The General Mechanism of the Origin of Natural Disasters in the Global Dimension

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Abstract. The article presents a possible mechanism for the occurrence of natural disasters on a global scale based on the view of the Earth as an evolving electromagnetic self-oscillating system. The possible future of natural disasters in the global dimension is presented. It has been established that for the period from 1900 to 2020 there was a gradual, and at certain time intervals and a sharp increase in the number of catastrophes on our planet. At the same time, there was an increase in the number of victims of these disasters, the number of victims and material damage. The article emphasizes that catastrophes for our planet are a natural course of development for it as for an evolving electromagnetic self-oscillating system. For this reason, all natural disasters on our planet must be adequately accepted and understood that only for humans they are catastrophes, and in the event of human losses and economic damage, they pass into the stage of emergency situations. The article also shows a close connection between natural disasters and the rhythms of the Sun and solar activity.

1. Introduction

There is hardly a region or place on Earth where no natural disasters have occurred. Disasters are complex and interrelated events with a series of associated hazardous phenomena and processes that may occur simultaneously or sequentially [2]. In the author’s opinion, the term “disaster” is best defined in [1].

Disasters are discontinuous changes that occur as a spontaneous response of a system to gradual environmental changes [1]. Experts of the Centre for Research on the Epidemiology of Disasters define disasters as “an unforeseen and often sudden event that causes great damage, destruction and human suffering” [16, 17].

Recent years have seen an ever growing number of natural disasters, accompanied by increasing property damage and the number of victims [7, 16, 17]. There are different opinions about causes of natural disasters themselves and their consequences [16, 17]. Among numerous hypotheses and theories, the vast majority of experts refer to the cause which may be called the “anthropogenic factor”, attributable to human economic activities. They say that economic activities produce a large

«The frantic desire for life thrives in the heart of every great calamity»
Albert Camus
amount of gases and various industrial wastes released into the atmosphere of our planet, which lead to environmental degradation and a growing number of disasters. However, these experts do not take into account the fact that human activities around the world account for no more than 2% of gases released into the atmosphere, while 98% of emissions are generated by the planet itself.

This study makes an attempt to present the general mechanism behind the emergence of natural disasters on our planet, explain why their number is ever increasing, and predict their development in the future. This is the main purpose of this study.

2. Global natural disasters statistics
At present, specialists have an integrated continuous database of natural disasters for 1900–2016 [16, 17]. Although this database is clearly insufficient to make some accurate predictions of future development, it can be used to identify a number of patterns in the development of natural disasters. The processed statistical data on natural disasters are presented in Figs 1, 2, 3 and 4.

Figure 1. The number of natural disasters in the world, cases per year for the period from 1900 to 2020, compiled by the authors based on materials CRED [16, 17].
Figure 2. The number of deaths from natural disasters in the world, thousand people for the period from 1900 to 2020, compiled by the authors based on materials CRED [16, 17].

Figure 3. The number of people affected by natural disasters in the world, million people for the period from 1900 to 2020, compiled by the authors based on materials CRED [16, 17].
Figure 4. Material damage from natural disasters in the world, billion dollars for the period from 1900 to 2020, compiled by the authors based on materials CRED [16, 17].

The analysis of the data presented in Figs 1–4 suggests the following conclusions: 1) since 1975–76, the number of disasters has been ever increasing for some unknown reason. However, let us see what was developing fast in those years. Since those years, ionospheric sounding has been developing at an impressive pace. So-called over-the-horizon radars appeared. There was an increasing interest in using ionospheric radars for nighttime illumination of cities. People began to create artificial stars in the ionosphere without having an idea what this could lead to.

2) for the period under study, 1900–2020, the number of people killed by natural disasters has fallen sharply since 1966, with most deaths occurred in less developing countries; 3) since 1975–76, the number of victims of natural disasters began to grow at an increasing rate; 4) since 1975–76, property damage from natural disasters began to grow at an increasing rate. These trends are clearly demonstrated by Figs 1–4. However, there is no sufficiently proven and well-grounded theory that could explain the growing number of natural disasters on the planet. In the old fashioned way, all the attention is focused on collecting statistics from long-term direct observations of natural disasters themselves, without analyzing their connection with rhythms of the Universe. Events on Earth are directly related to rhythms of the Universe since Earth, as a celestial body, is an electromagnetic self-oscillating system.

3. General Mechanism Behind the Emergence of Natural Disasters and Their Development Patterns
1. An obviously ever increasing number of catastrophic natural disasters, such as earthquakes, hurricanes, tornadoes, increasing ocean temperatures, melting of Arctic ice, changes in the movement of the Earth’s magnetic poles, declined solar activity and internal heating of the Sun to dangerous temperatures — all these trends make us look for a single cause responsible for all catastrophic processes which we are witnessing today [6, 8, 9, 12, 13]. In general, the mechanism behind the emergence of natural disasters on our planet is as follows: a solar flare causes a high-speed solar wind that reaches the Earth’s magnetosphere. Solar wind particles are captured by the open part (tail) of the magnetosphere. In the pole region, a flow of charged particles rushes into the planet and excite the planet’s body. The excitation energy reaches the 30th parallel (30 degrees north and south of the equator). The excitation energy of the planet’s body is released to the equatorial belt in the form of high-power electromagnetic vortex structures. They rush to the surface, exciting volcanoes, causing earthquakes, generating vortexes on the ocean surface. They move towards the west, forming ocean
currents, including the Gulf Stream. The Gulf Stream and other frontal currents create cyclones and anticyclones, which determine the weather on the planet: due to variations in humidity, the electrical conductivity of the atmosphere increases, while the electric current flows from the ionosphere into the planet’s crust, causing local volcanic eruptions and earthquakes. The interaction of vortexes with the magnetic field of the planet and the ring current of the ionosphere, flowing from west to east, creates a powerful ponderomotive force which throws the vortexes high up into the region of the ionosphere and radiation belts.

2. The oscillation frequency of natural disasters is in polar opposition to the rhythms of solar activity (Fig. 5), which can be confirmed as follows.

![Figure 5. The relationship between the frequency of occurrence of natural disasters and the geomagnetic activity of the Sun, built by the authors based on materials [8, 16, 17].](image)

As described above, cyclones and anticyclones determine the planet weather by increasing the electrical conductivity of the atmosphere. The electric current flows from the ionosphere into the planet’s crust, causing local volcanic eruptions and earthquakes outside the equatorial belt. Thus, the changing electrical conductivity of the atmosphere is a source of natural disasters around the world and is associated with thunderstorm activity. Thunderstorm activity provides evidence of the fact that electrical currents flow from the ionosphere into the planet’s crust.

Maximum thunderstorm activity is observed in the latitude range of 30° north to 30° south, making up approximately 75% of all thunderstorms on the planet [14]. The highest thunderstorm activity on the globe is observed in three sectors (or clusters): Indonesian (or Asian), African (Africa and Europe) and American (Central America and northern South America) sectors. The latter two sectors feature the most intense thunderstorm activity [4]. A thunderstorm cloud is a localized area of strong convective and electrical activity. It can consist of one or more cells. The average radius of the base of a single thunderstorm cloud is $R \approx 2$ km. In middle latitudes, the top of a typical cell is located at heights of 8–12 km. The top of giant thunderstorm clouds, which are typical for tropical latitudes, can reach 20 km in radius. The lifetime of the cell, from nucleation to decay, is about one hour [4]. This supports the statement that the maximum number of natural disasters occurs in the latitude range from 30° north to 30° south. Long-term observations of atmospherics (radio signals generated by lightning discharges) demonstrate that changes in thunderstorm activity are in polar opposition to the level of solar activity in the 11-year solar cycle, i.e. “in phase” with changes in the cosmic ray flux. The cosmic ray flux in the atmosphere and thunderstorm activity is maximal during the periods of minimum solar activity and minimal during the periods of maximum solar activity [4, 14]. Thus, the
frequency of natural disasters is in polar opposition to the rhythms of solar activity, i.e., catastrophic activity is minimal when solar activity is maximal, and vice versa: catastrophic activity is maximal when solar activity is minimal. Now, the definition of the term “disaster” should be recalled. As defined in [1], disasters are discontinuous changes that occur as a spontaneous response of a system to gradual environmental changes. Thus, natural disasters act as a response of the system (i.e., the planet) to solar activity. Therefore, all natural disasters are the norm for the natural environment. In other words, all these events are considered extreme only from a human point of view. It is social vulnerability that allows us to consider a particular situation as a disaster.

3. The gradually increasing number of natural disasters in the 20th century, especially in the mid-1970s, can be attributed to a decreased flux of galactic cosmic rays falling on the atmospheric boundary. As studies have shown [15], the flux of galactic cosmic rays falling on the atmospheric boundary gradually decreases. This leads to a decrease in thunderstorm activity and a decrease in the potential between the Earth’s surface and the equipotential layer in the ionosphere. During the 20th century, the potential gradient at the Earth’s surface gradually decreased. This fact indicates a gradual decrease in thunderstorm activity and an increase in solar activity in the 20th century (Fig. 5). It is possible that the simultaneous decrease in thunderstorm activity and the increase in solar activity leads to a stronger response of our planet’s system to increased solar activity, and, therefore, causes an increase in the number of natural disasters. Indeed, receiving more energy from the Sun, our planet should give it back to outer space using the mechanism of solar-terrestrial relationships, but, as we can see from the data above, this mechanism has been disturbed. Therefore, our planet corrects the disruption of these connections using the phenomena that we usually call natural disasters.

4. The basic law of the Universe is the law of preservation of life formulated by Nikolay V. Petrov. According to this law, any subsequent action is based on memory of previous actions and generates a new structural form of memory in which the previous memory is included as a constituent part and does not change due to the continuous reproduction of itself in an exact copy, following the rhythm of changing the polarity of the magnetic field in the external environment [10]. Based on this law, the future development of natural disasters is associated with a change in the polarity of the magnetic field in the external environment.

Civilizations on Earth change every 25,920 years. Physical and chemical interactions on Earth change. The planet has been growing and expanding since the beginning of the 13,000-year cycle, increasing in its mass and size. Over the next 13,000 years, it collapses while generating internal heat which causes ice melting and flooding. Coastal cities and territories go under water. In order to keep the internal heat, the planet covers itself with an ice coat for several thousand years. The changes affect all areas of life and biosphere. Human society enters the era of matriarchy. This is only a partial insight into the natural change in the evolution process of the planet and the biosphere associated with the change in the polarity of the magnetic field [13]. Every 13 thousand years, our planetary system passes from the magnetic field of the Milky Way of the same sign into the field of the opposite direction at the equinoctial or bifurcation points (Leo and Aquarius constellations). These are growth points for natural disasters on our planet. According to Fig. 7, the Age of Aquarius has started in 2012. The previous Age of Pisces saw growing solar activity (it began to fall only at the beginning of the 21st century), decreasing thunderstorm activity and, consequently, increasing the number of natural disasters. Such changes are inevitable. Therefore, it can be expected that the number of natural disasters on our planet will grow.

5. Another reason for the growing number of natural disasters is human activities aimed at heating the ionosphere using ionospheric stations (such as HAARP), which disrupt the Earth’s rhythm. This is evidenced by the appearance of auroras at times when there is no solar activity. These experiments cause a number of extreme events: increased seismic activity, a growing number of typhoons and tornadoes, abnormal climatic and hydrological events. Earth responds to artificial excitation by increasing the number of natural disasters [3, 10, 11, 13].
4. Conclusion

1. Events on Earth, including natural disasters, are directly related to rhythms of the Universe since Earth, as a celestial body, is an electromagnetic self-oscillating system. Earth keeps a number of parameters constant by using external energy from the Sun. Thus, there is a real plasma mechanism of solar-terrestrial relationships in the form of a radiation belt, ionosphere and magnetosphere.

2. In general, the mechanism behind the emergence of natural disasters on our planet is as follows: a solar flare causes a high-speed solar wind that reaches the Earth’s magnetosphere. Solar wind particles are captured by the open part (tail) of the magnetosphere. In the pole region, a flow of charged particles rushes into the planet and excite the planet’s body. The excitation energy reaches the 30th parallel (30 degrees north and south of the equator). The excitation energy of the planet’s body is released to the equatorial belt in the form of high-power electromagnetic vortex structures. They rush to the surface, exciting volcanoes, causing earthquakes, generating vortexes on the ocean surface. They move towards the west, forming ocean currents, including the Gulf Stream. The Gulf Stream and other frontal currents create cyclones and anticyclones, which determine the weather on the planet: due to changes in humidity, the electrical conductivity of the atmosphere increases, while the electric current flows from the ionosphere into the planet’s crust, causing local volcanic eruptions and earthquakes. The interaction of vortexes with the magnetic field of the planet and the ring current of the ionosphere, flowing from west to east, creates a powerful ponderomotive force which throws the vortexes high up into the region of the ionosphere and radiation belts.

3. The temporal differentiation of natural disasters on Earth is associated with a gradual decrease in thunderstorm activity and an increase in solar activity in the 20th century. It is possible that the simultaneous decrease in thunderstorm activity and the increase in solar activity leads to a stronger response of our planet’s system to increased solar activity, and, therefore, causes an increase in the number of natural disasters. The frequency of natural disasters is in polar opposition to the rhythms of solar activity, i.e., catastrophic activity is minimal when solar activity is maximal, and vice versa: catastrophic activity is maximal when solar activity is minimal.

4. Natural disasters act as a response of the system (i.e. the planet Earth) to solar activity. These are a kind of relaxation processes. Therefore, all natural disasters are the norm for the natural environment. In other words, all these events are considered extreme only from a human point of view. It is social vulnerability that allows us to consider a particular situation as a disaster.

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