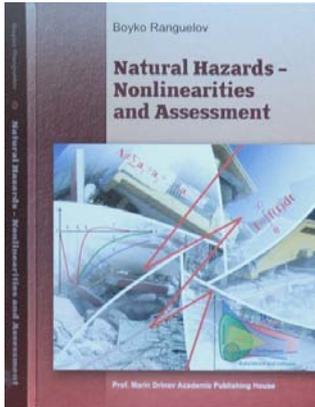


NATURAL HAZARDS – NONLINEARITIES AND ASSESSMENT. NATURAL HAZARDS COMPLEXITIES, MULTIDISASTERS, METHODOLOGIES, RISK MAPPING, RISK MANAGEMENT, PREVENTION AND PROTECTION



Geoscientists are developing and applying a wide range of methodologies to estimate volcanic and seismic (including tsunami) hazards. Although significant advances in site characterization and model development have been made in the last decade, many challenges remain. Several disastrous earthquakes in the past decade have required a rapid assessment of the underlying causes of the tragic loss of life and property. Earthquake risk reduction and control as a crucial criterion for sustainable development, minimizing social and economic loss and disruption due to earthquakes, requires reliable assessment of seismic hazard, vulnerability of the built environment and risk. All of these provide the critical basis for improved building codes and construction emergency response plans. The European practice needs such approaches due to the increased risk which is definitely dominated by the increased urbanization and the improved quality of life. Dr. Ranguelov is an active participant of several projects developed by the Space Research and Technology Institute of BAS.

His book is devoted to natural hazard studies, where main attention is paid to the expression of the nonlinear properties and influences related to triggering, development and consequences of the natural hazards to environment and society.

Several important issues are presented following the content of this book:

- Fractal properties of the seismotectonic models of the Mediterranean and the Balkan Peninsula and their relationship with the main geological and tectonic structures can help to better understand and develop seismogenic models and achieve better practical results in implementing such approach in seismic hazard mapping.
- It is suggested that primary and secondary damages follow a clear nonlinear pattern. This could be rather helpful when assessing and calculating these damages.
- The deterministic approach using nonlinear functions to investigate human groups behaviour in extreme situations can help a lot in the everyday

management practice of the administrations in case of natural hazards occurrence.

- The nonlinear elastic plate rebound in case of strong earthquakes is a rather new phenomenon established after the strong earthquakes in Sumatra (2004), Chile (2010) and Japan (2011) by the GPS measurements. It can provoke deeper geology and geophysics investigations to discover such effects during the past geological times, when geodynamics was much more active.
- The complex risk assessment in case of multihazard simultaneous action of several hazards (for example earthquakes, tsunamis and landslides) is a big challenge to risk management practice and was developed in some models related to the Black Sea coast.
- The concept of the destructive potential, limited space-time and temporal development of natural hazards could be helpful in damage assessment and the implementation of risk management preventive and protection measures.
- The modern development of early warning systems as a promising tool for human life safety and society sustainability is essential. In case of great natural disasters (such as earthquakes, tsunamis, volcanic eruptions, etc.) these systems can protect and save human lives and preserve the environment.
- The systematization and data base creation about different useful practices and measures against the negative impact of different natural hazards is the genuine way to mitigate their consequences. The cost-benefit analysis in every specific case can help decision makers a lot in the selection and implementation of the most effective measure in each individual case.

The book is a useful tool for urban planners and the Civil Protection authorities and could be of interest not only to scientists, researches, students, but also to the wide public.

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