SCIENTIFIC REPORT-WE12

1. The main objective of this workshop was to know the actual scientific activity of our formely colleagues,theirs results.The thematic developed during of free discussions and during visiting Vrancioaia and Plostina Seismological Observatories were in connection to "Modern seismology developed in National Institute for Earth Physics after strong March 4,1977 earthquake. Identification and approaching of potential thems of research of national and international usefulness".

The workshop evaluated the state of art of Earth Physics and discussed the modality to widen and to diversify the collaboration between Romanian seismologists from Romania and abroad of Romania , to identify new research potential fields with large internal and international utility . NIEP accomplishes deep character innovative researches which made the new field of Earth Physics developed on Magurele Platform of Physics to became one of major consequence in the seismic risk reduction process.

2. The workshop started on September 17,2008 at 9:30 after presentation of the laboratories and Seismic Commandment which is connected to all World seismic centers from Pacific Ocean to Florida, USA.

Professor.dr.Gh.Mărmureanu made a presentation of the institute and finally made a short description the main researches after strong Vrancea earthquake on March 4,1977: (i)-Monitoring of the seismic activity by using high quality instrumentation,in real time;(ii)-Early warning system for industrial facilities to strong Vrancea earthquakes which is winner of the "2006 IST European Prize";(iii)- Seismic microzonation maps of large populated cities(Bucharest,Iasi,Bacau,Buzau and Craiova) by using probabilistic and deterministic approaches;(iv)-Seismic tomography of dams for avoiding catastrophes(Vidraru etc.);(v)-„Shake/Quake Map", in fact, development of the earthquake, in real time .This type of map, which is a novelty on European area, gives the possibility to the decisions authorities, at central and local level, to take suited measures and it is asked by MIRA to construct disaster map ; (vi)- New seismic hazard map of Romania by using probabilistic and deterministic approaches, linear and nonlinear ones; (vii)-The concept of "Nonlinear Seismology-the Seismology of the XXI-st Century , concept developed by National Institute for Earth Physics, published by Springer Verlag (2005),Romanian Academy Prize on 2008, concept of international priority ;(viii)- Researches to sustain the concept of "continental collision" in Vrancea seismogenic area, "orderly" and "chaos" in Earth Physics, in prediction of Vrancea earthquakes etc. Other achievements were presented related to seismic source physics, structure and dynamics of the lithosphere, participation of the institute to different national and international projects.

The second part of the program, in the afternoon, included presentations of the foreigner colleagues. Prof. Cezar Ioan Trifu from the Queens University of Canada presented his researches in the field of induced seismicity. Prospecting of new materials requires application of more efficient technologies and improved safety conditions of exploitation, both for minerals and hydrocarbonates and for fluids' injection at depth in order to obtain geothermal energy and to stock residuals, as well as a great variety of geotechnical projects including: radioactive waste, hydrocarbonates deposits in underground holes, road tunnels, railway lines of high speed, underground factories for water purification, dams etc.

All these activities require operations at increasing depth and consequently in increasingly difficult conditions, which imply a higher level of control to assure their economical efficiency and guarantee in exploitation, both for operators, their tools and investments, and for the environment protection. Such a control can be reached through **microseismic monitoring**, able to provide direct real-time information as concerns the local instabilities in the environment.

On the other side, in case of many petroleum reservoirs the emphasis has at present the increase of the percent of extracted hydrocarbonates. To this aim, the reservoirs are monitorized on short, intermediary and long terms, from a few hours per year to a few weeks

per year. The **microseismic monitoring** allows the localization of the stimulated fractures to know the fracturing evolution process, set of the injection parameters to avoid petroleum migration outside the reservoir and to eliminate the environment contamination.

Mr. prof. Cezar Trifu (Canada) showed that the induced seismicity monitoring represents an activity of great economical and social importance, opening large application directions for the next years. As a consequence, he appreciated that the development of the applied researches in this field in Romania should represent a main direction of development in seismology. It is worth mentioning that now there is no other group of research in the country with the high seismological expertise like in NIEP and the institute has a good basis to deal with this research direction. Research of high economical and social impact can be carried out in this way and a continuous increase of the qualification of the specialists will be obtained making them able to perform more and more complex analyses and interpretations, leading to the growing of the institute prestige.

Mr. dr. George Purcaru form the University of Frankfurt, Germany, discussed in his presentation different models of earthquake prediction. Another colleague, Mrs. dr. Iosif Sieglinde, who left for Germany in 1986, presented a model of prediction, published in an international journal. Many debates started on this subject, without coming to a common point of view. Mrs. Dr. Ileana Tibuleac from the University of Nevada –USA presented her interests and works in applied seismology, including the seismic monitoring of the nuclear depositories.

On 18 September 2008 we went to the Seismological Observatories in Vrancioaia and Plostina, where the only system in Europe of seismic early warning in real time is operating. Its implementation in collaboration with the University of Karlsruhe is based on new concepts and risk models. The EWS uses the available time interval (28 – 32 s) between the moment the earthquake is detected by the instruments installed in boreholes in the epicenter area (Plostina) and the moment when the destroying waves come to the site to be protected. The system is able to automatically stop gas allocation, computing centers with data of national interest, activities of high risk on airports, nuclear power plants, refineries, high-speed trains, lifts in safety positions, alerts hospitals and triggers diesel generator etc. This system was nominated for the "2006 IST European Prize" **(www.ist-prize.org).**

3.The Final Programme of WE

First day.September 17,2008 Morning session: 9:00-11:00.Updating the research topics in Earth Physics **Chaipersons:** **Prof.Gheorghe Marmureanu** **Dr.Mircea Radulian** **11:00-11:30. Cofee break** **11:30-13:30.The seismology and its implications in industry etc.** **Chaipersons:** **Prof.Cezar Trifu,Queen's Univ.Canada**	Afternoon session : 15:00-17:20: **The actual theories on "orderly" and "chaos" in Earth Physics,in prediction of Vrancea earthquakes.On "continental collision " in Vrancea seismogenic area.** **Chaipersons:** **Dr. Purcaru George:Geophysik ,Univ.of Frankfurt ,Germany;** **Dr.Iosif Siegrinde ,Germany**
Second day:September 18,2008 **8:30-19:00** **Visit the Seismological Observatory from Vrancioaia and Plostina,the place of Early Warning System(2006 IST European Prize)**	Third day: September 19,2008 **-Participation at EW Joint Meeting "Chating with the Diaspora", Parliament Palace**

4.The final list keyspeakers:

1.Dr.Cezar TRIFU-profesor ,Queens'Univeristy,Canada si cercetator stiintific la Engineering Seismology Group Inc.1 Hyperion Court,Kingston,Notario,K7K 7G3,Tel:+1-613-548-8267,Fax:+1-613-548-8917;www.esg.ca;**trifu@esg.ca**;Canada;researches in physics of the Vrancea earthquakes,leads programmes of MSc / PhD etc.

2.Dr.George PURCARU, mathematician, Institute of Geophysics, University of Frankfurt/Main, Germany,Tel.:004969748140, e-mail:**purcaru@geophysik.uni-frankfurt.de**; author of many papers on earthquake prediction ; a world top in this field of research;
3.Dr.Sieglinde IOSIF, seismologist, Germany,left Romania on 1986;e-mail:**sieglinde.iosif@t-online.de**; physics of seismic sources,earthquake prediction etc..
4.Dr.Ileana TIBULEAC, Seismologist,resracher at University of Nevada at Reno,Reno, USA, NV 89557, e-mail:**ileana@seismo.unr.edu** ,Tel.:0017757846256 ;Fax:0017757844165; http://www.seismo.unr.edu, SUA;applyed seismology,nuclear deposits etc.

5.The final list of particpants.

Nume	Prenume	Institutie	Email	Tara	Invitat/ participant
Trifu	Cezar	Queens University	trifu@esg.ca	Canada	Participant
Purcaru	George	Frankfurt University	purcaru@geophysik.uni-frankfurt.de	Germania	Participant
Tibuleac	Ileana	Univ.of Nevada at Reno	ileana@seismo.unr.edu	SUA	Participant
Iosif	Sieglinde	Univ. of München	sieglinde.iosif@t-online	Germania	Participant
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Zaharia	Bogdan	NIEP	bzaharia@infp.ro	Romania	Participant
Hlevca	Alexandru	NIEP	hlevca@infp.ro	Romania	Participant
Beşuţiu	Lucian	Inst.of Geodynamic	besutiu@geodin.ro	Romania	Invitat

6.Statistical data on participants:

- between 20 and 30 years old: **6** ; between 30 and 40 years old:**4;** between 40-50 years old:**12** ; between 50-60 years old:**4** and between 60 and 70 years old:**3.** Total:**29** participants.

Director proiect,
Prof.dr.Gh.Mărmureanu