«Modern methods of seismic hazard assessment and earthquake prediction»

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Minimizing the consequences of natural and man-made catastrophic events is a most complex fundamental problem of great scientific, technical, social and economic importance. Its relevance is continuously increasing due to the rapid increase of the population density, the man-made load on natural complex, the development of environmentally hazardous industries (nuclear power plants, chemical industry, military complexes, etc.), as well as the expansion of mining, oil and gas production. According to the UN, seismic disasters account for about 51% of the total number of natural disasters. Earthquakes are extreme phenomena occurring in a complex system of the Earth's lithosphere. They are associated with the dynamics of lithospheric plates, the accumulation of tectonic stresses and their concentrated discharge. Strongest earthquakes occur rarely, but they determine most of the damage, causing serious economic and financial consequences, accompanied by loss of life.

Modern methods of seismic hazard assessment, although well developed, are not always able to sufficiently characterize a specific region on the subject of real danger of a possible strong earthquake. At the same time, the estimates obtained by classical seismic zoning methods happen to be underestimated in the case of all 88 earthquakes of magnitude 7.5 or greater that occurred worldwide from 1990 to 2011, including the 12 deadliest earthquakes in 2000-2011. Therefore, the improvement of existing and development of new methods for an adequate assessment of seismic hazard are relevant fundamental scientific problems aimed at solving the itchy problem of reducing losses associated with natural catastrophes.

In 30 years of existence the Institute of Earthquake Prediction Theory and Mathematical Geophysics of the Russian Academy of Sciences (IEPT RAS, former MITPAN), established in 1989 on the basis of the department of Computational Geophysics of the O.Yu. Schmidt Institute of Physics of the Earth of the USSR Academy of Sciences, has accumulated unique experience in research of regional tectonics, seismicity and earthquake foci, as well as in studies of critical (extreme) phenomena in Solid Earth including earthquake prediction. The Institute received widespread international recognition due to the studies on prediction of strong earthquakes, pattern recognition of the areas prone to strong earthquakes, modeling the dynamics of block-and-fault systems and creation of new methods for assessing seismic hazard and associated risks.

The Conference devoted to the problems of seismic hazard assessment, including earthquake prediction and related earth sciences is held in the format of two sessions:

Session 1 Seismic hazard assessment, modern earthquake prediction methods

The session is devoted to modern approaches to seismic hazard assessment, including (1) pattern recognition of the strong earthquake prone areas in a region, (2) earthquake prediction algorithms, (3) methods for assessing the reliability and authenticity of prediction results, (4) issues related to geodynamics and seismicity and (5) principles for developing new approaches for natural hazard reduction.

Session 2 Seismic data analysis aimed at determination of earthquake source parameters and the Earth structure to assess seismic hazard

The session is devoted to new methods of (1) analyzing databases of geophysical data and global positioning systems, including those of large volume (Big Data), (2) better determination of earthquake hypocenters and models of earthquake sources (3) algorithmic detecting seismic signals in a high-level background noise for early warning purposes; and (5) theoretical assessments of the quality of seismic monitoring algorithms.