

STUDY OF SEISMICITY ON THE FORMER SEMIPALATINSK TEST SITE (STS) TERRITORY AND ENVIRONS

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The problem of seismicity on the territory of former STS has two main aspects. First, it is important to know if this region has a natural tectonic activity. Did any earthquakes occur here before nuclear tests? Second, it is necessary to investigate a problem of possible man-caused seismicity in this area that was caused by numerous nuclear tests conducted here. Does this region have geodynamic processes caused by explosions that could lead to activity of small earthquakes?

According to catalogue of Kazakhstan earthquakes, catalogue of large USSR earthquakes, map of general Kazakhstan seismic zoning the answer is negative. However, there were no special investigations on seismicity conducted by instrumental equipment for this region and for Eastern Kazakhstan as well (until nineties).

Studies on three directions were conducted to answer these questions: analysis of global seismic bulletins, catalogues and literary data on historical seismicity of STS area; analysis of instrumental data of NNC RK stations from 1994 (data of Data Center IGR NNC RK); field investigations by network of high sensitive seismic stations on the STS territory. Additionally, structure-tectonic conditions in STS area were studied in detail using published literary and basic map, using results of IGR NNC RK works (1998 – 2005). Satellite images of Landsat of 1990 and 2000 were interpreted to precise location of tectonic structures and it led to construction of rupturing structures scheme on STS and adjacent territories.

The results of works show that STS territory is under influence of main seismically active regional Chengiz rupture traversing the STS territory from southeast to northwest. Series of small and middle earthquakes in the vicinity of STS border were determined using historical and modern data. No earthquakes and shocks were registered on the sites of nuclear tests during field season. Focal mechanisms of earthquakes occurred at STS west border were constructed. A pattern of active tectonic stresses in this region was reshaped.

The results of works on study of seismicity are important for seismic hazard estimation on the STS territory. Consideration of really possible intensity of seismic effects is very important for former and newly constructed facilities of high responsibility.