



The Abdus Salam International Centre for Theoretical Physics

Ninth Workshop on

Non-Linear Dynamics and Earthquake Prediction

1 - 13 October 2007

(Miramare - Trieste, Italy)

The Abdus Salam International Centre for Theoretical Physics, in collaboration with the Department of Earth Sciences of the University of Trieste, will organize the Ninth Workshop on Non-Linear Dynamics and Earthquake Prediction from **1 - 13 October 2007**. The Workshop will be endorsed by the IUGG Commission on Geophysical Risk and Sustainability and by the IASPEI Commission on Earthquake Hazard, Risk and Strong Motion.

The Workshop is dedicated to training in advanced methodologies of R&D in fundamental studies of the evolution and dynamics of the Earth lithosphere and its instability based on considering the Earth lithosphere as a hierarchical non-linear dissipative system. These studies create approaches to numerous applied problems, such as earthquake prediction, estimation and mitigation of possible seismic hazard, prospecting for mineral resources, etc. Earthquakes are considered, along with other natural disasters as critical transitions in complex systems (the Earth lithosphere, the atmosphere, the ocean). This general approach gives the possibility to search for analogues between precursors of different types of disasters. Among practical aspects, large attention will be given to the accuracy and statistical significance of prediction methods, their rate of errors, and to the interaction with disaster management authorities.

The Workshop is a continuation of the fourteen previous ones organized by the Trieste Science Centres (Italy) in 1983, 1988, 1991, 1993, 1995, 1997, 1999, 2001, 2003, 2005, CERESIS (Lima, Peru, 1986), IDEA (Caracas, Venezuela, 1991), IIEES (Tehran, Iran, 2006), and NCP (Islamabad, Pakistan, 2006).

The workshop will be aimed at facilitating and promoting research and not to providing some ready-made methods. However, know-how will be provided enabling participants to test some algorithms for medium-range intermediate-term earthquake prediction, and for modelling of the lithosphere dynamics, as starting points of further research. Lectures in different disciplines will focus both on methodology and results of interpretation of seismic observations. Several hours will be dedicated every day to computer exercises, with the active engagement of students, who will be allowed to process their own data. Particular attention will be paid towards the planning of future research based on the requests received from the participants.

The main topics of the Workshop programme will include.

LECTURES

Lithosphere as a non-linear dissipative system:

- Chaos and self-organisation in complex systems. Paradigms in prediction of critical phenomena in complex systems. Scaling, self-similarity, fractality
- Unified laws in seismicity. Time correlations in models of self-organized criticality
- Numerical models. Modelling of block-and-fault system dynamics: basic principles and applications. Computational geodynamics: problems, methods, results and perspectives

Pattern recognition:

- Algorithms. Testing reliability of classification results
- Application to problems related to earthquake prediction
- Application to exploratory data analysis for other complex systems

Earthquake prediction:

- Algorithms. Verification problem. Accuracy and limitations
- Real-time prediction of earthquakes: state-of-the-art and perspectives
- New approaches to short-term earthquake prediction: algorithms and testing
- Approaches to earthquake precursors based on data on different fields

Disaster Prediction and Preparedness:

- Integrated disaster risk management as an innovation of science and technology: issues, methods, and challenges
- Earthquake preparedness. Preventive disaster management of extreme natural events
- Prevention and implementation strategies

PRACTICAL EXERCISES

- Analysis of earthquake catalogues
- Modelling of block-and-fault structure dynamics and seismicity on a regional scale
- Application of pattern recognition algorithms for data analysis
- Application of earthquake prediction algorithms for diagnosis of premonitory phenomena

Scientists and students from all countries that are members of the UN, UNESCO, or IAEA can attend the Workshop. The main purpose of the Centre is to help researchers from developing countries through a programme of training activities within a framework of international co-operation. However, students and post-doctoral scientists from developed countries are also welcome to attend. As the Workshop will be conducted in English, participants should have an adequate working knowledge of that language. A degree in Physics, Mathematics, Geophysics (theoretical or computational), Computer Science and/or similar disciplines is required.

As a rule, travel and subsistence expenses of the participants should be covered by the home institution. However, limited funds are available for some research workers from developing countries. As scarcity of funds allows travel to be granted only in a few exceptional cases, every effort should be made by candidates to secure support for their fares (or at least half fare) from their home country. It is stressed that participants whose travel expenses are paid by ICTP are required to attend the entire Workshop. For logistic reasons connected to the number of Personal Computers available, the total number of participants in the Workshop is limited. There is no registration fee for attending the Workshop.

The Application Form is obtainable from the ICTP WWW server: <http://agenda.ictp.it/smr.php?1864> which will be constantly up-dated) or from the activity Secretariat. It should be completed and returned before **28 May 2007** to the address below or smr1864@ictp.it (please send file attachments in one of the following formats: pdf (preferably), rtf zipped, or doc) (recent photograph & signature of the candidate are compulsory).

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Earthquake Prediction

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Deadline:

28 May 2007