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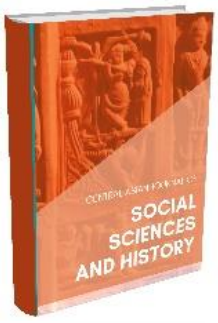

History of Earthquake Research

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Abstract:
The Earth did not freeze, the geological history of our planet shows that in many periods tectonic movements were much stronger. There were also more peaceful and calm times. During such periods, rocks were eroded and sediments were transported to deeper layers. After that, tectonic movements intensified and mountains appeared, volcanoes began to erupt, large cracks appeared in the earth's crust. In general, tectonic movements can last from a minute to several hundred thousand years. A lot of rocks moved along these cracks, which led to a significant change in the shape of the globe.

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These natural forces, which have influenced the entire geological history of the Earth, have now been joined by man. As people use nature for their needs, they continue to change the face of the earth. The creation of thermonuclear weapons, the discovery of new oil fields, the accumulation of large amounts of water in reservoirs become an overload for the earth. As a result, the force that has slowly accumulated in the bowels of the earth for centuries sometimes comes into motion suddenly, causing earthquakes.

One of the ways to reduce the damage that earthquakes can cause is to accurately investigate the occurrence of earthquakes in a timely manner and plan preventive measures based on it.

As a result of many years of research, scientists in this field have accumulated a lot of experience in studying large and small earthquakes and their causes. According to scientists, most of the forces that cause earthquakes are usually located at great depths, while the hypocenters (foci) of earthquakes can be close to the surface. The closer the hypocenter is to the ground, the stronger the earthquake will be,

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but it will occur over a smaller area. The deeper the hypocenter, the weaker the earthquake and the larger the area. At the epicenter, that is, the closer the hypocenter, the stronger the earthquake at its top. Typically, the surface is porous sedimentary rocks, while the interior consists of dense crystalline rocks formed under conditions of high pressure and temperature. Cracks appear where part of the crust within the crust is broken. Some large or small pieces (blocks) of the earth's crust move along these cracks, that is, they move. Such displacement of large debris may be the main cause of tectonic earthquakes. Such earthquakes are usually significant in their intensity. [*] For many years, such earthquakes have been studied day and night at thousands of seismic stations on all continents, and [†]the possibility of predicting earthquakes is being studied.

Another important problem facing the field of seismology is the issue of predicting the occurrence of earthquakes as a result of research. While there are different opinions on this matter. However, today we see that the probability of predicting earthquakes is increasing. [‡]Uzbek seismologists believe that seismic processes can be predicted. Earthquake prediction can be the basis for predicting their predators. [§]According to BN Strakhov, a scientist in this field, "An earthquake forecast is a stable structure of an unstable whole."[**]

In general, an important task facing the field of seismology is to determine where an earthquake may occur, but most importantly, to predict exactly where an earthquake will occur. Of course, this question is complex and complicated. However, over time, this issue will inevitably be resolved.

Uzbek seismologists have done a great job of predicting earthquakes. The creation of the Institute of Seismology of the Academy of Sciences of the Kyrgyz Republic set the task of studying earthquakes. At the same time, the issue of protecting buildings and structures from natural disasters had to be solved by studying the natural state of the institute by zoning the territories prone to earthquakes. To do this, it is necessary to know the causes of earthquakes, which have a long history, have affected human life for life and have become one of the main problems for them, and also determine where, when and with what force scientists began to cooperate. In order for seismologists to start such a big job, all conditions were created. In response, seismologists have been able to study the causes of earthquakes and predict the magnitude and location of possible earthquakes in the future.

Scientists were also able to prove that a significant increase in the chemical composition, temperature and pressure of surface water in the days before the earthquake was a sign of an earthquake. With this discovery, Uzbek seismologists made a significant contribution to world science.[††]

However, it is known from the history of earthquakes that many lives were saved due to the fact that

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[*]Yusupkhodzhaev X. When you look into the depths of the earth. T .: "Uzbekistan" 1978. Page 4
[†]Borisov O, Ishnazarov N. When he looked at the ground. T .: "Fan" 1977 Page 15
[‡]Mavlonov G, Sultankhojaev A, Ibroksimov R. Is it possible to predict earthquakes? T.:1979 _ Page 4
[§]Sherman S.I. Tectonophysical signs of the formation of strong earthquakes.sources in the seismic zones of Central Asia . Geodynamics and tectonophysics. Published by the Institute of the Earth's Crust of the Siberian Branch of the Russian Academy of Sciences. 2016 Volume 7 Issue 4Pages 495.
[**]Straksov VN Toward a new paradigm of seismology .//Nature. 1989. No. 12. p. 4-9.
[††]Mavlonov G, Sultankhojaev A, Ibroksimov R. Is it possible to predict earthquakes? T.: 1979 9-bet.

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these predators predicted an earthquake.[‡‡]

It should be noted that scientists have been studying more seismically active areas for years, but pay little attention to landslides, landslides and floods, which are minor factors leading to some disasters in these areas. To date, there are no reliable methods for accurately predicting earthquakes. But great progress has been made in determining the degree of seismic activity in a given area - strong or weak. This is also very important, because due to the seismic activity of the area, it was possible to take some measures to prevent natural disasters and ensure the durability of construction sites.[§§]

An integral part of the field of seismology is the early detection of these earthquakes, i.e., the prediction of the occurrence of earthquakes as a result of seismic studies. [***]In short, predicting a seismic process means estimating the timing, strength, and amount of damage they can cause. [†††]In this process, time plays an important role, that is, the period, in connection with which it is divided into long-term, medium-term and short-term forecasting. Forecasting long-term earthquakes includes a period from several months to several years. Medium-term earthquakes can last from several days to several weeks, while short-term earthquakes can last from several minutes to several hours.[‡‡‡]

In a seismic forecast, a scientific conclusion is made on the basis of the state (activation or vice versa) of seismic indicators identified as a result of seismic observations. However, despite the fact that a number of earthquakes have been recorded in the seismology of Uzbekistan, no special structure has been formed in this direction.

Since seismic forecasting has played an important role in reducing and preventing earthquake damage, research in the field of seismic forecasting in Uzbekistan began in 1968. Over the past years, Uzbekistan has carried out comprehensive scientific research in this area and has achieved great success in the history of world seismology. Hundreds of earthquakes have been predicted on various grounds.

Reliable tree dwellers are beginning to be identified to give early warning of earthquakes. [§§§]For example, the observations of seismologists in 1965-1970. revealed anomalous changes in some areas of the surface. This turned out to be the cause of the earthquakes.

Periodic theory also plays an important role in predicting seismic processes. In this regard, the Uzbek seismologists R.N. and provided information about it. According to him, this periodicity was 40 years, and recent calculations required a long-term forecast.

Therefore, in September 1973, on the basis of this information, at the urgent request of the director of the Institute of Seismology of the Academy of Sciences of the Republic of Uzbekistan G. Mavlonov, Andijan and the surrounding areas were included in the long-term pre-detection zone. By order of the Institute dated October 14, 1973, a department of the Andijan Scientific Complex was established in Andijan. The main objective of this section was a comprehensive study of the changes in seismic

[‡‡]Kurbonov B., Kurbonov A. Seismological indicators and earthquake forecast. // Protection +. 2020 No. 6. p. 12.
[§§]Can an earthquake be predicted? // Tashkent evening. 1989 No. 23 (6812)
[***]Tozhiev M. Nematov I. Ilkhomov M. Emergency situations and civil protection. T.: 2005 Page 19
[†††]Abdurashidov K. Earthquakes, buildings and people. T.: 1967 Page 8
[‡‡‡]Earthquake harbingers. // Protection +. 2007 No. 5. Pg. 9.
[§§§]Ibroksimov R. As a result of strong earthquakes. T.: 1982 Page 13

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processes taking place here.[****]

In 1970, thanks to the efforts of the secretary of the Andijan regional party committee B. R. Rakhimov , the deputy, deputy chairman of the State Scientific and Technical Committee of the former USSR A. N. Kirilin got acquainted with the work of the Andijan research complex.

When a deputy of the Supreme Soviet of the USSR A.N. Kirilin arrived in Andijan, G.Yu. Azizov, a responsible employee of the Andijan research complex, was invited to the building of the regional party. At the same time, the director of the Institute of Seismology G.O. Movlonov and officials. At the same time, an international symposium on seismic processes was held in Tashkent with the participation of 14 countries.

Having learned about the processes taking place in the Andijan seismic zone, A.N. Kirilin in 1975 provided the Andijan Research Complex with additional financial assistance to further expand its activities.

On the territory of the Andijan region, since 1976, continuous observations have been started in 5 directions: hydroseismological, geophysical, topogeodesic, astrogeodesic and deformometric.

The change in the geomagnetic field with the natural electromagnetic impulse of the earth became constantly monitored by the geophysical team. The group started monitoring the geomagnetic field on the Andijan-Madaniyat highway.[††††]

Members of the topographic and geodetic group go from South Opamilik in the direction of Uchkurgan-Osh.modern vertical movements began to be observed in the upper part of the earth along the micropolygon. These observations were made continuously every 3 months.

In 1977, horizontal measurements were carried out 4 times a year by the Astrogeodetic Group, and since the beginning of 1978 - 2 times a month. Deformometric group - Andijan and southern Olamushuk since 1976directionestablished continuous control over deformation processes on.

The groups analyzed the results of daily observations at the center in Andijan and summed up the results. These efforts have borne fruit.

One of the most urgent problems in the modern world is to reduce the harmful effects of earthquakes. This problem can be solved by studying the patterns of occurrence of earthquake precursors at geodynamic polygons. Using man-made objects as a natural model, it is possible to study the relationship between the process of earthquake preparation in the regions and the manifestation of their predators. Such studies can be seen at the Tokhtagul, Chirkey, Talbingo, Nurek, Azat reservoirs.[‡‡‡‡]

It should be noted that there were also scientists who did not believe in the detection and prediction of earthquakes. At the international symposium on the Tashkent earthquake in 1974, the great Siberian

[****]Problems and seismology of Uzbekistan // Scientific journal IS named after. G. Mavlonova T-I. T.: 20 10 _No. 7 .st .146-147.

[††††]Problems and seismology of Uzbekistan, Scientific journal IS named after. G. Mavlonova. T-I, T. : 2010 , No. 7 . st . 146-147.

[‡‡‡‡]Azimov A. Seismic safety of hydraulic structures. // Protection +. 2014 No. 11 (121) p. 5.

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scientist V. T. Soloninka denied the existence of such trees. However, Uzbek seismologists continued their work after the Tashkent test site and began work at the Kyzylkum test site in the Ferghana Valley and the central Kyzylkum. Scientific research was also launched to search for seismologists at these sites. The test site covered a large area with a radius of 70-100 km.[§§§§]

A number of causes of earthquakes have been proven - mineralization and saturation of groundwater with gases, changes in the electrical conductivity of rock layers, strong electromagnetic radiation, and others. An example of this is the 1978 Aloev earthquake in Kyrgyzstan, 120 km from Andijan. At this time, the composition and magnetic field of groundwater changed. The earthquake was reported to the administration 6 hours ago. The administration of the Andijan region was waiting for the earthquake until midnight that day. They went back to their homes after the earthquake. However, at 01:50 a magnitude 6 jolt occurred.[*****]

In the 1960s, the theory of the method of the time course of seismic movements was put forward by the director of the Institute of Volcanology of the Academy of Sciences of the Russian Federation, S.A. Fedotov, during the early detection of earthquakes. Accordingly, it was assumed that earthquakes could recur at certain intervals. Even today, this method is used to predict up to 70-80 percent of earthquakes.

There are also hydrogeological reports of earthquakes in which the water level in wells drops and then rises sharply, with changes in water temperature, and an increase in radon, carbon dioxide, and mercury vapor in the water. This method was proven by the example of the Tashkent earthquake in 1966. Several earthquakes could be predicted using this method.

The scientific results of seismologists of Uzbekistan on the early detection of such earthquakes were experimentally verified by Moscow scientists in the laboratory and fully confirmed their reliability. This law was confirmed by earthquakes in Dagestan in 1968 and Isfara-Batken in 1977.

Also, the magnitude of the development of hydroseismology was 7 or more: Khachenskoe 1975, Gazlinskoe 1976, Aloyskoe 1978, Chust-Popskoe 1964, Kamashinsky earthquakes 1999-2000.[†††††]

It can be said that in recent years, Uzbek scientists have achieved great success in predicting earthquakes. This plays a key role in ensuring the safe living of the population while preventing many possible losses in the country's economy. In particular, the adoption of a new version of the Decree and the Decree of the Cabinet of Ministers dated August 24, 2011 No. 242 led to a further expansion of issues of early warning of emergencies. In particular, significant results are achieved, such as the detection of high-precision data before the occurrence of large earthquakes. Such large-scale actions will make it possible to fulfill a very important task, such as ensuring the seismic safety of the regions and the population of the republic by predicting the occurrence of earthquakes.

[§§§§]UzR FVV. seismic processes. T.: 2007. Page 48.

[*****]FMI RUz., “Prospects and fundamentals for the development of earthquake monitoring” Materials of the scientific and practical seminar. T.: 2018 Page 56

[†††††]Gobilov H. Creating an Android application: initial concepts harden in an earthquake // Zashchita+. 2020 No. 6 (186) p. 7.

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