

Dear EMSEV community,

Since many years, EMSEV plays promotes new researches on active volcanoes (see EMSEV Web site: <http://www.emsev-iugg.org/emsev/>) and on active faults.

At present, the cooperation between EMSEV and the Philippines Institute of Volcanology and Seismology (PHIVOLCS, The Philippines) on the slow awake of Taal volcano (The Philippines) is running well.

Therefore, EMSEV now promotes investigations on the generation of earthquakes and on the electrical/magnetic signals which could accompany such events. Along the past EMSEV business meeting, it was discussed the setting of a scientific cooperation between the Research Station of the Russian Academy of Science in Bishkek (Kyrgyz) and EMSEV.

The scope of the cooperation will be

‘Understanding changes in electric conductivity structure associated with seismic activity in central Asia using large current injection systems of Bishkek Institute’

Background of the researches:

The Russian Academy of Sciences (RAS), has conducted active monitoring of underground electrical conductivity for over thirty years at the Bishkek Research Station in Kyrgyz (Director Anatoly Rybin, EMSEV member). Their experiment involves injecting powerful electrical currents from through 4.5-km long dipoles. This is literally one of the world's largest scale electric/electromagnetic prospecting experiments.

Through this experiment, they found resistivity changes prior to some moderate earthquakes with a few percents. They also claimed that these resistivity changes recovered after the impending seismic activities (Fig. 1).

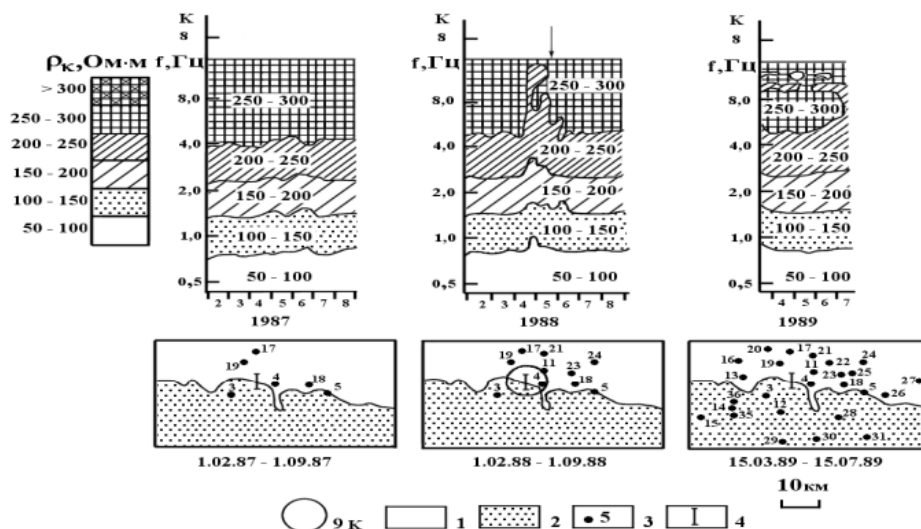


Fig. 1. Examples of resistivity changes and local seismicity. Middle of 1988, they observed resistivity change before some moderate earthquake. Resistivity structure recovered after the earthquake.

Furthermore, they found that 2 to 6 days after the high-power current injection experiments, an increased level of seismic activity was observed. According to their reports, released seismic energy was 106 times greater than the injected one (Fig. 2). It means current injection triggered seismic activity. This is really astonishing results. However, almost all such results were obtained during the former Soviet Union era. Therefore, these results have not been well recognized even now for all over the world. This situation was really grievous.

EMSEV bureau members (S. Uyeda and T. Nagao) with others have visited the Research Station a couple of times and were much impressed and agreed to a need for close international

cooperation in the further. The major aim of the first workshop is to get the exact information of what Bishkek scientists did.

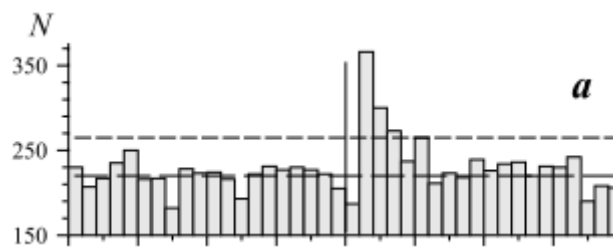


Fig.2. Daily number of earthquakes in the area of the northern Tien Shan and adjacent territories before ($t < 0$) and after ($t > 0$) the MHD-generator runs on the Bishkek test site plotted versus time (e.g. Avagimov et al., 2004).

Proposal:

The following target experiments are suggested for cooperative studies with the Research Station in Kyrgyz:

- 3D modelling of the source region(s) where electrical conductivity changes are occurring,
- Detailed investigation of correlation between electrical conductivity changes and seismicity,
- Electromagnetic triggering processes and their implications,
- Distortion of electrical signals by regional tectonics and faults systems,
- Common field experiments,
- Independent checking of VAN'S SES observations outside Greece,
- Physical mechanisms of EM signals generated by the MHD-generator.

Kick-Off meeting:

*The first joint Bishkek-EMSEV meeting will be held
at the RAS Bishkek station in Kyrgyz from November 8 to 12, 2011.*

Topics of the workshop:

Important results obtained at Bishkek so far include: observations of changes in electrical conductivity of as much as several percent before moderate earthquakes and sharp increases in triggered local seismicity that results from the operation of the injection experiment. Furthermore, the receiving stations in Kyrgyz are extremely remote and are relatively free of artificial noise sources. This provides an ideal environment for checking high-resolution monitoring experiments such as SES proposed by the VAN group in Greece. Complementary experiments to those led by the Research Station will be envisioned.

Specific talks will be given on:

- 1) Historical experiments by using MHD generator
- 2) Current (on-going) active monitoring experiments by using the 4km transmitting dipole
- 3) Geological/geophysical setting in and around the Bishkek test site
- 4) Resistivity structure around the Bishkek test site
- 5) Analysis methods of resistivity structures (which is similar to TDEM)
- 6) Temporal resistivity changes associated with earthquakes
- 7) Induced seismicity after the current emission experiments

General topics will be developed on:

- Detailed investigation of correlation between electrical conductivity changes and seismicity,
- Detailed 3D resistivity structure in the vicinity
- Electromagnetic triggering processes and their implications,
- How to make independent checking of VAN'S SES observations outside Greece,
- Physical mechanisms of EM signals, etc.

Organizing committee:

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Timetable:

Nov. 8 Arrival to Bishkek, registration

Nov. 9 Workshop

Nov. 10 Workshop

Nov. 11 Field excursion

Nov. 12 Departure for home and additional field work for those interested

(We expect about 20 foreign participants.)

Accommodation:

Bishkek Research Station has guest rooms.

They provide a room for 80US\$ including three meals for night.

Travel to Bishkek:

The most convenient way to get Bishkek, Kyrgyz is from Moscow and Istanbul. The other way is via Almaty, Kazakhstan which is located 250 km from Bishkek. The Research Station can provide transport from Almaty to Bishkek. In the case of route Almaty (airport) - Bishkek (Research Station) it is necessary to have 2 visas: transit visa to Kazakhstan and main visa to Kyrgyz.

August 23, 2011, Jacques Zlotnicki, Toshiyasu Nagao Anatoly Rybin and EMSEV bureau