



Geophysical and engineering-seismological research in Armenia main directions, achievements and prospects for development

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This thesis presents the main directions of scientific research (Geophysics, Engineering Geophysics, Environmental Geophysics, Earth's Magnetic Field, Seismology, Predicting Earthquakes, Engineering Seismology, Strong Ground Motion Database, Analysis & Modeling, Seismic Hazard & Risk Assessment, Earthquake Engineering & Structural Dynamics, Making & Manufacturing of Geophysical Instruments), performed by scientific departments (department of geophysics, department of seismology and earthquake prediction, department of engineering seismology and earthquake engineering, department of geophysical instrument engineering) of the Institute of Geophysics and Engineering Seismology after A. Nazarov NAS RA (IGES NAS RA). The main direction of scientific research in the department of geophysics is the construction of integrated geophysical model of the deep structure of the Earth's crust on the territory of the Republic of Armenia, the development of electrometric and nuclear geophysical study methods when exploring ore bodies on the flanks of metal deposits of the Republic of Armenia. Evaluation of the geoecological state by geophysical methods. Comprehensive studies of space-time variations of the Earth's magnetic field and related geological and geophysical phenomena. Scientific studies carried out in the department of seismology and earthquake prediction are aimed at studying seismicity and seismic regime, assessing the stress-strain state of the earth's crust in Armenia and adjacent territories, as well as studying foreshock and aftershock processes anticipating and accompanying strong earthquakes in the region. Scientific research carried out in the department of engineering seismology and earthquake engineering is the assessment of seismic hazard and risk on the territory of RA, improvement of methods for assessing quantitative parameters of seismic impacts. Improvement of the theory and methods of seismic resistance, considering the real effect of buildings and structures and the deformation features of the foundations. In the field of geophysical instrument engineering, a number of seismic sensors (accelerometer, velocimeter) and auxiliary equipment as recorders (loggers) have been designed at IGES NAS RA, providing wireless transmission of information to the data collection and processing center. On the basis of the developed equipment, instrumental observation systems (scientific networks) have been created in order to ensure the integrated safety of important objects. These systems can be converted to conduct seismic monitoring on seismic prognostic sites of large reservoirs, as well as important objects as nuclear power plants, bridges, overpasses, tunnels and technological pipelines of chemical and oil refineries. Also at IGES NAS RA we have developed a complex of seismo-hydro-geochemical equipment for aquatic ecosystem monitoring. Herein we will present the technical characteristics of the above mentioned equipment and the possibility of its mass application in foreign countries. In the future, together with the Geophysical Center of the Russian Academy of Sciences, it is planned to create a magnetometric observatory INTERMAGNET in order to geomonitor the territory of Northern Armenia in the observational experimental-methodical seismic-prognostic base Gyulagarak IGES NAS RA.