

Basic principles of seismic monitoring techniques for areas of NPP sites

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The basic principles of seismic monitoring techniques for the areas of NPP sites are formulated.

Despite the existing developments, it seems that monitoring methodologies must constantly evolve. The formation of observation systems, data processing and analysis should be sufficiently flexible and be directly dependent on modern concepts of the seismic process and earthquake mechanics.

The set up of seismic monitoring for important objects which are in conditions of low-level platform areas poses a number of problems. First of all, the traditional approaches for estimating the spatio-temporal patterns of the distribution of seismic events of different scale, a set of representative statistics and an assessment of the parameters of the magnitude-frequency relationship in such conditions practically do not work. In particular, due to significant difficulties in the registration and identification of weak events: a high level of microseismic noise, the presence of a huge number of seismic signals in the frequency range expected for weak events, including which cannot be determined.

Based on such assumption, seismic monitoring should be directed not just to the study of the controlled territory in common - as a rule, this is an area with a radius of several tens to several hundred kilometers (according to regulatory documents, seismic monitoring of NPP sites, for example, should monitor the territory with a radius of 300 km around the station site), - but mainly to the area of the most probable zones of seismic events, on fault zones.

Thus, the basis of the modern organization of seismic monitoring is the concept of the main role of geodynamic structures in the spatial distribution of seismic events. A formalized lineament analysis of the study area allows the construction of a structural model even in the absence of active faults.

The structural model in combination with the characteristics of weak seismic events and the parameters of their sources determines the concept of monitoring observations: the choice of the observation system, the characteristics and in-situ locations of the equipment.

Ultimately, the key point to set up the monitoring system is the choice of monitored parameters, based on both deterministic and probabilistic approaches to the analysis of the data obtained.

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