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**DETERMINING THE SEISMIC SAFETY ZONE
FOR THE NAKHCHIVAN AUTONOMOUS REPUBLIC**

**ОПРЕДЕЛЕНИЕ ЗОНЫ СЕЙСМИЧЕСКОЙ
БЕЗОПАСНОСТИ НАХИЧЕВАНСКОЙ АВТОНОМНОЙ
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*In article the importance of determinig seismic safety zone of
Nakhchivan Autonomus Republic is motivated. Geographical
rectangle vertices has been identified. Formula for calculation of*

distance between two geographical points has been given. By means of this formula extended borders of Nakhchivan Autonomous Republic geographical rectangle the seismic safety zone has been determined.

В статье обосновано необходимость определение зоны сейсмической безопасности Нахичеванской Автономной республики. Определено координаты вершин Нахичеванской географической прямоугольника. Дано простая формула определение расстояние между двумя географических точек. С помощью этой формулы расширена границы Нахичеванской географической прямоугольника и определено зона сейсмической безопасности.

Keywords: NAKHCHIVAN GEOGRAPHICAL RECTANGLE, SEISMIC SAFETY ZONE, DISTANCE BETWEEN GEOGRAPHICAL POINTS.

Ключевые слова: НАХИЧЕВАНСКИЙ ГЕОГРАФИЧЕСКИЙ ПРЯМОУГОЛЬНИК, ЗОНА СЕЙСМИЧЕСКОЙ БЕЗОПАСНОСТИ, РАССТОЯНИЕ МЕЖДУ ГЕОГРАФИЧЕСКИХ ТОЧЕК.

1. **Introduction.** Nakhchivan Autonomus Republic is situated in South-West of Azerbaijan between $44^{\circ}45'57,75'' - 46^{\circ}08'34,19''$ longitudes and $38^{\circ}50'14,24'' - 39^{\circ}42'52,49''$ latitudes. Nakhchivan and whole Azerbaijan Republic together with neighborhood territories are seismic active zones. It was revealed by observations that the epicenters of earthquakes have been dispensated unequally whole territory of Azerbaijan [1]. Purpose of the article is determination of seismic safety zone of Nakhchivan Autonomous Republic. To determine the seismic safety zone of Nakhchivan Autonomous Republic the followings should be take into consideration:

Firstly - Earthquakes can cause destructions in much further territories from their epicenters. Van earthquakes in 23.10.2011 has been felt in Nakhchivan autonomus Republic territory [2].

Secondly - Seismoacoustic stations allows to implement monitoring of seismic processes in about 500-700 km radius [3].

If we rate the dimensions of the rectangle by degrees we obtain: ((38,8373°, 44,766°); (39,715;46,143)). Lets name this geographical rectangle Nakhchivan geographical rectangle. Here first point (vertice) is South-West point (vertice), second is North-East point (vertice).

Taking into account the above-mentioned seismic safety zone of the Autonomous Republic we can take 200 km wider than Nakhchivan geographical rectangle at first approach.

It is known that:

$d_n = 111134866$ m. a degree over meridian,

$d_e = 111319444$ m. a degree over degree over equator.

Distance between $Q_1(\varphi_1, \lambda_1)$ and $Q_2(\varphi_2, \lambda_2)$ can be calculated as:

$$d = \begin{cases} \Delta\lambda * \cos\varphi_1 d_e; \Delta\varphi = 0 \\ \sum_{i=1}^N \text{sqr}t\left(\left(\frac{\Delta\varphi d_n}{N}\right)^2 + \left(\frac{\Delta\lambda \cos\left(\varphi_1 + \frac{\Delta\varphi}{N} * i\right)}{N} d_e\right)^2\right); \Delta\lambda \neq 0, \Delta\varphi \neq 0 \\ \Delta\varphi * d_n; \Delta\lambda = 0 \end{cases}$$

Here $\Delta\varphi = \varphi_2 - \varphi_1$, $\Delta\lambda = \lambda_2 - \lambda_1$ and $N = \left[\frac{\Delta\varphi}{0,001}\right] + 1$.

Thereby, seismic safety zone of Nakhchivan republic can determine as following geographical rectangle:

((37,037682°, 42, 459459°); (41,514618°; 48,478617°)).

By changing the adopted (accepted) 200 km in order to widen borders of Nakhchivan geographical rectangle, the seismic safety zone can be determined in ather way.

References

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