SSRG International Journal of Geo-informatics and Geological Science
ISSN: 2393–9206 / https://doi.org/10.14445/23939206/IJGGS-V12I3P102

Volume 12 Issue 3, 14-22, Sep-Dec 2025

Research Article

Forecasting Earthquakes and Volcanic Eruptions

Vitaly A. Prisyazhniuk

Former Head of Laboratory, Research and Design Institute for Basic Chemistry, NIOCHIM, Kharkiv, Ukraine.
Former Head of Laboratory, A. Podgorny Institute of Mechanical Engineering Problems of the National Academy of Sciences of Ukraine, Kharkiv, Ukraine.

Corresponding Author : vitalpris@yahoo.com

Received: 15 October 2025 Revised: 23 November 2025 Accepted: 09 December 2025 Published: 27 December 2025

Abstract *- In the USSR, from 1970 to 1992, they tried to create a geological map of the country's territory. For this purpose, 30 wells were drilled throughout the country, the deepest reaching a depth of 12,262 m. Geologists and geophysicists working at the Kola Superdeep recalled in 2024 that they encountered facts that contradicted what they were taught at universities. Some of their practical observations are quite explainable from the point of view of known laws of physical chemistry. The molecular weight of oxygen is only 1.14 times lower than that of nitrogen, but this is enough to cause oxygen starvation at an altitude of 2000 m above sea level because oxygen is more strongly attracted to the Earth. The molecular weight of uranium oxides exceeds that of silicon oxides by 3-5 times. It is natural to assume that there is gravity in the Earth's crust, which enriches the Earth's core with radioactive elements. The presence of water at any depth in the Earth's crust explains why volcanic eruptions and earthquakes occur. When the aggregate state of water changes from liquid to gaseous, its volume increases 1200 times. In a closed space, this leads to a proportional increase in pressure. All thermal power plants in the world operate using this property of water. The role of water in volcanic eruptions and earthquakes explains why volcanoes are most often located in areas washed by the world's oceans: Kamchatka, Iceland, Indonesia, Japan, and so on. The article provides a table that convincingly proves the existence of a correlation between geomagnetic storms and seismic activity. The electromagnetic radiation of the Sun interacts with the Earth's magnetic field, causing geomagnetic storms. The radio frequency range of the Sun's radiation penetrates the Earth's crust, providing energy for volcanoes and earthquakes. The article provides a table of data that illustrates this statement beautifully. Since each chemical substance has individual absorption/emission spectra, the geological composition of the Earth's crust determines the location of a particular volcanic eruption or earthquake. The article discusses ways of constructing an experimental-statistical model of seismic disturbances, which can be used as a basis for predicting volcanic eruptions and earthquakes. This article establishes for the first time a direct link between geomagnetic storms and Earth's crust activity.*

Keywords *- Volcanic eruptions, Earthquakes, Geomagnetic storms, Seismic activity, Spectral density, Radio frequency radiation.*

1. Introduction: A Little About The Little-Known

At the end of 2024, I was lucky enough to see the 2012 documentary film by director Vladimir Batrakov, "Kola Superdeep. Road to Hell" [1]. The film is shot in the "reportage" genre and tells the story and goals of drilling a superdeep borehole on the Kola Peninsula and another 29 boreholes throughout the USSR. The Kola Superdeep Borehole has reached a depth of 12,262 meters. This record remains unbroken to this day. Drilling began in 1970, and until the mid-80s, the work was completely secret.

In 1992, drilling was stopped due to a lack of funding. The well was never completed to the planned depth of 15,000 meters. But even at the depth achieved, unique scientific data were obtained. The official stated purpose of drilling 30 boreholes was to construct a geological map of the USSR. The mineral resources at the surface are already being exhausted, and no one knows what is at great depths. The scientific goal was to study rocks formed 2-4 billion years ago and to predict earthquakes.

From each meter of the borehole depth, a core was taken, sawed into pieces, and sent for research to different laboratories in the country. Core samples are still stored in the city of Yaroslavl. In Apatity-city, at the Geological Institute of the USSR Academy of Sciences, physicists are still studying core samples.

In the film, Yevgeny Kozlovsky, the USSR Minister of Geology from 1975 to 1989, says that the project's goal was to construct a geophysical profile 3,000 to 5,000 kilometers long, along which various instruments and magnetometers were installed. A large number of different parameters were measured: from humidity, temperature, to magnetic fields. Seismic vibrations were created by a series of underground atomic explosions. In fact, an echo sounder was created on a national scale. This is how they built a deep geological map of the USSR territory up to 150 km deep. They found out where and at what depth oil, nickel, gold, and other minerals are located.

In 1984, the project was declassified, and scientists from different countries were given access to the information. The research results were presented in a large number of published scientific articles and were reported at international scientific conferences. A boom in superdeep drilling began in the USA and Sweden. Gradually, the wave of interest in constructing a deep geological map of the Earth's crust disappeared due to the high cost of research.

Geologists and geophysicists who worked at the Kola Superdeep note:

1. All existing knowledge is wrong, we know absolutely nothing.
2. Radioactivity and temperature increase with depth. At a depth of 200 m, the temperature reaches 200°C.
3. There are no basalts at a depth of 7000 m. The composition of the rocks is the same at all depths.
4. There are areas where the pressure is less than near the surface.
5. Water is present at all depths.
6. Turned to stone, living organisms are found at great depths.

The above opinions of specialists in the field of geology and geophysics seem strange, since the listed "surprises" are quite expected and are explained by the laws of physics. For example, observation 2. Radioactivity increases with depth. Newton's classical theory of gravitation (Newton's law of universal gravitation) is a law that describes gravitational interaction within the framework of classical mechanics. This law was discovered by Newton around 1666 and published in 1687 in Newton's Principia. This law works even at the molecular level. For example, the amount of nitrogen in atmospheric air is 75.47mass.%. Its molecular weight is 28.014. The oxygen content in atmospheric air is 23.20mass.%. Its molecular weight is 31.998. That is, an oxygen molecule is heavier than a nitrogen molecule by 31.998/28.014 = 1.142 times. However, from about 2000 m above sea level, altitude sickness (altitude hypoxia) is observed, associated with a decrease in the partial pressure of oxygen in the air, that is, a decrease in its concentration: content in a unit of air volume. Incredibly, but true: the molecular mass of oxygen is only 14% lower, but this is enough for oxygen to be more strongly gravitated to the surface of the Earth.

The molecular mass of silicon is 28.086. The molecular mass of uranium is 238.03. Uranium is heavier than silicon by 238.03/28.086 = 8.475 times. But we still doubt that the mass of silicon compounds is lower than that of uranium compounds. Let us compare the masses of silicon and uranium oxide molecules. The molecular mass of silicon oxide is 60.08. But silicon oxide exists in several crystallographic modifications: quartz, cristobalite, lechatelierite, opal, tridymite, with different densities (specific gravity). Let us focus on silicon oxide with the highest density, that is, quartz. Its density is 2.65 kg/m3. The molecular weight of uranium oxide is 254.03. This is a completely different problem. Uranium is oxidized to oxide, dioxide, trioxide. The molecular weight of uranium trioxide is 286.03. In the solid phase, the trioxide with a trigonal crystal form has the lowest density. Its density is 8.34 kg/m3. In the melt, the uranium trioxide molecule is heavier than silicon oxide by 286.03/60.08 = 4.76 times. In the solid phase, the density of the uranium trioxide crystal is higher than the density of quartz by 8.34/2.65 = 3.15 times. Thus, both the uranium molecule and the molecules of its compounds are heavier than other chemical compounds and therefore will always have a tendency to be directed at the center of the Earth under the action of gravity. This is why the Earth's core contains uranium and transuranic elements, which explains the increase in radioactivity as you approach the center of the Earth. Similarly, the other "ambiguity" from the above list also ceases to be such if we proceed from other a priori information to explain them.

It is strange that a browsing of leading geology and seismography journals over the past 15 years (2009 to 2014) did not allow me to find the slightest mention of the Kola Superdeep project. However, it was possible to find information about the generation of the Krafla Magma test bed in Iceland with the aim of using the energy (temperature) of magma beneath the Earth's surface to produce geothermal fluid with a higher temperature [2].

In 2009, researchers in Iceland drilled straight into the ground atop a known volcano. The original plan was to drill to a depth of 4.5 km (about 2.8 miles) to just above a known magma chamber. However, as you might imagine, when it comes to messing with magma, things did not go entirely to plan. At a depth of just 2 km (about 1.2 miles), the equipment penetrated an unknown upper part of the chamber where the scalding hot magma plugged up the hole, damaged the drill, and released a stream of noxious gas into the air. A similar project was undertaken in 2014 with the same results. The drill hit an unexpected magma chamber, and the equipment was destroyed by acidic gases. Thus, it appears that melt (minerals in a liquid state) constantly exists not only in the Earth's core, but also in the Earth's crust at shallow depths.

All of the above raises more questions than it answers. As a specialist in physical chemistry, brought up in university on thermodynamics, I was surprised to discover that geologists and geophysicists never ask the question: where does the energy of volcanoes and earthquakes come from? The First Law of Thermodynamics – the Law of Conservation of Energy – states in Helmholtz's formulation: energy neither appears nor disappears, but only changes from one form to another. This means that the energy of the Sun, entering the ecological system of planet Earth over a period of billions of years, is constantly accumulating. The consequence of this is global warming and an increase in the frequency of earthquakes and volcanic eruptions.

In a previously published article [3], the author drew readers' attention to the fact that the Sun, as the main supplier of energy to planet Earth, also emits in the radio frequency range. It is radio frequency radiation that initiates geomagnetic storms when interacting with the Earth's magnetic field. The publication [4] presents Table 1 of magnetic storm forecasts and observed facts of volcanic eruptions and earthquakes. With great satisfaction, I received a letter on 12.06.2025 that confirmed the correctness of my observations. *Dear Vitaly, In the aftermath of events like the devastating earthquake that struck Myanmar and Thailand on Friday, and as the role of U.S. federal agencies in supporting earthquake resilience becomes more uncertain, we need your expertise now more than ever. EERI (Earthquake Engineering Research Institute).*

Since there is a clear correlation between magnetic storms and seismic disturbances, I would like to propose for discussion a hypothesis that can explain the role of radio-frequency radiation from the Sun. The hypothesis can be used to develop a method for predicting the date and location of probable seismic disturbances, as well as methods for reducing and perhaps even preventing the negative consequences of seismic disturbances.

2. How is the Action of Radio Frequency Solar Radiation Detected

From the point of view of thermodynamics, planet Earth is an open system, which means that the Earth exchanges energy with the Cosmos. But first of all, with the Sun, since it is part of the Solar System. The Sun is the main supplier of energy to planet Earth. The Sun emits electromagnetic waves in an extremely wide range of frequencies (see reference books and Encyclopedias, article Solar radiation) [5] The ultraviolet, optical, and infrared ranges of radiation are widely known, but their effects are limited to the surface of the Earth. The radio frequency range of solar radiation is limited to $2*10^9$-$3*10^{10}$ Hz, but it runs through the entire planet and essentially energetically provides the seismic activity of the Earth's crust.

There are two known methods for converting the energy of electromagnetic waves into thermal energy: absorption and emission spectra, and induction heating by eddy currents [3].

All chemical substances and compounds are characterized by individual emission (emission) and absorption (absorption) spectra. It is by these that chemical substances are identified. (See reference books on spectroscopy).

Induction heating is a method of non-contact heating of electrically conductive materials with high-frequency currents. Radio astronomers use the spectral radiation flux density, which is measured in W/(m^2*Hz), to estimate the amount of energy entering the Earth in the form of radio frequency radiation. The Sun has been supplying energy in the form of radiation for billions of years around the clock. The Sun lives its own life, which is why the energy flow in different frequency ranges is not stable. When flares occur on the Sun, a sharp surge in the spectral flux density of radiation is observed at certain frequencies. The Earth's magnetic field reacts to solar flares with geomagnetic storms. Let us observe the results of this directly on planet Earth.

2.1. Geothermal Fluids

Sources of geothermal fluids are widely known in different places on the planet and at different latitudes. Today, many kitchens use microwave ovens, which are capable of heating water and water-containing food using radio frequency radiation [3]. The emitter of the kitchen microwave oven is set to a frequency of $2.45*10^9$ Hz. This is the frequency of natural oscillations of water molecules (absorption spectrum). The water molecule, having received an additional impulse of energy from the emitter, rises to a higher energy level. But, since this level is unstable for it under the given thermodynamic conditions (temperature, pressure, concentration of chemical agents), the water molecule returns to its previous energy level, emitting "extra energy", but at a different frequency (emission spectra). This frequency lies in the infrared region, that is, the region of thermal radiation. Thus, every molecule of water in a microwave oven becomes a heater.
It is appropriate to measure the spectral flux density of radiation during magnetic storms directly at sources of geothermal fluids in different places around the world. At the same time, it is necessary to measure the temperature of the geothermal fluid. This will allow: 1. Test the proposed hypothesis. 2. Establish a quantitative relationship between the temperature of the geothermal fluid and the spectral flux density of a specific frequency. In fact, calibrate the strength of a specific magnetic storm for aqueous solutions.

2.2. Temperature in Mines and Shafts

The temperature of halite and sylvinite mines is characterized by high stability (±1 degree). Crystals of sodium chloride and potassium chloride are dielectrics, that is, they are not electrically conductive. Therefore, induction heating of such deposits with radio frequency radiation is impossible. But the crystals may have a heterogeneous color. There are red, pink, blue, and orange crystals. This is explained by the fact that during the crystallization of salts, impurities were admixed with them. Subsequently, the different colors of the colorless sodium chloride crystal, for example, are caused by the ionization of impurities. But where can ionizing radiation come from in a mine at a depth of 300 - 400 meters? Answer: radiofrequency radiation from the Sun, penetrating the thickness of the Earth's crust, ionizes impurities included in the colorless crystal [6].

2.3. Coal is Electrically Conductive

On average, in coal-bearing deposits, the temperature of the rocks increases by 1 degree for every 30-35 m of mine depth [7].

The air temperature in a coal mine depends on the concentration of non-conductive rock, that is, on the amount per unit volume, the electrical conductivity of coal, as well as on the heat released during the oxidation of coal, on the temperature, humidity, and volume of incoming outside air, and on the water abundance of the mine. It is advisable to measure the spectral density of radiation flux during magnetic storms and the temperature gradient along the depth of the mine. This will allow: 1. Test the proposed hypothesis. 2. Establish a quantitative relationship between the temperature in a coal mine and the spectral density of a specific frequency. In fact, calibrate the strength of a specific magnetic storm for a given deposit.

The permanently active Iwojima volcano, located in the southernmost part of the Izu-Ogasawara arc, is characterized by surface thermal manifestations. Small phreatic explosions (water entering magma) have been frequently recorded over the past 100 years, most recently in 1999 and 2001 [8]. Judging by the fact that the total CO_2 emission from the Iwojima volcano is estimated at 760 tons/day, the volcano is located on coking coal deposits. The soil temperature at a depth of 30 cm was 60°C. The coking temperature of anthracite is about 900°C. At a temperature of 350°C, hydrocarbons volatilize. Gas chromatography of escaping gases would make it possible to determine the nature of the ancient vegetation of the area.

I can assume that the heating of the depths of the Iwojima volcano is continuously carried out by radio frequency radiation from the Sun. It is advisable to measure the spectral density of radiation flux during magnetic storms and the soil temperature at a depth of 30 cm. This will allow: 1. Test the proposed hypothesis. 2. Establish a quantitative relationship between temperature and the spectral density of a specific frequency. In fact, to calibrate the strength of a specific magnetic storm in relation to a given deposit of coking coal.

2.4. Iron is Electrically Conductive

In Sweden, not far from Mount Kirunovara, the world's largest iron ore deposit is exploited [9]. The iron content in the ore reaches 70%. It is advisable to measure the spectral flux density of radiation during magnetic storms and the temperature inside an iron ore mine. This will allow: 1. Test the proposed hypothesis. 2. Establish a quantitative relationship between the temperature in an iron ore mine and the spectral density of a specific frequency. In fact, calibrate the strength of a specific magnetic storm based on iron ore deposits.

2.5. Gold is Electrically Conductive

The deepest operating gold mine is Mponeng in South Africa. Its shaft extends to a depth of approximately 4 km, where the temperature reaches 60-65 degrees Celsius with high humidity. At the same time, groundwater at the same or shallower depths remains cold [10]. As mentioned in section 1.3, the temperature in coal mines increases by 1 degree Celsius for every 30-35 meters of depth. If we assume the same pattern holds for gold mines, then with a surface temperature of 250°C, the temperature at a depth of 4,000 meters should reach 158°C. A number of caveats must be made here. Gold's electrical conductivity is higher than that of coal, which should increase the temperature. Gold does not lie in a continuous mass like coal. This should reduce the temperature inversely proportional to the percentage of gold in the formation. But the author of the cited article is most perplexed by the fact that the groundwater temperature is lower than the observed temperature in the mine. The keyword here is "humidity" of the air in the mine. Judging by the photograph in the article, groundwater does not flow down the adit walls, and the workers are wearing regular boots.

This means groundwater does not flood the adit, and any seepage through the pores of rocks or cracks has time to evaporate. This means we are experiencing evaporative cooling of the adit air. Let us turn to the reference book "Properties of Water and Water Vapor". The specific heat capacity of water at 60°C is 4.176 kJ/(kg*K). The specific heat of vaporization is 2358 kJ/kg.

This means that when gold is cooled by a stream of water, 1 kg of liquid water will transfer 4.176 kJ of thermal energy for every degree of temperature decrease. When water evaporates, 1 kg of liquid water will transfer 2,358 kJ of heat into vapor. That is 565 times more. This is why the World Ocean protects planet Earth from catastrophic overheating. This is why the temperature in a gold mine at a depth of 4,000 m is only 60-65°C, yet the air humidity is high.

3. Geomagnetic Storms and Seismic Activity

A geomagnetic storm is a disturbance in the geomagnetic field of planet Earth lasting from several hours to several days [11]. The Sun is not a stable source of energy, and geomagnetic storms of varying levels of energy intensity are observed constantly. It is natural to assume that bursts of solar energy activity can manifest themselves in seismic activity in the Earth's crust.

Researchers of the Sun and solar activity have learned to predict geomagnetic storms, as well as their intensity, up to a month ahead. These forecasts from various scientific centers: The National Aeronautics and Space Administration [12], the Institute of Geomagnetism, Ionosphere and Radio Wave Propagation of the Russian Academy of Sciences (RAS), Moscow; Institute of Solar-Terrestrial Physics of the Siberian Branch of RAS, Irkutsk; Pushkov Institute of Terrestrial Magnetism, Ionosphere and Radiowave Propagation of the Russian Academy of Sciences (IZMIRAN) [13]; Department of Geophysics of Kyiv University, are regularly published in the media, for example on YouTube. Information about volcanic eruptions and earthquakes that have occurred is also published there.

Table 1, previously published in the article [4] and additions in some years, contains forecasts of geomagnetic storms for 2023 and 2025 and media reports about volcanic eruptions and earthquakes. Column 1 presents forecasts from various research institutions about expected geomagnetic storms. Column 2 presents media information about actual observed volcanic eruptions and earthquakes.

Table 1. Geomagnetic storms - volcano eruptions, earthquakes

Forecasts Geomagnetic Storms	Volcanic Eruptions and Earthquakes
1	**2**
20.11.22	20.11.22 Kamchatka. Eruption of two volcanoes. 21.11.22 Indonesia. Volcano eruption 22.11.22 South America. Volcanic eruption
5.02.23	5.02.23 Türkiye, Syria. Earthquake 7.02.23 USA. New York State, earthquake.
8-11.03.23	10.03.23 North of Colombia earthquake 5.9 magnitude 11.03.23 Indonesia and Türkiye earthquake 7.7 magnitude 15.03.23 Türkiye earthquake 4.8 magnitude
19-21.03.23 Index 5	18.03.23 Ecuador earthquake 6.9 magnitude
1-2.04.23	2.04.23 Papua New Guinea earthquake 7.2 magnitude
10-11.04.23	10.04.23 Kamchatka. Bezymyanny Volcano eruption 11.04.23 Kamchatka. Volcano Shiveluch eruption
16-17.04.23	16.04.23 Mexico. Volcano Popocatepetl eruption
	25.04.23 Indonesia Earthquake in Sumatra 26.04.23 New Zealand. Hawke's Bay area near Dannevirke. Earthquake 5.2 magnitude 27.04.23 Ukraine. Yaremcha, Ivano-Frankivsk region. Earthquake 2.2 magnitude
11-12.05.23	10.05.23. Japan. Ishikawa Prefecture. Earthquake 5 magnitude
23-27.05.23	21.05.23 USA off the coast of Northern California Earthquake 5.5 magnitude Aegean Sea. Island of Crete. Earthquake 4.3 magnitude Northern Kuril Islands: Shikotan and Kunashir. Earthquake 5 magnitude 26.05.23 Japan. Tokyo and Eastern Japan. Earthquake 6.3 magnitude 26.05.23 Poltava region Earthquake 3.5 magnitude
6.06.23	6.06.23 Romania. Arad. Earthquake 3 magnitude
30.06.23	30.06.23. Indonesia. Java Island. Earthquake 6.4 magnitude
8-9.07.23	3.07.23 - 4.07.23 Iceland. Reykjanes Peninsula. Earthquakes 4 – 5 magnitude
12-22.07.23	25.07.23. Türkiye Adana Province. Earthquake 5.5 magnitude
4-6.08.23	6.08.23 China. Shandong Province. Earthquake 5.5 magnitude
10-16.08.23	11.08.23. Japan. Hokaido Island. Earthquake 6 magnitude 12.08.23. Türkiye. Two earthquakes of 4.8 and 4.5 magnitude
18-21.08.23	18.08.23. Colombia. Bogota. Earthquakes 6.3 magnitude 21.08.23. Northern California. Earthquake 5.1 magnitude
25-31.08.23	29.08.23. Indonesia. Bali Island. Earthquake 7 magnitude
8-10.09.23 K3	8.09.23. Morocco in the High Atlas Mountains. Earthquake 6.8 magnitude
1-2.10.23	3.10.23 Nepal. 2 earthquakes with an amplitude of 6.3 and 5.3 magnitude 3.10.23 Italy, a 4 magnitude earthquake north of Naples
5.10.23	7.10.23. Afghanistan. Two earthquakes of 6.3 magnitude
2-9.11.23 K4	2.11.24, Philippines earthquake 7.5 magnitude. The outbreak lay at a depth of 63 kilometers; the epicenter is located 19 kilometers in the municipality of Tagbina. Due to powerful tremors, the Philippines and Japan warned of a tsunami threat. 3.11.23 Nepal. Earthquake 6.4 magnitude. Another research center indicates a 5.7 magnitude
9-11.23 4 score	12.11.23 Iceland. Reykjanes Peninsula. Thousands of tremors have been recorded in the Fagradalsfjall volcano area. Before the 2021 eruption, it remained without volcanic activity for 800 years.
21-24.11.23 K4 24-26.11.23 Medium K5	23.11.23. Eastern Turkey, Malatya province. Two tremors of magnitude 5.3 and 4.7. The epicenter of the seismic event was located 30 km southeast of the city of Malatya. The outbreak lay at a depth of 6.9 km.

	23.11.23. Ukraine. In the Novoselytska territorial community of the Chernivets region (Bukovyna), an earthquake of magnitude 2.0 occurred.
1.12.23 K7 2.12.23 K5 4-7.12.23 K4 5.12.23 K5	On December 3, the most active volcano in Indonesia, Mount Merapi, on the island of Sumatra, has a height of 2891 meters. The eruption lasted about five minutes, throwing a column of ash to a height of more than 15 thousand meters.
17 – 18.12.23 K4-K6	17.12.23. Northern Turkey earthquake 4.3 magnitude. The epicenter is 26 km north of Erzincan at a depth of 15 km. 18.12.23 BBC report. Iceland. Reyk'janes Peninsula. After several earthquakes, the volcano began to erupt. Geothermal health resorts located near the volcano were closed.
1-2.01.24 – K4	1.01.24. The Japan Meteorological Agency reported earthquakes off the coast of Ishikawa and nearby prefectures this morning, one with a preliminary 7.6 magnitude. A tsunami with a wave of up to 5 m is possible.
11-14.01.24 Weak	15.01.24. In Iceland, on the Reykjanes Peninsula, the town of Grindavik is on fire. The seismic activity of the volcano has increased sharply over the past 24 hours, and an eruption occurred.
23-24.01.24	23.01.24 On Tuesday, an earthquake of magnitude 7.1 occurred in the border region of Kyrgyzstan and the Chinese province of Xinjiang. In Kazakhstan, the Ministry of Emergency Situations reported the latest earthquake with 6.7 magnitude.
23.11.24 K index 4 score	24.11.24 Morning 7:13. Seismic region of Vrancea in the southeast of Romania, 53 km from the city of Buzeu. Depth 128 km. Magnitude 4.1 Earthquake 8.8 magnitude
17-24.12.24 K= 5- 6	24.12.24. Kilauea Volcano on the Big Island of Hawaii has begun spewing fresh lava, according to the Hawaii Volcano Observatory.
NOAA Space Weather Prediction Center USA 16.06.24 average intensity	17.06.2024 eruption of the Levotobi Laki-Laki volcano. Ash column 10 km high
1-2.08.25 Institute of Space Research of the Russian Academy of Sciences 2 score	2.08.2025. Kamchatka. Krasheninnikov Volcano Earthquake 8.8 magnitude. The previous eruption was in 1463.
26.08.25 K4 Laboratories of Solar Astronomy Institute of Space Research	26.08.25 23:00 Moscow. Earthquake 5.9 magnitude, epicenter in the Caspian Sea.

4. Measures to Reduce Seismic Activity of the Earth's Crust

Table 1 convincingly proves the existence of a correlation between geomagnetic storms and seismic activity of the Earth's crust. This illustrates the role of radiofrequency solar radiation as a carrier of solar energy.

4.1. The Equation of Gas State, and the Reasons for the Increase in Pressure in the Earth's Crust

Let us repeat the circuit again. Radio frequency radiation, penetrating into the Earth's crust, is transformed into heat according to the mechanism of absorption spectra/emission spectra in the case of dielectric rocks or induction heating in the case of electrically conductive rocks. The released heat increases the volume, and therefore the pressure, in the heating zone.

The increase in pressure is especially significant if there is water in the heating zone or if gaseous substances are formed as a result of chemical reactions occurring with increasing temperature. As noted in paragraph 5 of the introduction, the presence of water was noted at all depths of the Kola Superdeep Borehole. When heated, limestone decomposes into calcium oxide and carbon dioxide. Coking coal recrystallizes into coke, releasing hydrocarbons.

The pressure of gaseous substances increases when heated in accordance with the Law of the Gas State of Boyle-Marriott, Gay-Lussac, and the Mendeleev correction as

$$P*V = n*R*T \qquad (1)$$

Where P, T, V, R, and n are, respectively, pressure, temperature (in degrees Kelvin), volume, universal gas constant, and n number of kilogram molecules of gas. The variable n was introduced by Mendeleev into the equation of the gaseous state due to the fact that, in accordance with Avogadro's law, a kilogram-molecule of any substance in the gaseous state under normal conditions occupies a volume of 22.4 m^3. One kilogram-molecule of liquid water occupies a volume of 18 liters or 0.018 m^3. But one kilogram-molecule of water vapor at room temperature and atmospheric pressure occupies a volume of 22400 liters = 22.4 m^3. Thus, the volume of water in the gaseous state increases in comparison with the volume of water in the liquid state by 22400/18 = 1244 times. In addition, the pressure in the zone of heating of the Earth's crust by radio frequency radiation from the Sun will further increase linearly with increasing temperature.

$$P = (n*R/V) *T \qquad (2)$$

For example, at a thermal power station in the superheater of a steam turbine plant at a temperature of 500^0C, the pressure is 300 kPa, that is, 300 times higher than atmospheric pressure under normal conditions. However, in a steam turbine, the amount of water vapor n is a constant value. In contrast, in the Earth's crust, it is a variable value due to the increase in the number of gases released with a continuous rise in temperature.

So, if you want to know what pressure is possible when the radio frequency radiation of the Sun heats the region of the Earth's crust from the moment of formation of gaseous substances, use equation (2), in which there are two variables: n, the number of kilogram molecules of gaseous substances, and T, temperature in degrees Kelvin. The accuracy of calculations according to equation (2) can be improved if the Mendeleev correction n is refined by the composition of the gas phase.

$$\text{ngeneralized} = \sum_1^m pi \times ni \qquad (3)$$

Where ni is the amount of the i component of the gas mixture, and pi is the statistical weight (relative amount) of the i component of the gas mixture.

4.2. Thermal Fields on the Earth's Surface

To predict volcanic eruptions, volcanologists began to use analysis of the localization and direction of thermal fields on the Earth's surface based on satellite monitoring data [14]. Taking into account all of the above in this article, it is advisable to pay special attention to such monitoring during periods of geomagnetic storms, measuring the kinetics of the increase in temperature of the Earth's surface in combination with measurements of the spectral density W/(m^2*Hz) of solar radiation. That is, by measuring the amount of energy transferred to a surface area during a geomagnetic disturbance. This is especially important from the point of view of earthquake forecasting.

The fact that the localization of the source of seismic disturbance activated by a specific magnetic storm is detected at different depths indicates a connection between the mineralogical (chemical) composition of the activated zone and the power of the part of the solar radiation spectrum of a specific geomagnetic storm. That is, the role of the absorption/emission spectra of a seismically active region.

Let us not forget that chemicals and compounds in the Earth's crust are distributed randomly. This leads to the fact that at high temperatures and pressures initiated by radio frequency radiation from the Sun, new mineral compositions previously unknown to geologists and mineralogists can be formed [15]. This may lead to the fact that, due to a change in the absorption/emission spectrum of a given region of the Earth's crust, subsequent seismographic disturbances will occur at a different spectral flux density of the solar radiation in frequency.

4.3. Radio-Frequency RF Shielding

A possible means of at least reducing the strength of seismic activity in the Earth's crust could be a metal mesh spread on the surface of the area of expected seismic disturbance. In this case, induction heating of the metal mesh with radio frequency radiation from the Sun will allow heat to dissipate on the surface. It is quite easy to test this idea by analyzing the history of seismic activity in the Tokyo area. The Bulletin of the Vulcanological Society of Japan frequently publishes articles on the history of seismic activity in Japan. Since modern building structures rely heavily on metals, it is important to find out when significant seismic activity occurred in the greater Tokyo area.

Previously mentioned was the active volcano Iwojima, located in the southernmost part of the Izu-Ogasawara arc, which is characterized by surface thermal manifestations. Small phreatic explosions (water entering magma) have been frequently recorded over the past 100 years, most recently in 1999 and 2001 [8]. The area around this volcano can be used as a proof ground for metal structures, that is, grids that dissipate heat from the radio frequency range of solar radiation.
The article [8] describes a method by which the soil temperature was measured at a depth of 30 cm. Since the spectral radiation flux density W/(m^2*Hz) changes over time, increasing sharply during geomagnetic storms, it is advisable to continuously record the soil temperature under the grid and the spectral radiation density. And of course, record forecasts of geomagnetic disturbances.

5. Modeling of Volcanic Eruptions and Earthquakes for the Purpose of Prediction

The ultimate aim of scientific research is mathematical model-building of a phenomenon or process. A mathematical model is an equation that allows one to calculate a certain number – a dependent variable, the value of which gives a quantitative assessment of the phenomenon or process. In the case of predicting volcanic eruptions and earthquakes, it is necessary to predict two indirectly related independent variables: the date of the predicted event and the location of the expected earthquake or volcanic eruption.

As follows from the data presented in Table 1, the date of the earthquake is predicted quite well a month before the event by the geomagnetic storm forecast. The localization of the predicted seismic event is determined by the chemical (mineralogical) composition of a specific area of the Earth's crust. That is, the absorption/emission spectra of a given localization, as well as the spectral density of the solar radiofrequency radiation flux. There are two ways to accumulate experimental data for building such a model.

1. Measurement of the spectral density of the solar radiation flux during a geomagnetic storm, the duration of this magnetic storm, and the chemical composition of the region of the Earth's crust where seismic activity will be observed.

Spectral flux density W/(m^2*Hz) is the power transferred by radiation of a spectrum section with a width of 1 Hertz (Hz) per unit surface. The basic unit of power in the International System of Units (SI) is the watt (W). One watt (1 W) is equal to the power that does one joule of work in one second. In the SI, power is denoted by the letter W. As already noted in Section 1, the radio frequency range of solar radiation is limited to $2*10^9$-$3*10^{10}$ Hz. An absorption spectrum is a characteristic of a substance that shows what part of electromagnetic radiation it absorbs at different wavelengths. It represents the dependence of the absorption coefficient on the wavelength (or frequency) of the radiation. Absorption spectra are used to determine the composition of a substance, its structure, and its properties.

2. If a geological map of the Earth (read the 1. Introduction to this article) already exists, at least partially, the information contained in it will essentially reduce the preparation of a database for constructing a forecast of the localization of expected seismic disturbances.

A metal mesh with a cell size corresponding to the frequency of radio frequency radiation is capable of transforming this frequency into heat. Thus, by placing a metal mesh on or above the surface of the Earth with a cell size corresponding to the absorption spectrum of the chemical substance located in a given area, it is possible to prevent or at least reduce the consequences of an earthquake or volcanic eruption.

6. Conclusion

1. In the USSR, from 1970 to 1992, an attempt was made to construct a geological map of the country. Specialists (geologists, geophysicists) who worked on drilling deep wells noted that the facts they observed did not correspond to the information they received during their studies at a higher school. The article provides explanations for some of the observations mentioned by the experts based on physical chemistry.
2. The Sun emits energy in an extremely wide range of frequencies. The article draws the reader's attention to the radio-frequency bandwidth of radiation, which provides energy for volcanoes and earthquakes. The amount of energy coming from the Sun to the Earth is measured by astrophysicists in units of spectral density W/(m^2*Hz), that is, in system units.
3. There are two known methods for converting electromagnetic wave energy into thermal energy: absorption/emission spectra and induction heating by eddy currents. Specific examples show the dependence of the temperature of mines and deposits on the electrical conductivity of rocks.
4. Electromagnetic radiation from the Sun interacts with the Earth's magnetic field to generate geomagnetic storms. A correlation has been shown between geomagnetic storms and seismic activity in the Earth's crust. Since experts in solar-terrestrial physics, terrestrial magnetism, the ionosphere, and radio propagation have learned to predict geomagnetic storms a month before they occur, it becomes possible to predict volcanic eruptions and earthquakes a month before these events.
5. Each chemical substance is characterized by a specific absorption/emission spectrum. This rule naturally extends to the minerals that form the Earth's crust. It is quite natural that solar radiation of the radio-frequency bandwidth, depending on its spectral density W/(m^2*Hz), will interact differently with individual areas of the Earth's crust. That is, in this case, the frequency and power of radiation play a role. During a magnetic storm, this interaction will manifest itself more clearly. It appears in an increase in the temperature of a certain area of the Earth's crust. The higher the radiation power (the rate of energy conversion per unit of time) and the exposure duration, the higher the temperature. If the minerals contain metals, the main mechanism for increasing the temperature of accumulation will be induction heating.
6. As the water, with change of state, that is, when passing from liquid to gas, under normal conditions increases the volume occupied by a unit of mass by 1244 times, which in a closed space leads to a sharp increase in pressure, it explains why volcanic eruptions are usually observed in areas surrounded by sea: islands, peninsulas or on the seabed.
7. A seismic activity forecast must answer two questions: the date and location of the event. While solar-terrestrial physics and terrestrial magnetism experts can predict geomagnetic storms with an accuracy of ±1-day, exact localization of an event requires knowing the chemical (geological, mineralogical) composition of the Earth's crust across the globe. An experimental-statistical model that can be used as a basis for predicting seismic activity should include a geological map of the Earth's crust, the water permeability and water content of local areas, and the energy-frequency characteristics of solar radiation in the radio frequency range, expressed in W/(m^2*Hz).

References

[1] V. Barkov, Kola Superdeep. Road to Hell, 2012. [Online]. Available: https://www.youtube.com/watch?v=pvMV8qjrTlI

[2] Michael Franco, Drilling into Magma: Risky Plan takes Geothermal to Supercritical Extremes, 2024. [Online]. Available: https://newatlas.com/energy/kmt-magma-geothermal-supercritical/#:~:text=The%20Krafla%20Magma%20Testbed%20%22has%20the%20potential,Hadron%20Collider%20has%20been%20for%20particle%20physicists
[3] Vitaly A. Prisyahniuk, "Humanity Lives on the Cosmic Microwave," *Journal of Geography, Environment and Earth Science International*, vol. 27, no. 2, pp. 1-6, 2023. [CrossRef] [Publisher Link]
[4] Vitaly A. Prisyahniuk, and Boris Stein, "The Sun is an Energy Generator Volcanoes and Earthquakes," *Journal of Energy and Natural Resources*, vol. 14, no. 1, pp. 12-18, 2025. [CrossRef] [Publisher Link]
[5] Britanica, Solar Radiations. [Online]. Available: https://www.britannica.com/search?query=solar+radiations
[6] Healthline, What is Halotherapy?. [Online]. Available: https://www.healthline.com/health/halotherapy
[7] G. Farr et al., "The Temperature of Britain's Coalfields," *Quarterly Journal of Engineering Geology and Hydrogeology*, vol. 54, no. 3, 2021. [CrossRef] [Google Scholar] [Publisher Link]
[8] K. Notsu et al., "Diffuse CO_2 Efflux from Iwojima Volcano, Izu-Ogasawara Arc, Japan," *Journal of Volcanology and Geothermal Research,* vol.139, no. 3-4, pp. 147-161, 2005. [CrossRef] [Google Scholar] [Publisher Link]
[9] Kiirunavaara. [Online]. Available: https://en.wikipedia.org/wiki/Kiirunavaara
[10] Why is it so Hot in the Deep Mines and The Groundwater is Cold?, 2024. [Online]. Available: https://www.ixbt.com/live/offtopic/pochemu-v-shahtah-na-glubine-ochen-zharko-a-gruntovye-vody-holodnye.html
[11] USGS, What is a Magnetic Storm?. [Online]. Available: https://www.usgs.gov/faqs/what-a-magnetic-storm
[12] NASA Science, 2025. [Online]. Available: https://science.nasa.gov
[13] The Pushkov Institute of Terrestrial Magnetism, Ionosphere and Radiowave Propagation of the Russian Academy of Sciences (IZMIRAN), Wikipedia, 2025. [Online]. Available: https://en.wikipedia.org/wiki/IZMIRAN
[14] O.A. Girina, "On Precursor of Kamchatkan Volcanoes Eruptions based on Data from Satellite Monitoring**,"** *Journal of Volcanology and Seismology*, vol. 6, pp. 142 – 149**,** 2012. [CrossRef] [Google Scholar] [Publisher Link]
[15] ScienceAlert. [Online]. Available at: https://www.sciencealert.com