2012 EMSEV Annual Report

1. INTRODUCTION

EMSEV Inter-Association Working Group on 'Electromagnetic Studies of Earthquakes and Volcanoes' (http://www.emsev-iugg.org/emsev/) strongly focuses on the development of new research and findings related to the physics of the Earth, volcanic and eruptive processes, electromagnetic (EM) and other geophysical phenomena related to dynamic processes leading to faults rupture and volcanic eruptions.

EMSEV is now composed of more than 290 scientists who belong to IAGA, IAVCEI and IASPEI Associations.

EMSEV's objectives are (1) the evaluation and the promotion of advanced studies in the electromagnetic field through international conferences and regional workshops, high levels international publications, (2) to actively contribute to the expansion of electromagnetic methods related to the study of earthquakes and volcanic eruptions in developing or interested countries, (3) to organize international and regional workshops, and sessions at international meetings, and (4) to participate in local educational programs.

During EMSEV business meetings, the management of scientific research and new findings are subjects of lively discussion, current EMSEV activities are considered and new prospects are defined. The XVth business meeting was held during the last international EMSEV meeting at Gotemba (Japan) on October 3, 2012.

2. ADMINISTRATION

During the XVth EMSEV business meeting, it was decided to enlarge the EMSEV expertise to include new related fields of research. A new body, called *EMSEV collaborators*, was defined. This body is intended to include active scientists working in Natural Hazards in any related field of research whose expertise's does not necessarily belong in the EM field but who are interested in, and wish to contribute to development of new broader geophysical knowledge. These collaborators are interested in participating in EMSEV activities, including contributing to the analysis of observations and understanding of physical processes from their different perspectives.

Therefore, EMSEV is now composed of an elected executive bureau, a nominated assembly of members and collaborators, and the community interested in electromagnetic phenomena, called corresponding members.

The bureau gathers twelve active researchers. The Chairperson is J. Zlotnicki, the Vice-Chairperson is M.J.S. Johnston, and the Secretary is T. Nagao. IAGA, IAVCEI and IASPEI liaison members are J. Y. Liu, Y. Sasai, and M.J.S. Johnston, respectively, while IAGA WG1-2 corresponding liaison member is T. Harinarayana. Q. Huang (China), V. Lapenna (Italy), A. Meloni (Italy), V. Korepanov (Ukraine), and R. Singh (India-USA) are also bureau members. S. Uyeda is Past-Chairperson.

The WG members are nominated for their expertise and their scientific activity in the EM field or in connected and related research fields. They can be nominated at any of the EMSEV business meetings. At this point, we have 32 working group members from 16 countries (China, France, Greece, India, Indonesia, Italy, Japan, Kyrgyzstan, Philippines, Poland, Romania, Russia, Taiwan, Turkey, Ukraine, and USA). The number of corresponding members now exceeds 290.

During the XVth business meeting, it was decided to have our next EMSEV meeting to be held in Europe in September 2014. Jan Blecki from Poland will be the chair of the organization committee. It should take place in September 2014.

Annual reports, minutes of the business meetings and activities on the Working Group can be found on EMSEV web site (http://www.emsev-iugg.org/emsev/).

3. ACTIVITIES

In 2012, EMSEV was involved in several important international meetings and has continued to support international cooperative studies.

- **Meetings**

EMSEV members have organized many sessions in international meetings like:

EGU, Vienna, April 22-27, 2011 (3 sessions),
ESC2012, 33rd General Assembly, August 19-24, 2012, Moscow, Russia
AOGS AGU (WPGM) Joint Assembly,13 to 17 August, 2012, Singapore
AGU, December 3-7, 2012, San Francisco, USA
GeoRisk Conference, December 8-12, 2012, Chapman University, USA

Following the 2010 conference held at Chapman University, Santa-Ana, USA, the 2012 international EMSEV meeting took place from September 30 to October 3, 2012. It was organized and hosted by Tokai University at Gotemba, Japan, in front of the 3776 m high and active Mount Fuji-yama volcano. This meeting was supported by the three IUGG Associations (IAGA, IASPEI and IAVCEI) to which EMSEV belongs.

More than 75 participants from 13 countries, including ten new young scientists, presented their latest results at both plenary oral and poster sessions over these three days. Papers were organized within five different sessions, (i) Electric, magnetic, and electromagnetic phenomena associated with active processes: earthquakes, tsunamis, volcanoes, active fault movements, landslides, and geothermal activities, (ii) Electromagnetic imaging based on land and space monitoring techniques, (iii) Pre-seismic, co-seismic and post-seismic phenomena related to the Lithosphere-Atmosphere-Ionosphere Coupling using multi-parametric observations to ensure reliable interpretation, (iv) Generation mechanisms of electromagnetic signals related to active processes: Theoretical and laboratory studies, and (v) Seismic, Geodetic and Electromagnetic studies related to the off Tohoku M9 Earthquake and tsunami on March 11, 2011.

- **EMSEV activity on volcanoes**

In Volcanology, EMSEV first formed a co-operative program with The Philippines Institute of Volcanology and Seismology (PHIVOLCS), on Taal volcano in November 2004. (http://www.phivolcs.dost.gov.ph/). At present, this international cooperation involves teams from Japan, France, USA, Greece, Italy, and Belgium. A report on the state of the cooperation, discussions of problems encountered and the latest results were presented during EMSEV 2012 meeting. It was pointed out that EMSEV has a primary responsibility to help PHILVOLCS to monitor the volcano.

Field trips were conducted in February and March, 2012 by groups from France, USA, and Japan with the collaboration from PHIVOLCS. In addition, new joint field work took place in December 2012 to repair and upgrade the telemeter network. During this time a new seismic crisis started on the volcano. The EMSEV project on Taal volcano which now involves many teams from the international community (Japan, France, USA, Greece, Italy, Belgium) in cooperation with PHIVOLCS clearly shows its effectiveness.

- **EMSEV activity related to Earthquake Processes**

In 2011, the EMSEV working group started a new research effort in Kyrgyzstan. We have developed a cooperative research program with the Bishkek Research Station in Kyrgyzstan under the Russian Academy of Sciences where some outstanding research on the relation between EM phenomena and electrical resistivity changes with earthquakes has been in process during the last 30 years. Previous discussions and visits had confirmed the great interest of this new cooperation:

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, Japanese and French passive EM stations were installed at new field sites, 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.

A cooperative agreement between EMSEV and the Bishkek Research Station was signed during the first meeting. This agreement states: "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 ways 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.

The first data issued from the collaboration were shown at the 2012 EMSEV meeting and it is clear that signal to noise is good. The data volumes are large. The Japanese recording system alone recorded 170 Gbytes of EM data in six months.

A presentation was made by Anatoly Rybin concerning the Bishkek station operation and obligations. 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.

4. PLANNED FUTURE ACTIVITIES

In 2013, EMSEV will be involved in important international meetings: EGU, AOGS, IAVCEI, IAGA, IASPEI, and AGU. In parallel, EMSEV will continue to maintain a high level of collaboration in Philippines and Kyrgyzstan.