

Discourse on the Evolution of the Earth

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Received: February 18, 2022

Accepted: March 25, 2022

Online Published: March 30, 2022

doi:10.5539/ep.v11n1p65

URL: <https://doi.org/10.5539/ep.v11n1p65>

Abstract

The discourse on the evolution of the Earth is a polemic with the Big Bang theory, which claims the formation of the universe 13.8 billion years ago. It is claimed that in a fraction of a second, elementary particles of matter formed from an atom of "peculiar" density, and then, in the process of primary nucleosynthesis, elements were formed. The alternative theory of the primal forces of nature negates this version of the explanation of the phenomenon and proves that the process of creating elements takes place today in a thermonuclear synthesis reaction in the Earth's core. The probability test of these theories is the georadiation criterion, based on the quantitative ratios of uranium and the helium ³He isotope on Earth. Referring to earlier publications, the activity of a thermonuclear reactor in the Earth's core and the appearance of 200 million years ago, the phenomenon of Earth expansion, is proven. The conclusion of the article is the statement of the evolutionary sequence of all planets in the solar system and the transformation of hot planets into new stars.

Keywords: planetary geology, the Big Bang theory, the theory of the first forces of nature, the formation of elements, the Earth's core, thermonuclear reactions

1. Introduction

This article presents a view on the evolution of the Earth and the causes of geological activity. This view is based on the theory of the primal forces of nature and the Copernican vision of the universe. It is a vision of a world that is infinite in time and space. The following theses are discussed in detail and included in publications (Pawuła, 2000, 2021a, b, c, d).

Theses:

- In the Earth's core, as in the Sun, there is a thermonuclear fusion reactor;
- In thermonuclear reactions and the plasma recombination process, elements are produced in the form of basalt magma components;
- There is a constant process of increase in the mass and temperature of the globes within the evolutionary sequence of planets and stars;
- The idea of the creation of the universe in the Big Bang, 13.8 billion years ago, is a deliberation on the border of philosophy and metaphysics, and the assumption of a simultaneous outbreak of "strange" matter and the process of nucleosynthesis is contrary to the laws of physics. The prerequisite for the nucleosynthesis reaction is the compression of matter, while the explosion of "strangeness" density matter is the opposite phenomenon, decompression!
- The theory of primal forces of nature provides logical answers to the question of the causes of geological activity, but the existence of these forces remains a mystery. It must be assumed that the forces of nature are as eternal as the universe.

It is assumed that the following primitive types of forces occur in nature:

- Gravitational forces occurring in the Cosmos in the mutual interactions of celestial bodies. These are weak forces, but they operate constantly and over long, cosmic distances.
- The electromagnetic forces that bind electrons to atomic nuclei, join atoms into molecules and determine the properties of matter.
- Nuclear forces, binding protons and neutrons together, operating at a short range and releasing enormous energy

in nuclear reactions.

2. A Few Words about Gravity

Gravity is a universal force that is present throughout the universe. A closer understanding of the phenomenon of gravity allows us to identify two basic effects of its operation: the gravitational increase in the mass of the globes, the formation of plasma and basalt magma. The increase in the mass of the globes is the result of the universal law of gravity and the increase in the mass of the globe is the greater the greater its mass. Gravity is a physical phenomenon that we feel but do not know its nature. The force of gravity F_g appears in the interaction of matter clusters and is expressed by the formula:

$$F_g = G \frac{m_1 \cdot m_2}{r^2}$$

where: G is the gravity constant $6.67E-11 \text{ N m}^2 / \text{kg}^2$, m - mass of clusters of matter (globes), r - distance between the centers of gravity of the interacting globes.

The mass gain explains the existence of hot gaseous planets. In the process of creating matter, only the principle of conservation of energy and momentum must be met, but the principle of conservation of mass does not apply. In the process of the evolution of the globes, two sizes of the critical mass are distinguished. The first critical mass, of the order of 10^{22} kg , corresponding to the mass of the Moon, concerns the initial state of the hot globe. Rift fissures and outflow of basalt magma appear, but there is no magnetic field yet. The second critical mass of 10^{30} kg , corresponding to the mass of the sun, concerns the transformation of the rocky globe into a star.

A spontaneous fusion reactor is created thanks to the generation of an appropriate amount of plasma, even before the nuclide synthesis reaction occurs. The effect of thermonuclear reactions is nucleosynthesis. The most common elements include light elements with an atomic number below 10, i.e. mainly hydrogen, helium, carbon, nitrogen and oxygen. It should not be concluded from this that the fuel in thermonuclear reactors must be exclusively hydrogen nuclei. Heavier and larger particles in nuclear fuel only require more energy to overcome Coulomb resistances, they are less likely to participate in collisions and therefore there are fewer of them. The source of ionization and thermonuclear reactions energy, apart from gravitational pressure, is cosmic radiation and radiogenic heat. The period of latent activity of the thermonuclear reactor begins with the beginning of the reactor's operation and the production of hot plasma. The produced plasma remains in the reactor, held back by a shielding layer of magnetically stiffened liquid plasma. Only when the plasma pressure exceeds the gravitational pressure does the phenomenon of plasma expansion and the expansion of the globe appear.

3. Ionization and Thermonuclear Synthesis Reactions

When explaining the phenomena of nature, one should know the structure of matter and its relationship with energy. The atomic nucleus is a constituent element of the structure of the atom, it is located in its center and contains over 99.9% of its mass. The size of the nucleus is about 10,000 times smaller than the size of an atom. The density of nuclear matter is about $1E + 13$ times the density of matter made of atoms. An atomic nucleus consists of neutrons and protons, collectively known as nucleons. Neutrons and protons are made of a quark.

Neutrons and protons are made of quarks. Quarks and electrons are the smallest constituents of matter structure and do not have an internal structure (Fig. 1).

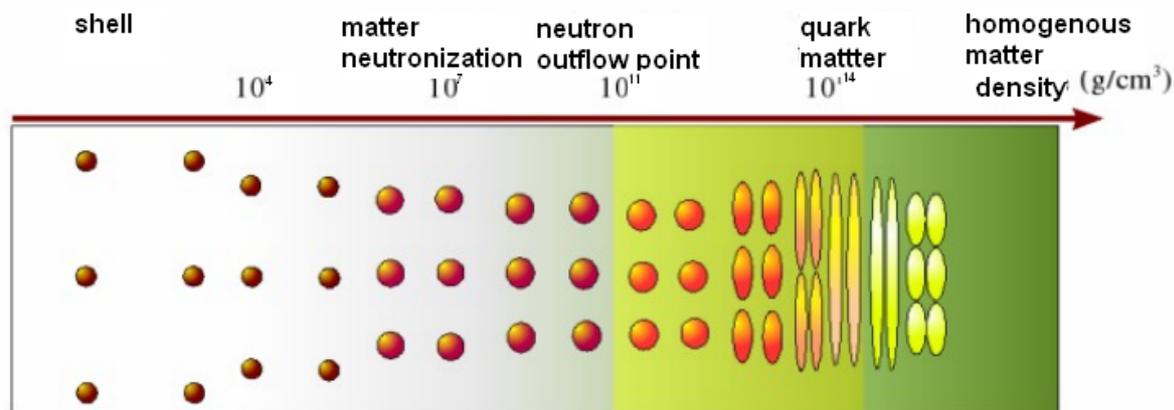


Figure 1. The phenomenon of compaction of matter

[http://users.camk.edu.pl/bejger/talks/gwyszne_neutronowe.pdf]

Table 1. Physical parameters of the Earth * /

Depth zone [km]	Name of the zone	Density [g/cm ³]	Temperature [°C]
0 - 30	the earth's crust	2,7 – 2,9	15 – 1000
30 - 400	outer sheath	3,3	1000 – 2000
400 – 700	transition zone	4,65	2000 – 2500
700 – 2750	inner coat	5,66	2500 - 4000
2750 – 2900	layer D"	9,7	4000 – 5000
2900 - 5170	outer core - liquid	11,8	5000 - 6000
5170 - 6370	inner nucleus - solid	16	6000 - 8000

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The geophysical profile shows an increase in the density of matter along with the increase in depth (Tab. 1, Fig. 2). A special characteristic density jump from 5 g/cm³ to 10 g/cm³ occurs in zone D", at a depth of 2750 - 2900 km. The maximum density of 16 g/cm³ occurs in the inner nucleus, which is the core of a thermonuclear reactor. Analogous reactor core. in the Sun, it has a density of 160 g/cm³. The difference is the degree of heating of the reactor, or more precisely, the gravitational pressure.

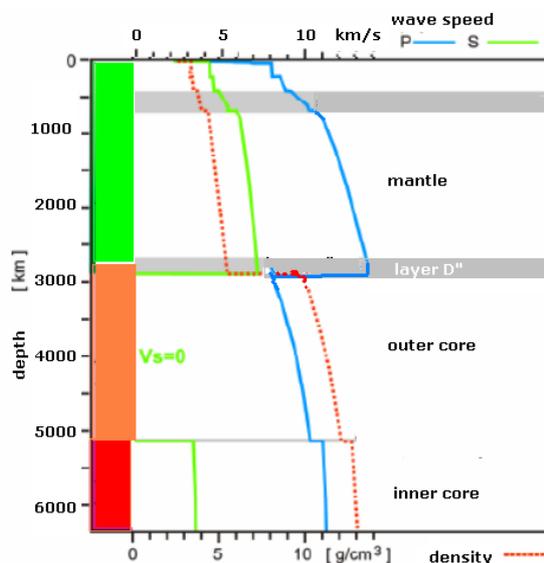


Figure 2. The geophysical profile of the Earth's globe (Żelaźniewicz A., Grad M., 2009)

At the atomic level, ionization occurs when an atom collides with a high-energy particle, for example a proton, electron, or an α particle; or as a result of mutual collisions of neutral atoms with high kinetic energy - thermal ionization. In this way, free positive ions and free electrons are formed, which by attaching to neutral atoms create negative ions. Plasma is ionized matter with special electromagnetic properties. There are basically two types of plasma, low temperature (cold) and high temperature (hot) plasma. This division is important in the process of preparing the conditions for the creation of a georeactor.

A spontaneous fusion reactor is created thanks to the generation of an appropriate amount of plasma, even before the nuclide synthesis reaction occurs. The effect of thermonuclear reactions is nucleosynthesis. The most common elements include light elements with an atomic number below 10, i.e. mainly hydrogen, helium, carbon, nitrogen and oxygen. It should not be concluded from this that the fuel in thermonuclear reactors must be exclusively hydrogen nuclei. Heavier and larger particles in nuclear fuel only require more energy to overcome Coulomb resistances, they are less likely to participate in collisions and therefore there are fewer of them. The source of ionization and thermonuclear reactions energy, apart from gravitational pressure, is cosmic radiation and radiogenic heat.

Low-temperature plasma is formed at a lower ionization energy and is a medium that allows the formation of the walls of the reaction chamber that meets the Lawson criterion. Having a reaction chamber, tight and resistant to a nuclear explosion provided, a thermonuclear reactor spontaneously arises when the mass of the globe reaches a critical size, about 10^{22} kg. At a lower energy level, the ionization of matter consists in detaching electrons from the orbitals of atoms, at a higher energy level there is an interference inside the atomic nucleus, and with even higher ionization energy, the structure of elementary particles may be disturbed and new matter particles may be created.

Plasma is a good conductor of electric current, better than copper, and behaves like metal in a magnetic field. The reported critical mass of 10^{30} kg corresponds to the mass of young stars such as the sun. If we take into account the process of gravitational aggregation of the solar system globes from cold matter, then we must add a preliminary stage, the Protosun warming up, still as a rocky globe. The preliminary stage consists in the ionization of the matter and the production of low-temperature plasma, which will create tightness conditions for the reactor being formed. Increasing the gravitational pressure, as the mass of the globe increases, causes a significant increase in temperature and the formation of successively - ions, atomic nuclei with a different number of nucleons, single - protons and neutrons, and finally quarks.

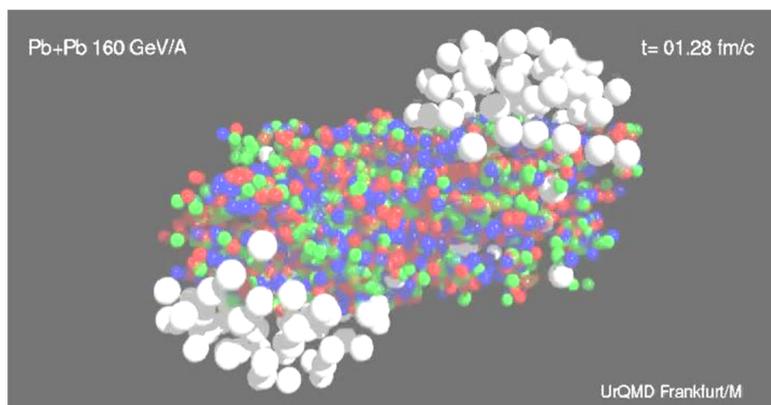


Figure 3. Creation of quark matter;
Heavy ion synthesis reaction on the UrQMD model (Pluta J., 2020)

The different ionization states of matter correspond to different phases of the plasma that differ in density. In the case of the plasma of the Sun's core, the plasma density is $1.6 \cdot 10^2 \text{ g / cm}^3$, low in relation to the density of the proton plasma $1.0 \cdot 10^7 \text{ g / cm}^3$. Spontaneous thermonuclear reactions occur in large clusters of matter. A thermonuclear georeactor is formed automatically after reaching the critical mass of the globe, when the pressure causes the matter to compact and form plasma. In plasma, the tunneling effect facilitates ion synthesis reactions. The course of the process of high energy nuclear reactions in the UrQMD model (Frankfurt / M). The figure shows the process of lead nuclei collision in high-energy 160 GeV conditions (Fig. 3).

There is an interesting similarity of the formula for the force of gravity F_g with the formula for the force of repulsive homogenous electric charges, which is a force proportional to their product $q_1 q_2$ and inversely proportional to the square of the distance between them, $1 / r^2$.

$$F = k \frac{q_1 \cdot q_2}{r^2}$$

Where: k- is the proportionality coefficient

In atomic nuclei, protons are at very small distances. So enormous repulsive forces are at work between them. Nevertheless, the core is a compact object. According to the nuclear physicist professor Jan Pluta (Institute of Physics, Warsaw University of Technology), attractive forces act between the protons in atomic nuclei, greater than the forces of electrostatic repulsion. *These forces also act on neutrons. These forces have a short range because they are not observed at greater distances. The action of these forces still requires further research.*

As is known, in nature there are gravitational and electromagnetic interactions. The resulting forces, however, cannot explain the mechanism of binding nucleons into atomic nuclei. The attractive gravitational forces are much weaker than the electromagnetic forces, which in turn are repulsive to particles with the same charge.

The forces that bind protons and neutrons in atomic nuclei are a manifestation of the so-called strong interactions, which in relation to atomic nuclei are called nuclear forces.

In the case of heavy ones with an unbalanced composition of neutrons and protons, when neutrons predominate at the point of contact, the synthesis reaction is facilitated. There are no repulsive electromagnetic forces between the neutrons. (Pluta J. 2020)

The reactions of the synthesis of elementary particles take place in the medium of dense matter, at high temperature and in a chamber with walls resistant to high pressure. The condition for such a reaction to take place is the Lawson criterion defined by the product of the density of matter (π) and the necessary reaction time (τ). The Lawson criterion is a variable quantity, depending on the individual properties of the reactants.

In the case of a collision of the nuclei of hydrogen isotopes, the criterion is as follows:

$$\begin{aligned} \text{Lawson's criterion} \quad & \pi \cdot \tau \geq 10^{14} \text{ s} \cdot \text{cm}^{-3} \text{ deuterium-tritium fusion} \\ & \pi \cdot \tau \geq 10^{16} \text{ s} \cdot \text{cm}^{-3} \text{ deuterium-deuterium fusion} \end{aligned}$$

There is a perception among physicists that under terrestrial conditions a thermonuclear reaction is impossible

because there is not a sufficiently high temperature and a tight reaction chamber. However, the fact that there is a fusion reactor in the Sun is overlooked. Thermonuclear fusion reactions take place in all stars, so it can be argued that spontaneous thermonuclear reactors are a common phenomenon in space. The existence of a thermonuclear reactor is based on two factors, the common law of gravity and the physical properties of plasma.

The creation of a georeactor begins with the production of low-temperature plasma, which generates a magnetic field and creates a magnetic trap for the plasma. A magnetically stiffened insulating layer is created, a cover for the future reactor. At the same time, plasma, thanks to the tunneling effect, reduces Coulomb forces between nuclides and facilitates their fusion. The fuel in thermonuclear reactions are particles with a different degree of ionization, from atoms with a changed configuration of electron orbitals to proton and quark plasmas.

The period of latent activity of the thermonuclear reactor begins with the beginning of the reactor's operation and the production of hot plasma. The produced plasma remains in the reactor, held back by a shielding layer of magnetically stiffened liquid plasma. Only when the plasma pressure exceeds the gravitational pressure does the phenomenon of plasma expansion and the expansion of the globe appear. High-temperature plasma is matter, the product of thermonuclear reactions, and makes up 99% of the mass of the universe. A characteristic feature of the cosmic matter formed in the process of nucleosynthesis is the abundance of light nuclides, hydrogen, helium, carbon, nitrogen and oxygen. The least amount is radioactive uranium and thorium, but their presence does not change. The operation of the reactor is determined by the gravitational aggregation of space matter, the ionization of concentrated matter and the production of plasma, which facilitates nuclide collisions through the tunneling phenomenon. The period of latent activity of the thermonuclear reactor begins with the beginning of the reactor's operation and the production of hot plasma. The produced plasma remains in the reactor, held back by a shielding layer of magnetically stiffened liquid plasma. Only when the plasma pressure exceeds the gravitational pressure does the phenomenon of plasma expansion and the expansion of the globe appear.

The process opposite to ionization is recombination, which consists in neutralizing ions by combining free electrons with positive ions, or in combining ions of opposite signs into neutral molecules. After the plasma temperature in the D "layer is lowered, the process of completing electron orbitals and the formation of elements takes place. This is analogous to the transformation of the alpha particle into radiogenic helium atom ${}^4_2\text{He}$. Since plasma is a mixture of particles with a fixed composition, the formed basalt magma has the feature of homogeneity. Magma is an alloy of mineral and gaseous compounds, with a temperature of over 1200 ° C. Under deep sea conditions, magma undergoes fractional differentiation, expressed in the crystallization of igneous rocks in order, from basic gabbro to granite enriched with silica. At a temperature of <1000 ° C, gases are released from the magma. and post-treatment solutions: CO_2 , H_2 , HCl , H_2S , SO_2 , HF oraz CH_4 , H_2O , NH_3 , P_4O_{10} . Mineral compounds of silicon, titanium, aluminum, iron, manganese, calcium, sodium, potassium and phosphorus as well as numerous elements crystallize in the basalt rock.

Table 2. Chemical composition of basalt rocks

Main elements (8)	Minor elements (16)	Elements trace (46)
O, Si, Al, Fe, Ca, Mg, Na, K	Ti, Mn, P, S, F, Ba, Rb, C, Cl, Zr, Cr, Sr, V, Ni, Cu	Li, Be, B, N, Sc, Co, Zn, Ga, Ge, Nb, Mo, Pd, Ag, Cd, In, Sn, Sb, Te, J, Cs, La, Co, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Hf, Ta, W, Re, Pt, Au, Hg, Tl, Pb, Bi, Th, U

Basalt magma has special properties, it is homogeneous, identical regardless of the age and place of outflow, and its elemental composition is similar to that of solar plasma. Hot plasma contains a wide spectrum of rare elements and a small but fixed amount of uranium and thorium. Basalt magma lacks the light elements, hydrogen, nitrogen and carbon, which dominated the plasma. After transformation into matter with an atomic structure, the above-mentioned elements constitute the gaseous phase of the magma and enter into chemical reactions, forming in the first place methane and juvenile water: $\text{CO} + 3\text{H}_2 \rightarrow \text{CH}_4 + \text{H}_2\text{O}$.

According to the theory of primal forces of nature, a thermonuclear reactor spontaneously forms in the nucleus of the globe. After exceeding the critical mass of the globe (approx. $1\text{E} + 22$ kg), thermonuclear fusion reactions appear, and hot plasma is produced with a fixed nuclide composition. The thermal state of the globe is a function of its mass. When plasma pressure exceeds gravitational pressure and magnetic attraction forces, hot plasma erupts

into zone D". Recombination occurs. By attaching free electrons to positively charged ions, electrically neutral elements are formed. Plasma recombination causes giants. an increase in the volume of matter particles, for example a proton with a diameter of $1E-15$ m, by attaching an electron, becomes a hydrogen atom with a diameter of $1E-10$ m. This means that by changing its electromagnetic properties, matter increases its volume over a billion times. The result is the formation of enormous stresses in the rock mass and tectonic faults Conclusion: the eruption of plasma and the creation of basalt magma cause geological activity, the appearance of global fractures, igneous intrusion and volcanism. marginal importance of the mass of the electron, in this process, each nuclide of the plasma becomes an element of the same mass. Thus, it can be argued that the process of basalt magma formation takes place without changing the mass. There is only a change of plasma matter of very high density into matter of atomic structure and much lower density. The exponential function of the increase in the radius of the Earth shows that the production of basalt magma has practically no quantitative limitations and depends on the temperature and pressure of the plasma in the georeactor.

4. The Origin of the Elements

According to BB theory, elements were formed in the primary nucleosynthesis 13.8 billion years ago. Despite such an improbable theory, that the entire Universe would suddenly arise, practical conclusions are drawn that are assumed to be false. Therefore, in the considerations on the genesis of uranium and other long-lived radionuclides, it was assumed that they are elements originating from pre-Earth matter. The facts do not support this hypothesis. Comparative analysis of the global amount of alpha-emitting radionuclides with the amount of radiogenic He-4 helium produced shows that natural radioactive elements appeared relatively recently. According to calculations (Polański, A., 1964), the total amount of helium in the Earth's lithosphere and atmosphere corresponds to the production of alpha particles in a much shorter time than the age of the Earth. The helium He-4 paradox - the apparent deficit of helium isotopes. If we accept the thesis that uranium U-235, U-238 and thorium Th-232 do not appear with juvenile basalt magma, then 4 billion years ago there would have to be more of them, as shown in the diagram (a consequence of half-decay). Since helium on Earth is a product of the decay of radioactive elements in their ranks, there should be enough of it. Polański calculated that excluding the growth of the primary radionuclides U-235, U-238 and Th-232, the amount of helium on Earth corresponds to its production only over a period of 300 million years. According to the theory of primal forces of nature, a thermonuclear reactor spontaneously forms in the nucleus of the globe. After exceeding the critical mass of the globe (approx. $1E + 22$ kg), thermonuclear fusion reactions appear, and hot plasma is produced with a fixed nuclide composition. The thermal state of the globe is a function of its mass. When plasma pressure exceeds gravitational pressure and magnetic attraction forces, hot plasma erupts into zone D". Recombination occurs. By attaching free electrons to positively charged ions, electrically neutral elements are formed. Plasma recombination causes giants. an increase in the volume of matter particles, for example a proton with a diameter of $1E-15$ m, by attaching an electron, becomes a hydrogen atom with a diameter of $1E-10$ m. This means that by changing its electromagnetic properties, matter increases its volume over a billion times. The result is the formation of enormous stresses in the rock mass and tectonic faults Conclusion: the eruption of plasma and the creation of basalt magma cause geological activity, the appearance of global fractures, igneous intrusion and volcanism. marginal importance of the mass of the electron, in this process, each nuclide of the plasma becomes an element of the same mass. Thus, it can be argued that the process of basalt magma formation takes place without changing the mass. There is only a change of plasma matter of very high density into matter of atomic structure and much lower density. The exponential function of the increase in the radius of the Earth shows that the production of basalt magma has practically no quantitative limitations and depends on the temperature and pressure of the plasma in the georeactor.

The view of the pre-terrestrial origin of uranium stems from the disregard for the operation of a thermonuclear reactor in the Earth's core and leads to the conclusion that the rock cycle and convection cells of the Earth's mantle are closed. The Big Bang theory introduces laws of nature that it does not follow. From the formal point of view, in accordance with the principles of scientific research, the condition for recognizing an experiment is its repeatability. In the case of the Big Bang, there is no repeatability. The reflection is that the Big Bang scenario is contrary to the laws of nature, one can say more - it was not there at all.

By assuming a wrong theory, you get erroneous results. This maxim is true when it comes to defining the genesis of natural radioactive elements. According to BB theory, the elements formed in the primary nucleosynthesis 13.8 billion years ago. It is therefore concluded that the amount of radioactive elements has been decreasing all the time due to natural decay and that due to the radioactivity, it is disappearing. According to the second view, elements are formed in the Earth's core and their number increases in an accelerated manner. According to the Earth's evolution scenario, it maintained a low level of radioactivity, such as in meteorites, for 4 billion years (expressed as uranium content of around 0.2 ppm). The elements appear in the Earth's mantle and oceanic plates as a

cycle proves that each star was formed by heating up a cold globe. Thus, the theory of the primal forces of nature explains the existence of multiple star systems.

The following stages can be distinguished in the evolution of the planets of the solar system:

- gravitational aggregation of galactic matter
- multiple, cumulative ionization - formation of low-temperature plasma
- reaching a critical mass of the globe - hot core and generation of a magnetic field
- thermonuclear synthesis reactions and the formation of hot plasma, transformation of energy into matter, creation of basalt pramagma - increase in the mass of the globe, expansion of the globe - volcanic and seismic activity

Gravitational pressure increases as the mass of the globe increases, regardless of the temperature in the center of the globe. The comparison of the mass of the solar system globes shows that with a mass of $1E + 22$ kg, they are rocky globes, in which hot core begins to form and global rifts appear with volcanic activity (an example is the Moon).

Initially, local reactions occur, producing fragmented magnetic fields (for example, Mars). Then, as a result of the interaction of cosmic rays and a faster increase in the mass of the planet, thermonuclear processes intensify, which gives rise to hot, gaseous planets (for example, Jupiter and Saturn). Jupiter is a giant planet with a mass of 317.8 times the mass of the Earth. According to its mass, Jupiter has warmed up, there is no more rocky crust, and the outer layer is composed of igneous products, mainly hydrogen and helium. Jupiter is similar to stars in chemical composition and mass, which is why astronomers refer to it as "would-be star" or "almost star".

Table 3. The relationship of the thermal state of the globe with its mass, atmosphere, thermal state, magnetic field

	mass	atmosphere	thermal state, magnetic field
Moon	7.37E+22 kg	no	globe rocky, cold, trace activity
Mercury	2.99E+23 kg	no	globe rocky, cold, trace activity
Mars	6,399E+23 kg	volcanic gases CO ₂	rocky, cold globe fragmentary magnetic field
Venus	4,874E+24 kg	volcanic gases CO ₂ , CH ₄ , N ₂	rocky, cold globe, weak magnetic field
Earth	5.98E+24 kg	O ₂ (76%), N ₂ (23%)	rocky, cold globe; warm ocean rift zone, strong magnetic field
Saturn	5,687E+26 kg	hydrogen and helium - fusion reaction products: H ₂ (96,3%), He (3,3 %), CH ₄ (0,4%), śladowe ilości H ₂ O i NH ₃	gas globe warm, very strong magnetic field
Jupiter	1.895E+27 kg	H ₂ (86%), He (10%), traces CH ₄ , N ₃ , H ₂ O, S ₂ , CS ₂ , H ₂ S, and Si, Fe	gas globe; very strong magnetic field
Sun	1.989E+30 kg	protons, alpha particles, electrons coronal outbursts globe of hot plasma	globe of hot plasma, solar wind emission

A characteristic feature of stars, including the Sun, are thermonuclear synthesis reactions and the process of creating elements. The question is, when did the thermonuclear reactor appear in the core of the sun? After reaching the current weight of $1.989E + 30$ kg, or earlier? The hot gas giants are evidence that the thermonuclear reactions began at an earlier stage of evolution, the planetary stage. The planetary stage is further divided into the stage of latent activity and the stage of global expansion. The solar thermonuclear reactor is in balance only because it is not bursting under the pressure of the plasma because it is balanced by the force of the sun's gravity. Solar plasma, which has magnetic properties, is stopped by a magnetic field. If the plasma pressure is much higher than the gravitational pressure, the plasma is ejected from the globe as prominence. The prominence consists in throwing plasma together with fragments of the frozen magnetic field into outer space at a speed of up to 2,000 km / s. Thermonuclear reactions take place only near the center of the sun, in a region that extends to about 0.25 of the

sun's radius from its center, or a radius of 174,065 km. The sun is a typical star and an example of a spontaneous thermonuclear reactor formed in a cold rocky globe. The phenomenon of the spontaneous formation of thermonuclear reactors is common in the cosmos, so it also applies to planets and moons of the solar system.

The appearance of thermonuclear reactions on Earth can be associated with the Proterozoic era (3800 million years BP), when a magnetic field and volcanic activity appeared, an atmosphere composed of volcanic gases and the first primitive organisms appeared - proterionta bacteria. Initially, a low-temperature plasma was formed in the Earth's core. After the appearance of the magnetic field and telluric currents, the temperature of the Earth's core increased and nuclear reactions took place locally. Volcanic activity has significantly increased since the beginning of the Cambrian (560 million years BP) and this moment can be considered the formation of a global georeactor. An even stronger increase in geological activity, signaling the beginning of the Earth's expansion, occurred in Lower Perm, 280 million years BP. The production of basalt magma and its outflow through rift fissures increased. The traces of these eruptions are basalt covers "traps" in Perm deposits (250 - 280 million years BP). The oldest basalts that build ocean plates are dated at 180 million years. Hot plasma, ejected sporadically from the Earth's core, is the source material for basalt magma. Plasma discharges into zone D "occur when the plasma pressure exceeds the gravitational pressure. For comparison, in the center of the Earth, the gravitational pressure is $1.7E+6$ atm., And the plasma pressure in the center of the Sun is $2.34E+11$ atm.

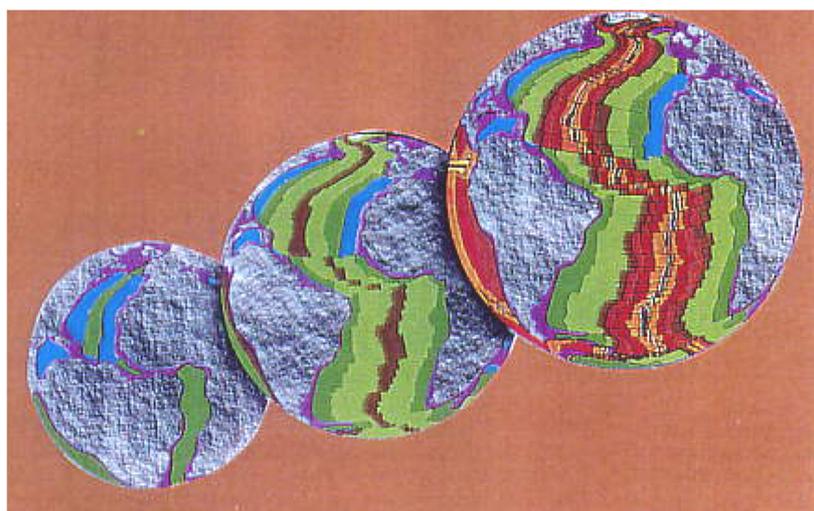


Figure 5. Earth expansion (Koziar J., 2018)

An important evidence of the georeactor's activity is the amount of basalt magma produced. Ocean plates, formed by basalt magma, cover more than 70% of the globe. Geophysical research shows not only an increase in oceanic plates in the surface zone, but also an increase in the mantle of the Earth under the continental plates. The process of the fusion reaction in the Earth's core is developmental, in the last 280 million years there has been an increase in the radius of the Earth, from 2800 to 6373 km, and the radius growth curve is an exponential function. Two hundred and eighty million years ago, the volume of a small globe with a radius of 2800 km was $9.2E+10$ km³, now at a radius of 6373 km it is $1.08E+12$ km³. Thus, there was an increase in the volume of the globe by $9.88E+11$ km³. Over the last 280 million years, the volume of the earth has increased tenfold. Therefore, it can be concluded that during this period the georeactor produced plasma, which formed $9.88E+11$ km³ of basalt magma ($3.53E+3$ km³ / year). Part of this magma froze on the ground surface in the form of basalt rocks, and a much larger part crystallized in deep sea conditions, creating a series of igneous rocks and emitting igneous gases and post-treatment solutions. It leads to a general conclusion that the igneous rocks are less than 280 million years old and that the presented characteristics allow to establish a relationship between basalt magma and the hot plasma of a thermonuclear georeactor.

The concept of the evolutionary sequence of planets is an integral part of the theory of the primal forces of nature. The concept is based on the assumption that the thermal state of the planets is a function of their mass and the logical connection of the different stages of evolution. The assumption of this idea is to relate the earlier stages of the Earth's history to the thermal state of planets smaller than it and to formulate a forecast in relation to larger planets. The evolution of the planets primarily explains the differences between the planets resulting from their different masses. It is assumed that the global thermalism index, defined as the ratio of the radius of the planet's

hot core to the radius of the whole, is a measure of this evolutionary development.

The theory of primal forces of nature, supplemented by the analogy of the thermal state of the Earth to the situation on other planets, changes the view on the structure of the Earth and the source of geothermalism. Taking into account the phenomenon of evolution changes views on other matters, including those concerning geotectonic issues, the origin of elements and the genesis of mineral deposits. A special issue is the extrapolation of the evolutionary sequence and taking into account the stellar stage. In astronomy, stars are treated as a separate phenomenon in which theonuclear synthesis reactions take place, but in the process of the evolution of the star, which is the Sun, the phenomenon of burning protons and alpha particles is assumed. The astronomer's view of the burnout of stars, which does not take into account the aforementioned phenomenon of the increase in mass of all globes, is quoted below:

A star, similar to the Sun, for example, begins its life as a condensing, cool and dark cloud, probably one hundred times the size of the Sun today ... As the cloud shrinks rapidly, the temperature inside rises and its luminosity increases. As the protostar continues to shrink, its surface temperature no longer increases, but the ever-decreasing surface area causes the object to diminish in brightness until the gas pressure balances the gravitational contraction and the core temperature is sufficient to initiate a reaction. thermonuclear.

At this point, about 100 million years after the cloud begins contracting, a star is born ... and it remains there for about 9 billion years, steadily burning the hydrogen and converting it to helium. After the hydrogen resources are depleted, a much shorter period in the life of the star begins, with helium burning first, and then other, heavier elements. At this stage, the star initially increases in size and brightness so that it becomes a giant, and then, pulsating and shedding its outer shells, passes through the variable star stage. After the hydrogen-helium fuel is completely depleted, the star slowly cools down and, diminishing its brightness, becomes a white dwarf (Wnuk E., 1995).

The exclusion of the Sun from the evolutionary sequence is illogical, since all the globes were formed simultaneously from the same cold galactic matter. On the contrary, the process of gravitational accretion increases as the globe grows, whether it is cold or hot. In the evolutionary sequence of the globes, which is an open process, only the effects of individual stages of this process change (Table 2). The evolutionary sequence begins with a cold globe that transforms into a planet with a heating core. The phenomenon of heating up the planet consists of:

- a preliminary phase, that is, low-temperature ionization and the formation of a liquid plasma reactor jacket;
- the latent activity phase, consisting in the production of hot plasma, without its ejection outside the core;
- main phase, manifested by recombination of plasma components, all natural nuclides from 1 to 92, but mainly hydrogen nuclide, production of basalt magma and expansion of the globe. (Figure 5, 6, 7).

The evolution of the globes from the cold moon to the hot planet to the star. The process of heating the globe is manifested by an increase in the thermal index from 0 to 100%, where the index 100% means reaching the state of a hot planet, without a rock crust. The logical explanation for the next phase of the evolutionary sequence is the transformation of the globe into a star state. The correctness of such an interpretation of the evolution of the globes is the formation of stars in multiple systems. The sun and planets of the solar system were formed in the process of aggregation of cold galactic matter and a thermonuclear reactor spontaneously formed on the sun. The natural thermonuclear process is due to the forces of gravity and depends on the mass of the globe. The process takes place with any mass of matter in the range of $1E+22$ - $1E+34$ kg of globes. The soil weighing $5.97E+24$ kg falls within this range. Spontaneous thermonuclear reactors are ubiquitous in space and also occur in the hot core of the Earth.

In the process of the evolution of the globes, two sizes of the critical mass are distinguished. The first critical mass, on the order of $1E+22$ kg, concerns the initiation of thermonuclear reactions. Rift crevices and basalt magma outflows (traps) appear. The second critical mass, of the order of $1E+30$ kg, concerns the transformation of a hot planet into a star. The precondition for the creation of a thermonuclear reactor is the initial ionization stage in which a low-temperature plasma is formed. Due to the electromagnetic properties of this spot, a magnetic field is generated and the formation of a protective layer for the future reactor. In the second stage, after exceeding the critical mass of $1E+22$ kg, thermonuclear synthesis reactions are initiated and hot plasma is produced.

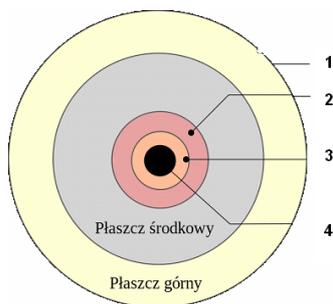


Figure 6. The Moon

1. Shell;
2. Semi-fluid lower coat;
3. Liquid outer core;
4. Middle coat;
5. Top coat

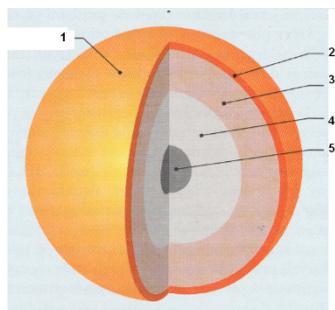


Figure 7. Jupiter (planet hot)

1. Clouds with sulfur content;
2. Atmosphere;
3. Liquid hydrogen;
4. Liquid plasma (magnetic shield of a thermonuclear reactor);
5. Thermonuclear reactor core

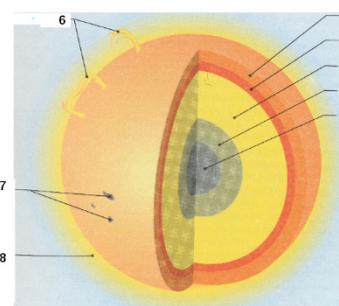


Figure 8. Sun (star)

1. Chromosphere;
2. Photosphere;
3. Zone convectin;
4. Radial zone;
5. Nucleus (reactor);
6. Protuberance;
7. Spots;
8. Crown

6. Conclusions

In the scenario of the evolution of the Earth, over a period of 4 billion years, the activity of a thermonuclear reactor was in a latent form, expressed by thermalism and the formation of the atmosphere. Seismic and volcanic activity occurred in the late Precambrian. Activity increased rapidly in the Palaeozoic, about 500 million years ago, and was marked by the phenomenon of an increase in the radius of the globe. The expansion of the globe occurred when the plasma pressure in the reactor exceeded the gravitational pressure.

The existence of a georeactor is confirmed by the universality of the phenomenon of spontaneous thermonuclear reactors in space, incl. In the sun. The required high temperature of the nuclide synthesis reaction is achieved by the constant increase in gravitational pressure and the creation of a magnetic trap. The trap is created by low-temperature plasma. Hot plasma is a product of the fusion reaction and is characterized by a stabilized nucleic composition. The evolutionary cycle of all globes results from the increase in mass, begins with a planetesimal and progresses through the cold rocky globes, hot globes, and ends with massive stars.

In the case of the Earth, which is a rocky globe with a heating up core, under the influence of increasing plasma pressure, excess plasma is sent to the outer core zone (layer D ") and transformed there into basalt magma. In the center of the Earth, zone D", occurs transformation of plasma into basalt pramagma. In this process, protons capture electrons and create hydrogen gas, which is a significant component of volcanic gases and post-treatment solutions. During post-magmatic migration, this hydrogen reacts with elemental carbon and carbon oxides to form methane and juvenile water.

Magma pressure causes the globe to expand, the radius of the Earth increases and stresses appear in the earth's crust. The creation of matter in the nucleus of the globe is therefore the cause of various forms of geological activity. The process of creating matter is an element of the evolution of the Earth resulting from the action of the primal forces of nature. Basalt magma (oceanite) is juvenile matter, which is confirmed by the results of geochronological studies. An important phenomenon is the increase in uranium concentration due to magma differentiation and selective precipitation of minerals from post-magma solutions. The concentration of primary uranium in ocean basalt is about 1 ppm and increases to 600 ppm in phosphate deposits. Exploitation of mineral deposits containing radioactive elements increases the radioactivity of the environment.

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Appendix

Basics of the Primary Forces of Nature Theory

The basic assumption of the <PFNT> theory is the Copernican view that the universe is infinite in time and space and that primal forces act in it: the force of gravity, electromagnetic forces and nuclear forces. The source of these forces is the subject of high-energy particle physics research. The theory takes into account the Einstein principle, the equivalence of energy and matter, and the fact of enormous pressure in nucleons. The energy, expressed in pressure in protons, is ten times greater than the gravitational pressure of a neutron star. On the other hand, proton matter is concentrated in three quarks. A neutron has a similar structure, distinguishing it from a proton only by the spin of one of the quarks. In nucleons one should look for a more complete answer about the relationship between energy and matter.

The force of gravity causes matter to thicken and temperature to rise. The heat and density of matter in the globe's core are therefore a function of the globe's mass. The effect of the increase in temperature and density of the medium are structural changes in matter, expressed in the process of ionization of matter and then in the process of ion synthesis.

The phenomenon of ion collisions, apparently impossible to be induced in natural conditions, in fact appears in the cosmos as a common, spontaneous phenomenon. The evidence is the thermonuclear reactor in the Sun. The main factor facilitating the ion collision is the formation, as a result of ionization, of a low-temperature layer of liquid plasma, which forms a tight shield for the thermonuclear synthesis reaction zone. Liquid plasma has electromagnetic properties, generates a magnetic field and can be magnetized itself. Thus, it forms the shell of the reactor and ensures the tightness of the thermonuclear reaction chamber, which meets the Lawson tightness criterion.

The high temperature condition is also met by the constant increase in the mass of the globe and temperature. The increase in temperature inside the ion fusion reaction chamber occurs as a result of the release of nuclear energy. The ion collision reaction produces a new, heavier ion and numerous protons, the total mass of which is smaller than the mass of the reacting ions. The mass difference is emitted as electromagnetic radiation energy and is called the mass deficit. The production of protons is so abundant that they constitute over 90% of the particles that make up the universe's plasma. The process of gravitational accretion and the continuous increase in the mass of the globe, followed by the increase in the density of matter and temperature constitute the formation of the evolutionary sequence of planets, which also applies to stars.

In the initial phase of the evolution of the Earth, about 3.8 billion years ago, thermonuclear reactions began, but in a latent form. Magma gases appeared, creating the primary atmosphere. A fragmentary magnetic field appeared. The Earth's core was warming up for several billion years, but it was only 0.5 billion years BP that the phenomenon of the globe expansion appeared. The phenomenon of expansion is expressed by the production of basalt magma and an accelerated increase in the volume of the globe. The growth curve of the Earth's radius takes the form of an exponential function. Calculations show that over the past 200 million years the volume of the Earth has increased tenfold without increasing the mass of the globe.

The expansion phenomenon appeared only when the pressure of the hot plasma exceeded the gravitational pressure and the resistance of the magnetically stiffened reactor shell. Hot plasma with the dominant participation of protons and alpha particles, after ejaculating outside the nucleus, undergoes the process of recombination. It is the opposite of ionization, involving the attachment of electrons and the formation of elements. After changing the structure, the radius of the matter particle increases a thousand-fold, which causes the uplift of the globe, the formation of fissures, volcanic eruptions or intrusions with batolitas.

The main conclusion, resulting from the theory of primal forces of nature, is that the source of heat in the Earth's core is a thermonuclear reactor operating there, and the cause of geological activity are hot plasma eruptions and the creation of basalt magma.

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