work and technical facilities are not well developed. However, this may improve with the international recognition that will follow from this cooperation. The priorities of the Bishkek Institute concern scientific communication, training of younger scientists and possible visits to geophysical institutes in foreign countries and provision of long term support for field work. One other difficulty is continuing political instability in the region. While all this is not optimal at this point, the Bishkek Institute needs only minimal funds at this point to continue the cooperation.

7) EMSEV budget

2011 Budget

Incoming:

IUGG: 1388 €

Outgoing:

Bishkek meeting (Nov. 2011) : 950 €

Taal field work (Nov. 2011) : 387 €

2012 Budget

Incoming:

IUGG: 1970 € (2 500 $)

IAGA/IUGG for EMEV 2012 meeting : 1601 € (2 000 $)

Outgoing:

Support to EMSEV 2012 meeting : 1500 €

Remaining budget on 2012 grant : 2071 €

2013 Budget

We expect to get $2500 from IUGG for general activities (~1970 €)

Global Budget

The remaining budget can be addressed to the following items in the next future:

[x] Remaining IUGG grant : 605 € ---> building of the 4th station on Taal (November 2012)

[x] EMSEV schedules support for the installation of 2 additional tiltmeters on Taal (1000 €)

[x] Small reserve for Business meetings, EMSEV posters, EMSEV activities (500 €)

[x] Small reserve for individual requests (500 €)

Other Proposals for Support:

[x] Continuation of the EMSEV- Bishkek RAS cooperation

[x] Participation to IAGA meeting in Merida, Mexico (26-31 August 2013).

[x] Support to IAVCEI meeting in Kagoshima, Japan (20-24 July 2013)

[x] Support to IASPEI meeting in Gothenburg, Sweden (22- 26 July 2013)

[x] 4th telemetry and upgrade of the telemetry, data transmission

Others proposals can be addressed to EMSEV bureau

8) General discussion on next EMSEV meeting (2014)

EMSEV previously received two proposals from EMSEV members for organizing next EMSEV meeting in 2014. The first was received during the 2010 EMSEV meeting from

Jan Blecki (Poland) who proposed organizing a meeting and described the main features of the organization of the 2014 meeting.

While several proposals were received from Chinese colleagues to have the meeting in China, only one formal proposal with an organizational guideline was made by Lanzhou Institute together with the Chinese Earthquake Administration. Unfortunately, no one from China attended the 2012 EMSEV meeting in Gotemba, Japan to discuss this further.

Another factor is that, to be more effective, it seems that successive EMSEV meetings should not be in the same general global location. Since the EMSEV 2012 meeting was in Japan, the next meeting should perhaps not be in Asia. Jacques Zlotnicki proposed that we accept Jan Blecki's proposal for the next EMSEV in Poland and invited Jan Blecki to provide more details of the meeting.

Jan Blecki outlined the proposal:

Support Organizations:	-Poland Space Research Center -Institute of Geophysics -Consorta Geoplanet
Motivation:	-Improve Science -Allow young people at the Instiute of Geophysics to gain international experience -Improve knowledge about interpretation of data
Venue:	-Space Research Center, Warsaw, Poland. Warsaw has an international airport, train connections to Europe. The actual meeting could be in Warsaw at the Institute of Geophysics, just south of Warsaw (20 km) in a forest retreat (Konstanciu) or further south near the border at Krakow.
Dates:	Possibly September

The proposal was accepted by Jacques Zlotnicki. Further discussion indicated that the third week in September would be the best date. Also, earlier is the North American holiday season so some participants may have family obligations. The preferred location would be at Konstanciu

9) Other Topics

-Ramesh Singh suggested that some sort of tribute be made in honor of Molchanov. No decision was made.

- The question came up concerning whether a special publication issue to include papers from the meeting should be put implemented.
- A suggestion was made concerning whether EMSEV should have a prize or award for Best Paper from a Young Scientist.

10) The Meeting was adjourned by Jacques Zlotnicki who thanked everyone for a successful meeting.