

Editorial

Special Issue on Comprehensive Research in Earthquake Forecasting and Seismic Hazard Assessment

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Dear Colleagues,

Despite some success, the issue of earthquake forecasting has yet to be resolved. There are occasional discussions within the scientific community about the principal feasibility of earthquake forecasting, particularly in the short-term aspect. However, the bulk of these discussions were set in the Resolution of the General Assembly of the International Association of Seismology and Physics of the Earth's Interior (IASPEI) in 2009 in Cape Town: "Resolution 4: Earthquake Forecasting and Predictability Studies—IASPEI RECOGNIZING the opportunities provided by recent developments in earthquake science and technology RECOMMENDS that research on forecasting and predictability of earthquakes, and the validation and comparative testing of prediction methods be supported".

However, it is not sufficient to precisely predict a future strong earthquake. It is necessary to make a correct, scientifically based assessment of the level of seismic hazard and the intensity of seismic shocks to be expected in a particular region, city and settlement. What should the administration of a megapolis do when it receives information about the likelihood of a strong earthquake? The problems of earthquake forecasting and seismic hazard assessment are, therefore, closely related to the problems of high-quality anti-seismic constructions.

More than 13 years have passed since the adoption of the IASPEI Resolution. New earthquakes have occurred. Their study increased our knowledge regarding the physics of the seismic process, the physics of earthquake preparation processes and the search for earthquake precursors. The new data obtained became the basis for the development of new models of the behaviour of the ground under the influence of seismic waves and provided initial information for the development and parameterization of earthquake occurrence zone models and ground motion prediction equations.

More than one and a half years have passed since the announcement of the Special Issue "Comprehensive Research in Earthquake Forecasting and Seismic Hazard Assessment" in the MDPI Journal of *Applied Sciences*. We invited representatives of the seismological community to present their results on these topics, to show the current view of the state of the problem, what has been achieved in the field of earthquake forecasting and seismic hazard assessment, what needs to be done next and in which direction to move forward. We expected to discuss the results and directions of further research on the physics of the seismic process—from experiments under laboratory conditions to rock bursts in mines and earthquakes in seismically active regions at the stage of preparation for strong earthquakes.

As a result, 14 articles were published in the Special Issue, with authors representing different thematic areas and working in different institutions and organisations in Russia, Greece, Italy, Colombia, New Zealand, China, Argentina and Japan. The total number of authors was around 50. Thus, we managed to attract a sufficiently wide range of representatives of the scientific geophysical community to participate in this Special Issue. In this sense, our hopes and assumptions were fulfilled. In addition, this Special Issue is



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fully in line with Resolution 3 “Sharing Geophysical Data across Borders” adopted at the 28th IUGG General Assembly in Berlin on 18 July 2023.

All published articles can be roughly divided into three unequal groups in terms of the number of articles presented. The first group includes theoretical and methodological articles [1,2]. The second group includes articles confirming one or another model of seismicity behaviour in anticipation of a strong earthquake [3–5]. Finally, the third and most numerous group of articles consists of those analysing the results of long-term observations of the behaviour of various geophysical fields (seismic noise [6], seismicity [7–9], magnetotelluric field [10,11], deformation field [12], infrared radiation [13], vertical electric field in the atmosphere [14]) before strong earthquakes. We are confident that each of these articles will find an interested reader, and the whole collection will deserve the attention of representatives of the scientific community dealing with the problem of earthquake forecasting and the search for their precursors.

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