Science News

Forecast of seismic activity till 2026

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Source: *Global Network for the Forecasting of Earthquakes*

Summary:

Prof. Elchin Khalilov is President of the Global Network for the Forecasting of Earthquakes GNFE (UK) and Chairman of GEOCHANGE International Committee (Germany), gave the forecast of seismic activity of the world till 2026 on behalf of the above-mentioned organizations.

Mr.Khalilov, what awaits us next year and subsequent years, in respect to the possibility of strong earthquakes?

First of all, I would like to give a brief analysis of what happened in the previous period, and then go on to forecast the future. The medium-term forecast of seismic activity of the world is given for the first time after forecasts presented in the first report of the International Committee on Global Changes of the Geological Environment GEOCHANGE. The report had a great public resonance in the world. I remind that it was sent to the UN Secretary General, to the European Commission, the Organization of Islamic Cooperation, UNESCO and other authoritative international organizations, as well as to all heads of states. A comprehensive and detailed analysis of global changes in geological environment for the last 120 years for the first time was submitted for public judgment in the 200 - pages report. (http://seismonet.com/media_files/1/Geochange%20Journal-V1-English%20version.pdf)

What was said in GEOCHANGE report?

It has been shown that since 1998 the overall trend of gradually increase of activity of all natural disasters dramatically changed its character and became to grow exponentially. This process was accompanied by the release of giant endogenous energy of the Earth and serious changes in the outer space surrounding our planet. In particular, it concerns the magnetosphere – the Earth's magnetic shell, which protects the surface and the atmosphere from the impact of flows of cosmic particles of high-energy and cosmic wave radiation.

So, the north magnetic pole of the Earth, which earlier had been oscillated at a speed of 10 km per year, began to move in the direction of Western Siberia with great speed, sometimes reaching 70-80 km per year. Moreover, ATROPATENA complex geophysical stations, located in Indonesia, Pakistan, Azerbaijan, Ukraine and Turkey have registered the most powerful anomalies of gravitational field at the Earth's core level, which may indicate the release of a huge energy in the core, which has become the main reason for the sharp increase of seismic and volcanic activity of the Earth, the numbers of large tsunamis, tornadoes, storms and hurricanes, huge holes in the upper layers of the Earth, floods, landslides and other natural disasters and natural phenomena.

Unusual low-frequency sounds that came from the upper layers of atmosphere were recorded all over the planet. The results of researches of GNFE with the help of special infrasound recorders showed that these sounds can be a result of exposure to the ionosphere the acoustic-gravitational waves appearing under the

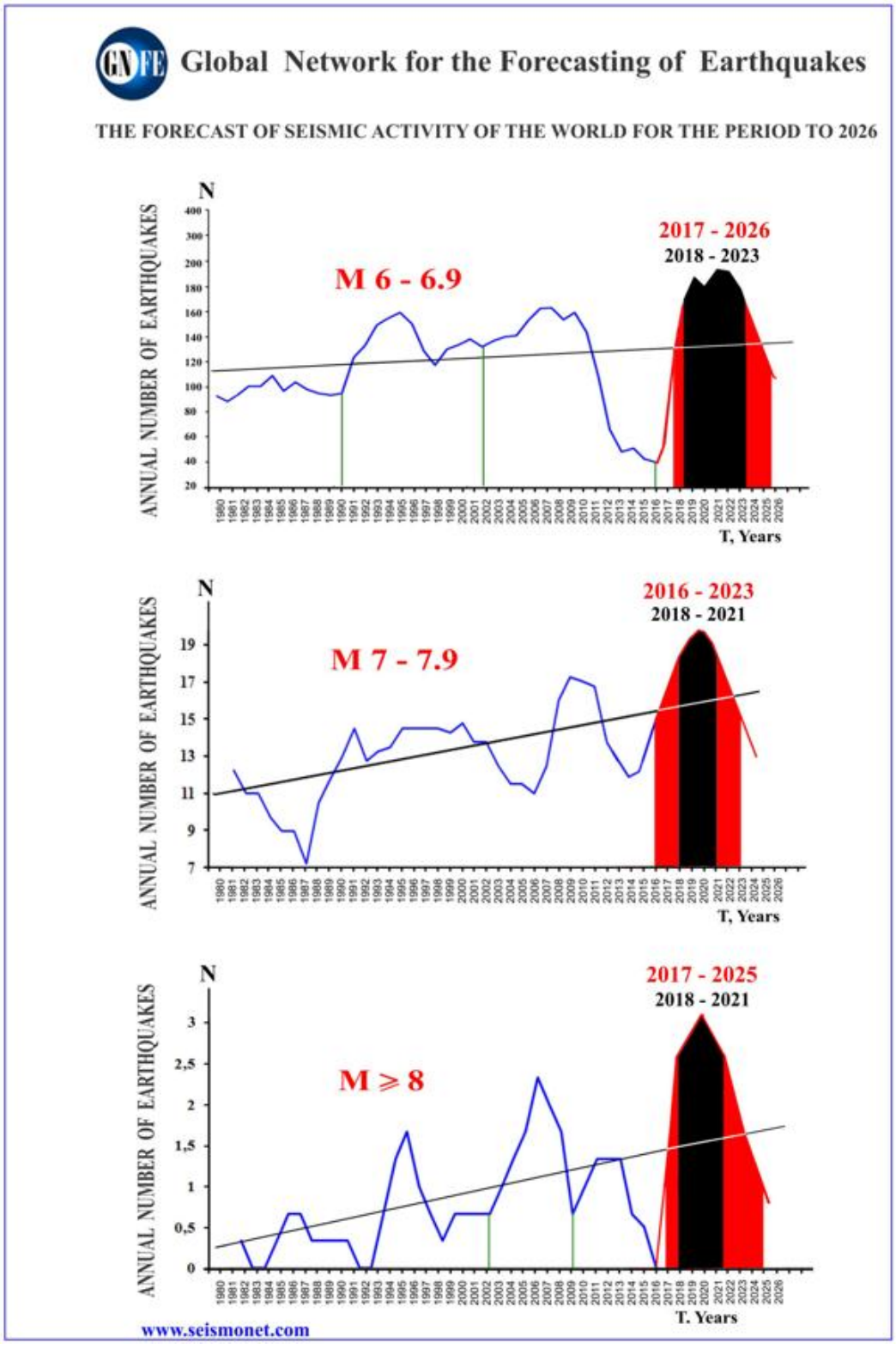
influence of powerful solar bursts and the further solar wind, as well as before and after strong earthquakes and volcanic eruptions.

What is the reason of such a "non-standard" behavior of our planet?

In the period from 1998 to 2012 inclusive we saw the peak values of the majority of natural disasters, then the general geodynamic, atmospheric and solar activity began to decline, as it was expected according to the theory of global cyclical natural processes. In fact, this behavior of the planet can be called standard. People quickly forget about different natural disasters and switch to the daily problems and remember them when they show themselves again. By the way, the fact that all natural processes, in particular, geodynamic ones are connected to each other and different cosmic factors greatly influence on them: solar activity, the location of the planets of the solar system, the Earth's position in orbit, the position of the solar system in the Galactic orbit, etc. was investigated in detail and described in the fundamental monograph – V.E.Khain, E.N.Khalilov "Cyclical geodynamic processes: its possible nature (Moscow State University named after Lomonosov, Moscow, 2008), which can be downloaded for free from the website:

http://seismonet.com/media_files/1/Khain,%20Khalilov.pdf

Thus, as it is seen in the graphs, now the seismic activity of the Earth is experiencing a deep minimum, which is expressed in a sharp decline of the number of strong earthquakes. Such a deep minimum and the relatively long period of seismic quiescence is evidence of accumulation of giant tectonic energy in the bowels of the Earth, which will soon break out on the surface. Using mathematical device to identify the hidden periodicities, including by spectral analysis and other methods - the trend analysis, the theory of resonance, we have attempted to give the next medium-term forecast of seismic activity of the Earth until 2026.

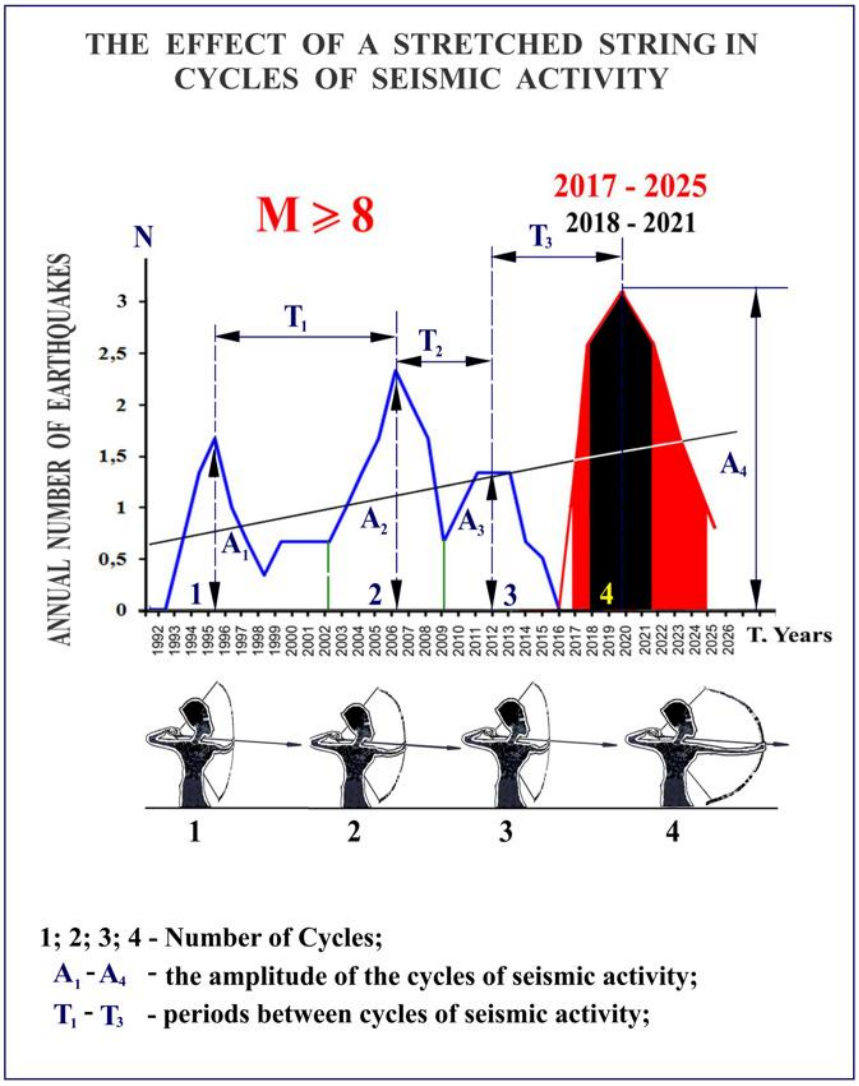


As it is seen in the forward graphs of seismic activity of the Earth, the next peak of seismic activity for the earthquakes with the magnitude M from 6.0 to 6.9 comes for the years of 2017 - 2026 with maximum value in the years of 2018 - 2023. For earthquakes with M from 7.0 to 7.9 the higher values of seismic activity will be observed in the years of 2016 - 2023 with maximum value in the years of 2018 - 2021. For catastrophic earthquakes with $M \geq 8$ the high level is expected in the years of 2017 - 2025 with maximum values in the years of 2018 – 2021.

THE EFFECT OF THE STRETCHED STRING

How is medium and long term forecast of seismic activity is done by studying cyclicity?
There is a complicated mathematical device, on which research data is based. First of all, the methods of analysis used in mathematical statistics, in particular, the identification of latent periodicity by linear transformations, trend analysis, spectral analysis and etc. We have developed special methods for the analysis of cyclical seismic and volcanic activity and subsequent prognosis.

These methods are described in the fundamental monograph (Khain V.E, Khalilov E.N. Cyclicity of geodynamic processes: its possible nature. Moscow State University. Lomonosov. Moscow, Science World, 2009, 520 pp.). I would like to present in more popular form the basic principles that we took as a basis for medium-term and long-term forecast of seismic activity cycles. First of all, an understanding of the principle of conservation of energy.



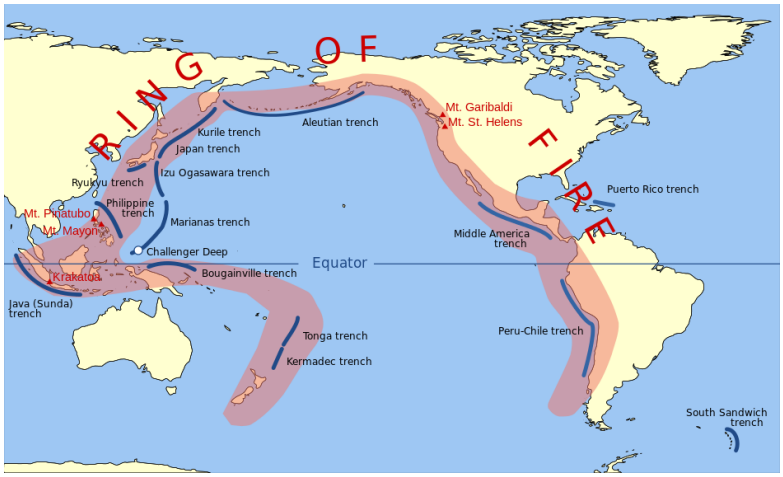
Cyclicity of any process - is uneven redistribution of energy in the form of periodic pulses (cycles). Meanwhile, the overall average flow of the released energy remains unchanged. That is, if we observe a very intense pulse of released seismic energy with a large amplitude and the period so after it usually follows a deep minimum of energy. This pattern is observed throughout the geological history of the Earth. At the same time, the deeper minimum of seismic activity is and the longer period of lull of seismic activity, the higher the amplitude of the next cycle of seismic activity.

For an analogy, we can compare this process with a stretched string. The more archer nock, the more time and energy spent on its tension. Naturally, the more kinetic energy is released when you release the bowstring and the farther the arrow flies. Roughly the same thing happens and the process of accumulation and discharge of seismic energy.

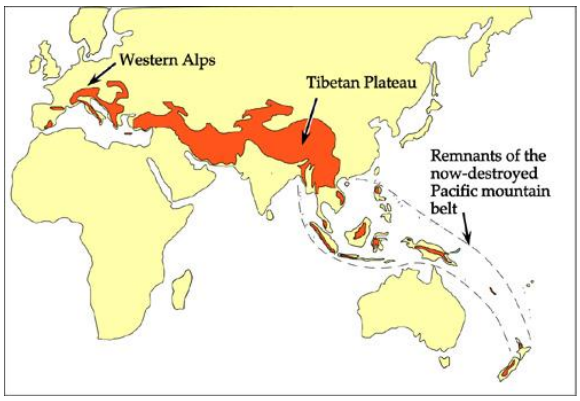
This analogy is demonstrated on a specific example, Graphics of medium-term forecast of seismic activity for the earthquakes with M ≥ 8. The figure shows that the latest projected fourth cycle of seismic activity is preceded by a very deep low seismic activity, falling in 2014-2015, and a long period of seismic quiescence.

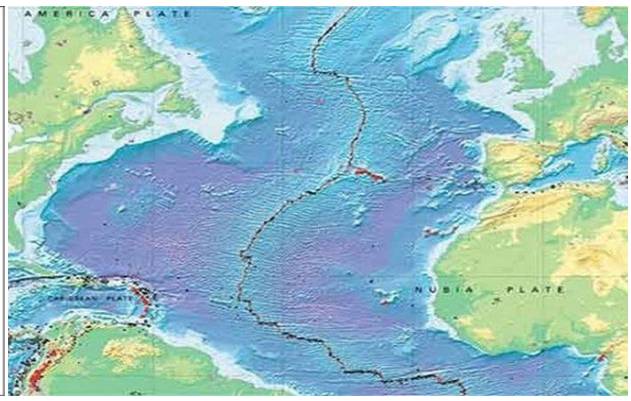
Based on these principles issued a forecast of the expected very intense seismic activity cycle with a large amplitude and the maximum probability of catastrophic earthquakes during the 2017 - 2025 period.

With regard to areas where are strong and catastrophic earthquakes expected, they are well known to seismologists. In the first place according to the degree and magnitude of seismic risk is the so-called "Pacific Ring of Fire". Below is a map of the territory of the "Pacific Ring of Fire". In the Pacific ring of fire
there have been about 90% of the world's earthquakes and 80% of the most powerful of them.



The second power seismic zone (5-6% of earthquakes and 17% of the most powerful earthquakes of the world) - it is the Alpine-Himalayan fold belt A, which starts at about Java and Sumatra, goes across the Himalayas and the Mediterranean to the Atlantic Ocean.





A third of the energy released by the earthquake zone - is the Mid-Atlantic Ridge.

Concerning other types of natural disasters - volcanic eruptions, tsunamis, etc. the data will be presented later.

Thank you for the actual interview

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