

2004 Annual Report of Inter-Association (IAGA/IASPEI/IAVCEI) Working Group of Electromagnetic Studies on Earthquakes and Volcanoes (EMSEV)

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1) Introduction

EMSEV has been very active throughout 2004. While business meeting activity up to October is detailed in the attached minutes (referred to as “The Minutes”), organizational activity for 2005, including convening meetings at IAGA (Toulouse) and EMSEV (Mexico and in India), and planning/implementing training programs in the Philippines (Taal Volcano), are continuing.

2) Membership

35 country representative regular EMSEV members and 221 corresponding members enlisted in EMSEV mailing emsev@sml-z3.infoseek.co.jp

3) Activity in 2004

EMSEV members played important role in many meetings as depicted in the “Minutes”. Only activities, where EMSEV funds were used, are depicted in the following.

3-1) International Workshop MEEMSV-2004 and Third EMSEV Business Meeting: September 6-9, Agelonde, La Londe les Maures France.

This meeting, organized by Jacques Zlotnicki (our IAGA liaison member), was exceptionally successful, with 80 international attendees from 15 countries and lots of lively discussion.

EMSEV contributed \$ 5,100 to assist participation of developing country and young scientist. Publication of presented papers in Annals of Geophysics is underway.

15 EMSEV members and 16 corresponding members and non-members attended the Business Meeting. (see “The Minutes”) Important decision was that MEEMSV meetings will be organized by EMSEV in future. It was also decided to hold the annual EMSEV workshop and Business Meeting in 2005 will be held in Mexico and 2006 meeting will be in India .

3-2) Asian Seismological Commission (ASC) General Assembly and Mini-EMSEV Business Meeting: 18-21 October 2004, Yerevan, Armenia.

The ASC GA (S. Balassanian; Chair) was also a very well organized active meeting. EMSEV contributed \$2,000 for assisting participant’s travel and registration fees. (see “The Minutes”)

3-3) IAVCEI General Assembly: Pucon, Chile, 14-16 November 2004.

EMSEV related two symposia were held (Chaired by Y. Sasai). Since no request of travel money was made, Budgeted EMSEV (IAVCEI) funds (\$700) were used for Volcano Taal campaign 3.4)

3-4) Inter-Association Initiative activity: Volcano Taal investigation

As a part of EMSEV’s 4-year project of Inter-association Initiative, magnetic and electric survey was made on Volcano Taal near Manila with cooperation of PHIVOLCS in Jan. 6-16, 2005. EMSEV sent 3 scientists (J. Zlotnicki, Y. Sasai and M. Harada) with \$3,100 from IUGG and IAVCEI and some funds from

Japanese and French sources, while PHIVOLCS supported all kinds of field activity with 11 scientists. The campaign was extremely successful in the survey as well as in science/technology transfer, so that PHIVOLCS can make repeat surveys over the volcano, which was showing signs of renewed volcanic activity after 28 years of quietness. This campaign, being so timely, could be a major success in demonstrating assistance for developing countries.

3-5) Financial Report 2004 (“The Minutes”)

EMSEV was allocated a total of \$10,200 in 2004. Its break –up and usage:.

- a) \$ 2,000 from IUGG for general activity was used for ASC in Armenia and MEEMSV in France (\$1,000 each)
- b) \$ 1,500 from IUGG for MEEMSV in France
- c) \$ 3,000 from IUGG for Philippine field work
- d) \$ 1,000 from IASPEI for ASC in Armenia
- e) \$ 700 from IAVCEI for Philippine fieldwork (\$ 100) and MEEMSV in France (\$ 600)
- f) \$ 2,000 from IAGA for MEEMSV in France

Thus,

\$ 5,100 for MEEMSV France
 \$ 2,000 for ASC Armenia
 \$ 3,100 for Taal Volcano

4) Activity planned for 2005 and 2006

4-1) IUGG support for 2005 (as of February 11,2005).

We will be given \$2,000/ yr for our general activity until 2007. This amount will be quite insufficient for our major activity in Mexican Workshop and Business Meeting in November. EMSEV related research in the Latin American countries, most of which are developing countries, needs substantial encouragement. We requested \$ 3,000 for our Mexican activity. However, we missed the IUGG deadline for application of such meeting support for 2005.

4-2) IAGA General Assembly, Toulouse, July 2005.

Two symposia are convened by EMSEV members and a Business Meeting is planned there. To assist participants IAGA supports us with \$ 2,000.

4-3) Workshop and Business Meeting in Mexico, November 2005.

This will be a joint meeting with the Mexican Geophysical Union (UGM - Union Geofisica Mexicana). \$3,000 is requested from IASPEI, but we are notified that no more than \$ 1,000 will be allocated..

4-4) Taal Volcano investigation in 2005

\$3,000 is requested to IAVCEI for this promising campaign. We need to act now for helping PHILVOLCS efficiently in the EM monitoring of the activity. We are requesting these funds from IAVCEI because we missed the opportunity to apply for Inter-Association Initiative Funds.

4-5) Workshop and Business Meeting in India 2006

There is a generous invitation from India for EMSEV meetings, which we will gratefully accept. Request for support will be made in due course.

5)Concluding Remarks

The objectives of EMSEV concern the physics of pre-, co- and post-event EM phenomena related to earthquakes and volcanic eruptions. Our activity has played a major role in promoting this science. Although the importance of the EM phenomena related with seismic and volcanic events is not fully appreciated by conventional researchers yet, EM studies are now performed more and more accurately with sophisticated tools and data processing in association with other geophysical and remote sensing methods. Results become clearer and more convincing as the number of observations accumulates.

On active volcanoes,, magnetic and SP-potential measurements show clear changes associated with initial intrusions, final explosive eruptions and post-eruptive activity that reflect the physical processes within the volcano. Co-seismic effects are observed that scale with moment/magnitude deduced from source theory. DC to higher frequency (to 1000 Hz) EM signals before earthquakes have also been actively investigated. In even higher frequency bands (kilohertz to megahertz), anomalies have been reported before earthquakes by many radio scientists, Disturbances in the atmosphere ionosphere and magnetosphere are suspected to be the cause of anomalous transmissions. Monitoring of these regions with land based ionosondes, total electron concentration (TEC) derived from GPS data, and from satellites has been initiated. Such phenomena are collectively called Lithosphere-Atmosphere-Ionosphere (LAI) coupling. Some statistical evaluations on the correlation between these pre-

seismic EM phenomena and earthquakes reveal positive results, but we need also to establish their unambiguous physical causal connection. Considering that many researchers in the EM field come from a wide variety of disciplines, including radio engineering, space physics, and solid state physics, bringing together these groups and integrating their data and ideas with those obtained in other related fields will be a daunting but worthwhile task.