14th Business Meeting of IASPEI/IAGA/IAVCEI Inter-Association Working Group on Electromagnetic Studies of Earthquakes and Volcanoes (EMSEV)

July 4, 2011, Melbourne, Australia

1) **Participants**

Jacques Zlotnicki (Chairperson, CNRS, France)
Malcolm Johnston (Vice Chairperson, IASPEI liaison member, USGS, USA)
Toshiyasu Nagao (Secretary, Tokai Univ., Japan)
Yoichi Sasai (IAVCEI liaison member, Tokai Univ., Japan)
J. Y. Liu (IAGA liaison member)
T. Harinayarana (IAGA liaison member)
Seiya Uyeda (EMSEV past chairperson
Ramesh Singh (Chapman Univ., USA/India)
Angeo De Santis (INGV, Italy)
Gilda Currenti (INGV, Italy)
Anatoly Rybin (RAS, Kirgyztan/Russia)
Akihiro Takeuchi (Tokai Univ., Japan)
Dimitar Ouzonov (NASA, USA)
Mikhail Gokhberg (RAS, Russia)
K.Veesawamy (India)

2) **Opening Remarks: Zlotnicki : Chair**

Jacques Zlotnicki thanked the attendees for their interest in EMSEV activities. He pointed out that IUGG General Assembly is a key step in the development and renew of EMSEV objectives. 2011 IUGG meeting was successful because (1) EMSEV working group is well recognized for its activities and the numerous meetings in which the WG is dynamically involved, (2) five sessions were focused on electromagnetic studies related to earthquakes and volcanoes, (3) new comers will board EMSEV bureau, and (4) EMSEV will start new cooperation in the domain of the physics of earthquakes with the International Geophysical Research Centre at Bishkek Research station in Khyrgyzstan.

3) **Reports from liaison officers: Johnston (IASPEI), Sasai (IAVCEI)**

Report from IAVCEI: Yoichi Sasai

COV6 (Cities on Volcanoes 6) was successfully held in Tenerife, Canary Island, Spain, from May 31st to June 4, 2010. EMSEV convened a session on EM and other combined methods on active volcano monitoring, where about 60 audiences joined. At the closing ceremony was announced that the next COV7 will be held in Colima City, Mexico in November, 2012. At the IAVCEI business meeting, it was also decided that the next IAVCEI GA will be held in Kagoshima City, Japan, in July, 2013.

Report from IASPEI: Malcolm Johnston

Following the very successful EMSEV meeting in Orange, California, efforts for the next joint meeting involving IASPEI/EMSEV are being focused on the IUGG to be held in Melbourne, Australia in 2011. Four joint sessions (see below) on various aspects of electromagnetic studies of earthquakes and volcanoes are proposed and have been accepted. Equipment for joint studies of electromagnetic, seismic and deformation of Taal volcano near Manila in the Philippines has been partly supported by IASPEI.

Report from IAGA: Jacques Zlotnicki

IAGA mother association strongly supports EMSEV, because EMSEV continues to promote basic and fundamental studies on the mechanisms of earthquakes and volcanic eruptions, make efforts to highlight reliable observations and for developing international cooperation through agreements with developing countries.

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

EMSEV is one of the 12th Inter Associations and current status can be found at http://iugg.org/associations/inter-associations.php.

EMSEV web site is regularly updated and information on activities and meetings can be obtained at http://www.emsev-iugg.org/emsev/.

Basically, the communication among EMSEV corresponding members is done through the mailing list (emsev_ml@emsev-iugg.org). An email should not exceed 50Kb in size. Larger size of the email should be sent to the secretary (T. Nagao: nagao@scc.u-tokai.ac.jp)

Now the numbers of EMSEV corresponding member is 269.

Working group members are now 44 members from 16 countries (China, France, Greece, India, Indonesia, Italy, Japan, Kyrgyzstan, Philippines, Poland, Romania, Russia, Taiwan, Turkey, Ukraine, and USA).

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

a) 2010 activities (After October Santa Ana EMSEV meeting)

EMSEV 2010 meeting at Santa Ana (Chapman University)

Following the meeting, five papers were submitted, four papers are accepted for publication in a special issue of Geomatics, Natural Hazards and Risk in early next year. All these four papers are available online.

AGU, San Fransisco, USA, 13–17 December 2010

Two sessions are related to our EM activities:

- NH06: Multidisciplinary Research for Validation of Earthquake Precursors: Case Studies and Statistics
  Conveners: D. Ouzounov, S. Pulinets, M. Parrot, J.-Y. Liu, K. Hattori
- NG10: Multiplicity of Scales, Dynamics and Extremes in Geophysics: Theory, Validation, and Applications
  Conveners: V. Kossobokov, D. Ouzounov, M. Parrot, J.-Y. Liu, I. Main

b) 2011 activities

EMSEV was involved in several international meetings, but the highest contribution was IUGG 2011 General assembly in Melbourne (Australia, June 27 to July 8, 2011)

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 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 is planned to be held in Paris in October 10-12, 2011. C. Contact: Michel Parrot: mparrot@cnrs-orleans.fr

URSI GA, Istanbul, Turkey, August 2011

AOGS GA, Taipei, Taiwan, August 2011

- 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 G Liu, National Central University; D P Ouzounov, NASA/GSFC; S A Pulinets, Institute of Applied Geophysics; M Parrot, LPC2E/CNRS

6) IUGG Grants Program 2008-2010 : Taal project

EMSEV started to cooperate with PHIVOLCS (http://www.phivolcs.dost.gov.ph/) on Taal volcano in November 2004. At present, the international cooperation involves teams from Japan, France, USA, Greece, Italy, and Belgium. An International workshop was held in February 2010 during which about 50 participants evaluated the state of activity and the volcanic risks on the volcano. A seismo-volcanic crisis has occurred between April and August 2010 during which EM signals and ground deformations were observed. During this crisis, EMSEV was able to process the data from the real-time network and to send two reports on the on-going activity to PHIVOLCS.A new agreement of cooperation was signed in 2010 for a new 4-years period.

7) EMSEV budget

2010 Budget

Incomes:

IAGA: 1 500 $ (1188 €)

IUGG: 2 000 $ (1609 €)

IASPEI: 1 000 $ (M.J.S. Johnston, support to developing countries)

Outcomes:

Support to CoV6: 150 €

Support to EMSEV meeting: 2 200 €

Support to developing countries: 1000$ (Provision and installation of a bore-hole tiltmeter on Taal Volcano, Philippines)

2011 Budget

Incomes:

IUGG: 2 000 $ (1388 €)

Outcomes:

Support to EMSEV-Bishkek meeting and activity: 950 €

Support for installing a second tiltmeter on Taal volcano (field): 1000 €

8) General discussion on next EMSEV meeting (2012)

EMSEV received three proposals from EMSEV members for organizing next EMSEV meeting which will be held in 2012. The first application was made during 2009 IAGA meeting at Sopron (Hungary) by Japanese colleagues. During the last weeks preceding Santa Ana meeting, some offers were made by Chinese colleagues from different Institutes in different cities, but only one formal proposal with an organization guideline was issued by Lanzhou Institute which belongs to Chinese Earthquake Administration. Finally, during the meeting Jan Blecki from Poland made a proposition for organizing the meeting.

The three proposals are very interesting and they show the increasing interest in Electromagnetic studies related to earthquakes and volcanic eruptions. But, from the general discussion, it has appeared that the Japanese candidature is the oldest and the most advanced proposal. Japanese colleagues have also greatly worked for the benefit of EMSEV since its conception in 2009.

Under these considerations, next EMSEV meeting should be held in Japan. This meeting is now scheduled. It will be held from September 30 to October 4, 2011 at Shizuoka University. Information can be found at http://www.emsev/iugg.org/emsev2012/.

It would be necessary that other candidatures should be more accurately defined in the next months and already submitted to EMSEV bureau, which will give information to our community.

9) New EMSEV activities

EMSEV activity on Taal volcano (Philippines) done in cooperation with PHIVOLCS has shown its effectiveness when an international community is involved in the project. Now, the EMSEV working group is now ready to start a new research effort. We propose to develop cooperation with Kyrgyzstan where some outstanding researches during the last past 30 years on the relation between EM phenomena and electrical resistivity changes with earthquakes. Previous discussions and visits confirm the great interest of this new cooperation:

First, in 2009, S. Uyeda, T. Nagao visited at the Bishkek Research Station (RS) in Kyrgyz where Kyrgyz 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. The Bishkek RS

During this XIIIth business meeting held at EMSEV Santa 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.

During the last few months, EMSEV has been in contact with Anatoly Rybin, Director of Bishkek RS, in order to organize a new research agreement. In March 2011, a new visit in Kyrgyzstan was made by S. Uyeda and M. Komagawa. We propose to organize a specific workshop in Bishkek in November 2011, in which all EMSEV members interested in a cooperative work will be welcome.

10) Extension of EMSEV bureau members

Following some discussions between mothers associations and EMSEV, the previous bureau (2007-2011) was enlarged with new elected representative colleagues.

* Vincenzo Lapenna (National Research Council of Italy, Institute of Methodologies for Environmental Analysis, Piza, Italy)
* Antonio Meloni, Instiituto Nazionale di Geofisica e Vulcanologia, Roma, Italy)
* Valery Korepanov (Lviv Centre, Nat. Acad. Sci. and Nat. Space Agency, Ukraine)
* Qinghua Huang (Department of Geophysics, Peking University China)
* Ramesh Singh (Department of Civil Engineering, Indian Institute of Technology, India and Chapman University, India and USA)

The Chairperson, Vice-Chairperson, Secretary and liaisons members were elected for a new mandate. Detail information is on EMSEV website.

11) Open discussion about predictability of earthquakes

A general and lively discussion was held on the predictability of earthquakes. Last catastrophic events in Italy and Japan, as well as the experiences brought by earthquakes along San Andreas faults have led to some issues which can be summarized as follow:

- Earthquakes (Magnitude, Location and time) cannot be predicted with enough reliability for assuming a true prediction.

- However, some multi-parameters observations on the ground and in board of satellites, which are done more and more accurately, seem to indicate that some parameters could slightly change before some earthquakes. Most of these studies assume that stress change near the focal area (which can be initially less than 1 km^2) can induce several mechanisms as release of gas and thermal anomalies, water percolation through fissures, local mechanical ruptures, and displacement of electrical charges along fractures. The transportation of the signal through the crust, the interference with the atmosphere, and the propagation through it to the ionosphere is still debated. Actual surface and subsurface observations of the size and stress change in the earthquake nucleation zone indicate values less than 10 m^2 and 1 mPa, respectively.
- Laboratory measurements are a fundamental issue and should be supported more efficiently.