



The Abdus Salam
International Centre for Theoretical Physics



Advanced School on Understanding and Prediction of Earthquakes and other Extreme Events in Complex Systems

Organizer(s): Directors: V.I. Keilis-Borok, G.F. Panza, A.A. Soloviev
Trieste - Italy, 26 September 2011 - 8 October 2011

Venue: Adriatico Guest House Kastler Lecture Hall

Preliminary Programme

Monday, 26 September 2011 (Room:Adriatico Guest House Kastler Lecture Hall)

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|----------------------|---|
| 09:10 - 09:20 | Prof. V. Keilis-Borok / <i>International Institute of Earthquake Prediction Theory and Mathematical Geophysics, Russian Academy</i>
OPENING |
| 09:20 - 09:30 | Prof. G.F. Panza / <i>University of Trieste; The Abdus Salam International Centre for Theoretical Physics</i>
OPENING |
| 09:30 - 09:40 | Prof. A. Soloviev / <i>International Institute of Earthquake Prediction Theory and Mathematical Geophysics, Russian Academy</i>
OPENING |
| 09:40 - 10:00 | --- Break --- |
| 10:00 - 10:45 | Prof. V. Keilis-Borok / <i>International Institute of Earthquake Prediction Theory and Mathematical Geophysics, Russian Academy</i>
Predictive Understanding of Extreme Events in Nature and Society |
| 10:45 - 12:00 | Registration Formalities (Fermi Building) |
| 10:45 - 12:00 | (Room: Adriatico Guest House (Lower Level 1))
REGISTRATION |

- 12:00 - 13:30** (Room: Adriatico Guest House Cafeteria)
--- LUNCH ---
- 13:30 - 14:15** **Prof. V. Kossobokov** / *International Institute of Earthquake Prediction Theory and Mathematical Geophysics, Russian Academy*
Earthquakes and Their Distribution in Space-Time-Energy Domain
- 14:15 - 14:30** --- Break ---
- 14:30 - 15:15** **Prof. M. Caputo** / *Universita' degli Studi di Roma 'La Sapienza'*
The Forecast in Economy and in Seismology
- 15:15 - 15:45** (Room: Adriatico Guest House (Lower Level 1))
--- Coffee Break ---
- 15:45 - 17:45** **V.Keilis-Borok, V.Kossobokov, O. Novikova, A.Peresan, V.Rozenberg, A.Soloviev, I.Vorobieva**
Analysis of Earthquake Catalogs - Exercises
- 17:45 - 18:00** --- Break ---
- 18:00 - 19:30** (Room: Adriatico Guest House Informatics Lab.)
V.Keilis-Borok, V.Kossobokov, O. Novikova, A.Peresan, V.Rozenberg, A.Soloviev, I.Vorobieva
GROUP A - Analysis of Earthquake Catalogs - Computer Exercises
- 19:30 - 20:30** (Room: Adriatico Guest House Cafeteria)
--- DINNER ---

Tuesday, 27 September 2011 (Room:Adriatico Guest House Kastler Lecture Hall)

- 09:00 - 09:45** **Prof. M. Ghil** / *Ecole Normale Supérieure, Paris*
Extreme Events: Dynamics, Statistics and Prediction. Part 1
- 09:45 - 09:55** --- Break ---
- 09:55 - 10:40** **Prof. M. Ghil** / *Ecole Normale Supérieure, Paris*
Extreme Events: Dynamics, Statistics and Prediction. Part 2
- 10:40 - 11:10** (Room: Adriatico Guest House (Lower Level 1))
--- Coffee Break ---
- 11:10 - 12:00** **Prof. V. Kossobokov** / *International Institute of Earthquake Prediction Theory and Mathematical Geophysics, Russian Academy*
Multi-Parametric Description of Earthquake Sequences
- 12:00 - 13:30** (Room: Adriatico Guest House Cafeteria)
--- LUNCH ---
- 13:30 - 16:00** **V.Keilis-Borok, V.Kossobokov, O. Novikova, A.Peresan, V.Rozenberg, A.Soloviev, I.Vorobieva**
Analysis of Earthquake Catalogs - Exercises
- 16:00 - 16:30** (Room: Adriatico Guest House (Lower Level 1))
--- Coffee Break ---
- 16:30 - 18:00** (Room: Adriatico Guest House Informatics Lab.)
V.Keilis-Borok, V.Kossobokov, O. Novikova, A.Peresan, V.Rozenberg, A.Soloviev, I.Vorobieva
GROUP B - Analysis of Earthquake Catalogs - Computer Exercises

19:30 - 21:30 (Room: Adriatico Guest House (Terrace))
--- Get Together ---

Wednesday, 28 September 2011 (Room:Adriatico Guest House Kastler Lecture Hall)

09:00 - 09:45 **Prof. M. Ghil / Ecole Normale Supérieure, Paris**
Damage Propagation on Networks. Part 1

09:45 - 09:55 --- Break ---

09:55 - 10:40 **Prof. M. Ghil / Ecole Normale Supérieure, Paris**
Damage Propagation on Networks. Part 2

10:40 - 11:10 (Room: Adriatico Guest House (Lower Level 1))
--- Coffee Break ---

11:10 - 12:00 **Prof. A. Soloviev / International Institute of Earthquake prediction Theory and Mathematical Geophysics, Russian Academy**
Pattern Recognition Methods and Algorithms

12:00 - 13:30 (Room: Adriatico Guest House Cafeteria)
--- LUNCH ---

13:30 - 14:15 **Prof. A. Soloviev / International Institute of Earthquake prediction Theory and Mathematical Geophysics, Russian Academy**
Application of the Pattern Recognition Techniques to Earthquake-prone Areas Determination

14:15 - 14:30 --- Break ---

14:30 - 15:15 **Prof. V. Kossobokov / International Institute of Earthquake Prediction Theory and Mathematical Geophysics, Russian Academy**
New Approaches to Seismic Hazard Assessment

15:15 - 15:45 (Room: Adriatico Guest House (Lower Level 1))
--- Coffee Break ---

15:45 - 17:30 (Room: Adriatico Guest House Informatics Lab.)
V.Keilis-Borok, V.Kossobokov, O. Novikova, A.Peresan, V.Rozenberg, A.Soloviev, I.Vorobieva
GROUP B - Analysis of Earthquake Catalogs - Computer Exercises

17:30 - 17:45 --- Break ---

17:45 - 19:30 (Room: Adriatico Guest House Informatics Lab.)
V.Keilis-Borok, V.Kossobokov, O. Novikova, A.Peresan, V.Rozenberg, A.Soloviev, I.Vorobieva
GROUP A - Analysis of Earthquake Catalogs - Computer Exercises

19:30 - 20:30 (Room: Adriatico Guest House Cafeteria)
--- DINNER ---

Thursday, 29 September 2011 (Room:Adriatico Guest House Kastler Lecture Hall)

09:00 - 09:45 **Dr. A. Peresan / University of Trieste**
Analysis of Earthquake Catalogs for Intermediate-term Prediction and Seismic Hazard Assessment

- 09:45 - 09:55** --- Break ---
- 09:55 - 10:40** **Dr. A. Peresan / University of Trieste**
Prospective Testing of Intermediate-term Middle-range Earthquake Predictions in Italy
- 10:40 - 11:10** (Room: Adriatico Guest House (Lower Level 1))
--- Coffee Break ---
- 11:10 - 12:00** **Prof. A. Soloviev / International Institute of Earthquake Prediction Theory and Mathematical Geophysics, Russian Academy**
Prediction of Extreme Events in Socio-economic Systems. Part 1
- 12:00 - 13:30** (Room: Adriatico Guest House Cafeteria)
--- LUNCH ---
- 13:30 - 14:15** **Prof. A. Soloviev / International Institute of Earthquake Prediction Theory and Mathematical Geophysics, Russian Academy**
Prediction of Extreme Events in Socio-economic Systems. Part 2
- 14:15 - 14:30** --- ---
- 14:30 - 15:15** **Prof. V. Kossobokov / International Institute of Earthquake Prediction Theory and Mathematical Geophysics, Russian Academy**
Earthquake Forecast/Prediction Problem and Solutions
- 15:15 - 15:45** (Room: Adriatico Guest House (Lower Level 1))
--- Coffee Break ---
- 15:45 - 18:45** **V.Keilis-Borok, V.Kossobokov, O. Novikova, A.Peresan, V.Rozenberg, A.Soloviev, I.Vorobieva**
Pattern Recognition - Exercises
- 19:30 - 20:30** (Room: Adriatico Guest House Cafeteria)
--- DINNER ---

Friday, 30 September 2011

- 09:00 - 09:45** (Room: Adriatico Guest House Kastler Lecture Hall)
Prof. C. Doglioni / Universita' degli Studi di Roma 'La Sapienza'
Plate Tectonics, Earth Asymmetries, and Seismicity. Part 1
- 09:45 - 09:55** --- Break ---
- 09:55 - 10:40** (Room: Adriatico Guest House Kastler Lecture Hall)
Prof. C. Doglioni / Universita' degli Studi di Roma 'La Sapienza'
Plate Tectonics, Earth Asymmetries, and Seismicity. Part 2
- 10:40 - 11:10** (Room: Adriatico Guest House (Lower Level 1))
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- 11:10 - 12:00** (Room: Adriatico Guest House Kastler Lecture Hall)
Prof. C. Doglioni / Universita' degli Studi di Roma 'La Sapienza'
Plate Tectonics, Earth Asymmetries, and Seismicity. Part 3
- 12:00 - 13:30** (Room: Adriatico Guest House Cafeteria)
--- LUNCH ---

- 13:30 - 14:15** (Room: Adriatico Guest House Kastler Lecture Hall)
Prof. V. Kossobokov / *International Institute of Earthquake Prediction Theory and Mathematical Geophysics, Russian Academy*
Global and Regional Monitoring Aimed at Earthquake Forecast/Prediction
- 14:15 - 14:30** --- ---
- 14:30 - 15:15** (Room: Adriatico Guest House Kastler Lecture Hall)
Prof. A. Soloviev / *International Institute of Earthquake Prediction Theory and Mathematical Geophysics, Russian Academy*
Modeling of Block Structure Dynamics and Seismicity
- 15:15 - 15:45** (Room: Adriatico Guest House (Lower Level 1))
 --- Break ---
- 15:45 - 18:45** (Room: Adriatico Guest House Informatics Lab.)
V.Keilis-Borok, V.Kossobokov, O. Novikova, A.Peresan, V.Rozenberg, A.Soloviev, I.Vorobieva
GROUP A - Pattern Recognition - Computer Exercises
- 19:30 - 20:30** (Room: Adriatico Guest House Cafeteria)
 --- DINNER ---

Saturday, 1 October 2011 (Room:Adriatico Guest House Informatics Lab.) **(Saturday)**

- 09:00 - 12:00** **V.Keilis-Borok, V.Kossobokov, O. Novikova, A.Peresan, V.Rozenberg, A.Soloviev, I.Vorobieva**
GROUP B - Pattern Recognition - Computer Exercises
- 12:00 - 14:00** (Room: Adriatico Guest House Cafeteria)
 --- LUNCH ---
- 14:00 - 18:00** (Room: Adriatico Guest House Kastler Lecture Hall)
V.Keilis-Borok, V.Kossobokov, O. Novikova, A.Peresan, V.Rozenberg, A.Soloviev, I.Vorobieva
Numerical Simulation of Block Structure Dynamics - Exercises

Monday, 3 October 2011 (Room:Adriatico Guest House Kastler Lecture Hall)

- 09:00 - 09:45** **Prof. V. Kossobokov** / *International Institute of Earthquake Prediction Theory and Mathematical Geophysics, Russian Academy*
Validation of Forecast/Prediction Methods
- 09:45 - 09:55** --- Break ---
- 09:55 - 10:40** **Dr. V. Rozenberg** / *Institute of Mathematics and Mechanics, Ural Branch of the Russian Academy of Sciences*
Spherical Block-and-Fault Model: Basic Principles and Different Modifications
- 10:40 - 11:10** (Room: Adriatico Guest House (Lower Level 1))
 --- Coffee Break ---
- 11:10 - 12:00** **Dr. V. Rozenberg** / *Institute of Mathematics and Mechanics, Ural Branch of the Russian Academy of Sciences*
Spherical Block-and-Fault Model: Simulation of Global Seismicity

- 12:00 - 13:30** (Room: Adriatico Guest House Cafeteria)
--- LUNCH ---
- 13:30 - 14:15** **Prof. V. Kossobokov** / *International Institute of Earthquake Prediction Theory and Mathematical Geophysics, Russian Academy*
Predicting Predictable: Accuracy and Natural Limitations of Seismic Forecasts
- 14:15 - 14:30** --- ---
- 14:30 - 15:15** **Prof. V. Kossobokov** / *International Institute of Earthquake Prediction Theory and Mathematical Geophysics, Russian Academy*
Similarity and Difference of Impulsive Energy Release Processes
- 15:15 - 15:45** (Room: Adriatico Guest House (Lower Level 1))
--- Coffee Break ---
- 15:45 - 19:15** (Room: Adriatico Guest House Informatics Lab.)
V.Keilis-Borok, V.Kossobokov, O. Novikova, A.Persan, V.Rozenberg, A.Soloviev, I.Vorobieva
GROUP B - Numerical Simulation of Block Structure Dynamics - Computer Exercises
- 19:30 - 20:30** (Room: Adriatico Guest House Cafeteria)
--- DINNER ---

Tuesday, 4 October 2011 (Room:Adriatico Guest House Kastler Lecture Hall)

- 09:00 - 09:45** **Prof. A. Kryazhimskiy** / *V.A. Steklov Mathematical Institute, Russian Academy of Sciences; The International Institute for Ap*
Recovery Times as Indicators of Stability Loss
- 09:45 - 09:55** --- Break ---
- 09:55 - 10:40** **Prof. A. Kryazhimskiy** / *V.A. Steklov Mathematical Institute, Russian Academy of Sciences; The International Institute for Ap*
Optimal Development and Seeds of Changes in Economic Trends
- 10:40 - 11:10** (Room: Adriatico Guest House (Lower Level 1))
--- Coffee Break ---
- 11:10 - 12:00** **Prof. A. Kryazhimskiy** / *V.A. Steklov Mathematical Institute, Russian Academy of Sciences; The International Institute for Ap*
Early Warning Signals and Binary Classifications of Historical Paths
- 12:00 - 13:30** (Room: Adriatico Guest House Cafeteria)
--- LUNCH ---
- 13:30 - 14:15** **Prof. A. Ismail-Zadeh** / *International Institute of Earthquake Prediction Theory and Mathematical Geophysics, Russian Academy*
Understanding of Extreme Seismic Hazards
- 14:15 - 14:30** --- ---
- 14:30 - 15:15** (Room: Adriatico Guest House - Kastler Lecture Hall Area (Lower Level 1))
Dr. I. Vorobieva / *International Institute of Earthquake Prediction Theory and Mathematical Geophysics, Russian Academy*
Prediction of the Subsequent Large Earthquake

- 15:15 - 15:45** (Room: Adriatico Guest House (Lower Level 1))
--- Coffee Break ---
- 15:45 - 19:15** (Room: Adriatico Guest House Informatics Lab.)
V.Keilis-Borok, V.Kossobokov, O. Novikova, A.Peresan, V.Rozenberg, A.Soloviev, I.Vorobieva
GROUP A - Numerical Simulation of Block Structure Dynamics - Computer Exercises
- 19:30 - 20:30** (Room: Adriatico Guest House Cafeteria)
--- DINNER ---

Wednesday, 5 October 2011 (Room:Adriatico Guest House Kastler Lecture Hall)

- 09:00 - 09:45** **Prof. W. Plastino** / *University of Roma Tre; Italian National Institute of Nuclear Physics*
Overview of Nuclear Techniques for Probing Earth's Interior and Earthquake Prediction. Part 1
- 09:45 - 09:55** --- Break ---
- 09:55 - 10:40** **Prof. W. Plastino** / *University of Roma Tre; Italian National Institute of Nuclear Physics*
Overview of Nuclear Techniques for Probing Earth's Interior and Earthquake Prediction. Part 2
- 10:40 - 11:10** (Room: Adriatico Guest House (Lower Level 1))
--- Coffee Break ---
- 11:10 - 12:00** **Dr. I. Vorobieva** / *International Institute of Earthquake Prediction Theory and Mathematical Geophysics, Russian Academy*
Block Structure Modeling: Study of Connection between Geodynamics and Seismicity
- 12:00 - 13:30** (Room: Adriatico Guest House Cafeteria)
--- LUNCH ---
- 13:30 - 14:15** **Prof. A. Ismail-Zadeh** / *International Institute of Earthquake Prediction Theory and Mathematical Geophysics, Russian Academy*
Computational Geodynamics for Geohazard Analysis. Part 1
- 14:15 - 14:30** --- Break ---
- 14:30 - 15:15** **Prof. A. Ismail-Zadeh** / *International Institute of Earthquake Prediction Theory and Mathematical Geophysics, Russian Academy*
Computational Geodynamics for Geohazard Analysis. Part 2
- 15:15 - 15:45** (Room: Adriatico Guest House (Lower Level 1))
--- Coffee Break ---
- 15:45 - 17:15** **Poster Session**
- 17:15 - 17:30** --- Break ---
- 17:30 - 19:30** (Room: Adriatico Guest House Informatics Lab.)
V.Keilis-Borok, V.Kossobokov, O. Novikova, A.Peresan, V.Rozenberg, A.Soloviev, I.Vorobieva
GROUP A - The Algorithms M8 and Mendocino Scenario - Computer Exercises
- 19:30 - 20:30** (Room: Adriatico Guest House Cafeteria)
--- DINNER ---

Thursday, 6 October 2011 (Room:Adriatico Guest House Kastler Lecture Hall)

- 09:00 - 09:45 **Prof. G.F. Panza** / *University of Trieste; The Abdus Salam International Centre for Theoretical Physics*
Earthquake Prediction and Prevention for a Disaster Resilient Society. Part 1
- 09:45 - 09:55 --- Break ---
- 09:55 - 10:40 **Prof. G.F. Panza** / *University of Trieste; The Abdus Salam International Centre for Theoretical Physics*
Earthquake Prediction and Prevention for a Disaster Resilient Society. Part 1
- 10:40 - 11:10 (Room: Adriatico Guest House (Lower Level 1))
--- Coffee Break ---
- 11:10 - 12:00 **Dr. A. Peresan** / *University of Trieste*
Time-dependent Neo-Deterministic Seismic Hazard Scenarios
- 12:00 - 13:30 (Room: Adriatico Guest House Cafeteria)
--- LUNCH ---
- 13:30 - 14:15 **Prof. W. Plastino** / *University of Roma Tre; Italian National Institute of Nuclear Physics*
Comparison between Nuclear and other Physico-Chemical Candidates as Earthquake Precursors. Part 1
- 14:15 - 14:30 --- ---
- 14:30 - 15:15 **Prof. W. Plastino** / *University of Roma Tre; Italian National Institute of Nuclear Physics*
Comparison between Nuclear and other Physico-Chemical Candidates as Earthquake Precursors. Part 2
- 15:15 - 15:45 (Room: Adriatico Guest House (Lower Level 1))
--- Coffee Break ---
- 15:45 - 18:45 (Room: Adriatico Guest House Informatics Lab.)
V.Keilis-Borok, V.Kossobokov, O. Novikova, A.Peresan, V.Rozenberg, A.Soloviev, I.Vorobieva
GROUP B - The Algorithms M8 and Mendocino Scenario - Computer Exercises
- 19:30 - 20:30 (Room: Adriatico Guest House Cafeteria)
--- DINNER ---

Friday, 7 October 2011 (Room:Adriatico Guest House Kastler Lecture Hall)

- 09:00 - 09:45 **Prof. J. Kurths** / *Potsdam Institute for Climate Impact Research*
Structure Formation on Complex Networks
- 09:45 - 09:55 --- Break ---
- 09:55 - 10:40 **Prof. J. Kurths** / *Potsdam Institute for Climate Impact Research*
Analysis of Spatial and Temporal Extreme Monsoonal Rainfall over South Asia using Complex Networks
- 10:40 - 11:10 (Room: Adriatico Guest House (Lower Level 1))
--- Coffee Break ---
- 11:10 - 12:00 **Dr. I. Vorobieva** / *International Institute of Earthquake Prediction Theory and Mathematical Geophysics, Russian Academy*
Block Structure Modeling: Study of Seismic Regime

- 12:00 - 13:30** (Room: Adriatico Guest House Cafeteria)
--- LUNCH ---
- 13:30 - 14:15** **Prof. W. Plastino** / *University of Roma Tre; Italian National Institute of Nuclear Physics*
New Methodological Developments in Nuclear Physics for Solid Earth Physics. Part 1
- 14:15 - 14:30** --- ---
- 14:30 - 15:15** **Prof. W. Plastino** / *University of Roma Tre; Italian National Institute of Nuclear Physics*
New Methodological Developments in Nuclear Physics for Solid Earth Physics. Part 2
- 15:15 - 15:45** (Room: Adriatico Guest House (Lower Level 1))
--- Coffee Break ---
- 15:45 - 17:45** (Room: Adriatico Guest House Informatics Lab.)
V.Keilis-Borok, V.Kossobokov, O. Novikova, A.Peresan, V.Rozenberg, A.Soloviev, I.Vorobieva
GROUP A - The Algorithms M8 and Mendocino Scenario - Computer Exercises
- 17:45 - 18:00** --- Break ---
- 18:00 - 19:00** (Room: Adriatico Guest House Informatics Lab.)
V.Keilis-Borok, V.Kossobokov, O. Novikova, A.Peresan, V.Rozenberg, A.Soloviev, I.Vorobieva
GROUP B - The Algorithms M8 and Mendocino Scenario - Computer Exercises
- 19:30 - 20:30** (Room: Adriatico Guest House Cafeteria)
--- DINNER ---

Saturday, 8 October 2011 (Room:Adriatico Guest House Informatics Lab.) (**Saturday**)

- 09:00 - 12:00** **V.Keilis-Borok, V.Kossobokov, O. Novikova, A.Peresan, V.Rozenberg, A.Soloviev, I.Vorobieva**
Final Consultations, Distribution of the Software
- 12:00 - 13:30** (Room: Adriatico Guest House Cafeteria)
--- LUNCH ---
- 13:30 - 14:30** **V.Keilis-Borok, V.Kossobokov, O. Novikova, A.Peresan, V.Rozenberg, A.Soloviev, I.Vorobieva**
Final Consultations, Distribution of the Software