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GLOBAL CATASTROPHES IN A GLOBALIZING WORLD

ABSTRACT

This article is devoted to the critical points in the realization of the ongoing processes of globalization, which outline the problem field for human development and the course of global development processes. The paper comes to conclusions about the emerging responsibilities of society to the processes of global development and modeling of the development of individual geographical regions, in terms of the ongoing global processes at the local level and the implementation of actions in this sphere. An attempt is made to show the processes and phenomena that have a detrimental impact on development and will have a brutal effect on planetary development. In addition, the needs for change are related to objectively highlighting the territorial prerequisites and promoting the regional factors and geographic features of globalization, as well as to retain and further expand the already functioning businesses related to the irrational use of natural capital, and to attract new investments to overcome the ecological deficit of society.

KEY WORDS

ECOLOGY, CHANGE, MANAGEMENT, NATURE, COMPLEX, DEVELOPMENT

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F01, B40, D23, F18

INTRODUCTION

Our planet Earth has always been subject to natural and socio-economic changes. Today, in the global world of technology, the principles of a sustainable natural environment are linked to overcoming the geo-global natural-geographical problems caused by the interrelations of man and nature, his responsibilities towards himself, the natural environment and natural resources.

Since the second half of the twentieth century, human society has found itself face to face with numerous serious problems, among which is the predatory exploitation of the resources of the natural environment by human society itself. Humans for the first time saw their planet from space and how small and fragile it was and the prevailing picture of natural formations - oceans, seas, continents, soils, vegetation. Human activity, which so far does not fit into this picture, is the main cause of significant changes in the planetary system.

Global catastrophes are associated with events of a sudden nature that take place within the range of our planet and have a large deviation from their average manifestation. They have a negative impact on the economies of countries and the safety of populations. They are characterised by their great destructive power and destructive effect, which far exceed the ability of human society to mitigate or prevent their negative impact.

By definition, a catastrophe (from Latin catastrophe) is an unexpected misfortune; a calamity; an event with tragic consequences; a disastrous end, a disastrous conclusion . Global catastrophes are therefore events that cause many casualties or damage to the health of large numbers of people, affect the whole of human civilization and recognize no boundaries, and no single country can cope with them alone[1].

Any classification of global catastrophes on Earth is very tentative. Most often a combination of many factors of different nature leading to catastrophic consequences is used. There is no such thing as a ranking of all the bad things that could happen to all of us, but if there were, global catastrophe would probably be at the top. To the global catastrophes that threaten us now and in the foreseeable future we can with good reason include the evolution of the stars in the universe, the asteroid threat, and rogue artificial intelligence that can cause catastrophic destruction[2].
These sorts of terrible things (defined as events or processes) that would lead to the deaths of roughly 1/10th of the world's population or have similar impacts may only be hypothetical for now, but that doesn't mean we shouldn't recognize them, study them, assess their causes and risks, and do everything in our power to prevent them.

NEW TRENDS IN PLANETARY ENVIRONMENTAL PROCESSES

Astrophysicists who study the evolution of stars, taking into account the irreversible nuclear changes taking place in the interior of stars, believe that with the diminishing supply of hydrogen in its interior, the Sun will become progressively hotter in the future. This trend will make the Earth's surface so hot that water in the oceans will evaporate and the atmosphere will dissipate into interplanetary space. The charred surface of the planet will be exposed to scorching heat and no life form could survive it[2]. This would mean that climatic extremes on Earth would reach or even surpass those prevailing today on the planet Mercury, where no one would even think of looking for any sign of life. Neither we nor the other planets could do anything to save us from the Sun's farewell fiery embrace. The only consolation in this pessimistic outlook is the fact that this sad end is still very far in the future. It is likely to be another five to seven billion years before sunlight turns from benevolent friend to ruthless foe. Events will perhaps accelerate if the planets move closer to the Sun as time passes, or slow down if the planets move slowly away at the behest of the inexorable laws of celestial mechanics [3].
On the Sun there are constant explosions and discharges of plasma into space. The probability of an explosion leading to a global catastrophe on earth is estimated at about 12%. The last strong plasma release occurred in 1989, and one of the most powerful magnetic storms was recorded on Earth. Massive disruptions to power grids around the world were the aftermath of this magnetic storm. The year 2020 marked the beginning of our star's 25th solar cycle. We are currently at the low point of the changes. There is a lull like this every 11 years.
According to the Global Catastrophic Risks Report 2021 by the Swedish Global Challenges Foundation, the most likely global catastrophes that could happen in the next few years are also questioned in advance planning to prevent a catastrophe and studying the next global risks. The survival of human civilization near a black hole formation is identified as such[4]. The night sky may appear calm but, in reality, cataclysms are constantly occurring throughout the cosmos. Among the most extreme of these are gamma-ray bursts (GRBs). These occur when old stars collapse to form black holes. The amount of energy released is enormous. In no more than a few minutes, an amount of energy equivalent to that released by the Sun over its 10 billion-year existence is ejected in concentrated beams of high-energy radiation called gamma rays. What might happen to our planet if the Earth were hit by such a powerful beam of radiation? Direct damage would be limited because the Earth's atmosphere would weaken the GRB beam significantly. A brief pulse of a dangerous ultraviolet beam (UV radiation) would reach the Earth's surface, but widespread damage would be prevented. The GRB beam, however, would be catastrophic to the stratosphere (the layer 10 to 50 km above the Earth's surface where there is a high concentration of ozone), ultimately wreaking havoc on the Earth's surface[4].

The main destructive effects are caused by gamma rays, which ionise and dissociate nitrogen and oxygen molecules in the stratosphere, forming ozone-destroying nitrogen compounds. The subsequent destruction of the ozone layer will lead to increasing levels of solar ultraviolet radiation reaching the Earth over several years. It damages DNA, leading to the destruction of life forms, for example through developmental abnormalities and cancer. Surface marine inhabitants, such as plankton, which are critical to the food chain and global oxygenation, will be threatened. A secondary effect will be smog-like nitrous oxide gas, which is produced in the stratosphere and will reduce the amount of visible sunlight reaching the Earth's surface. Although the reduction in visibility is expected to be small and to last for several years, it could lead to global cooling at the extinction level if the climate system has already reached its tipping point.

But the chance of the GRB beam threatening life on Earth is still minimal. All the outbursts observed so far have occurred far outside our galaxy. Consequently, the GRB beam is weak and has little effect, if any, on Earth's atmosphere[5]. Understanding the risk associated with GRBs is possible through curiosity-driven research, which seeks a deeper understanding of the world without providing a specific application. This leads to a better understanding of habitable zones in galaxies in general, which informs the search for extraterrestrial life .

Only 10% of all galaxies may be hospitable to life. The low-density regions of galaxies are favorable as conditions are not conducive for GRB beam formation. It is reassuring that the solar system is in just such an environment [5].

Towards the lower risk global catastrophes is the asteroid collision hazard. An asteroid is a small planet-like celestial body in orbit around the Sun. Asteroids are also considered to be minor planets, with sizes much smaller than those of the actual planets. The exact definition of an asteroid has not yet been fully clarified, but relative to their size, asteroids are bodies larger than 50 m in diameter, unlike meteorites (solid bodies of extraterrestrial origin ranging in size from a few mm to several m). Large space objects include asteroids more than 1 km in diameter. There are about 120 very large asteroid craters known on our planet. Asteroids can reach the Earth's surface almost unimpeded, unlike meteorites, which explode when they enter the Earth's atmosphere. They are composed mostly of rocks and metals. The asteroid that killed the dinosaurs 65.5 million years ago is about 10 km across. The fall to Earth of a cosmic body with a diameter of 90 km is absolutely guaranteed to end life on the planet. Many scientists have developed theories that the mass extinction during the Cretaceous and Tertiary periods was caused by one or more catastrophic events, including a massive asteroid impact or increased volcanic activity[6].

In 1980, a team of scientists led by physicist and Nobel laureate L. Alvarez discovered that sedimentary layers from the Cretaceous-Tertiary boundary all over the world contained iridium in concentrations many times higher than normal. Because iridium is present in abundance in most asteroids, Alvarez's team speculated that it was an asteroid impacting Earth .

With growing acceptance of L. Alvarez's theory of the extinction of the dinosaurs and the 1994 collision of the comet Shoemaker-Levy 9 with the planet Jupiter, increasing attention is being paid to the question of identifying asteroids whose orbits cross Earth's and which are likely to collide with Earth in the future. Since 1998, highly efficient automatic asteroid detection and observation systems have been introduced, equipped with cameras and computers directly linked to telescopes[7].

It is no coincidence that the Global Catastrophic Risks Report 2021 includes asteroid impacts among the 10 major risks identified. The largest of these (over 1 km in diameter) have the potential to cause geological and climatic impacts on a global scale, threatening all of human civilization. Smaller asteroids (in the 140 m to 1 km range) could cause regional to continental destruction, potentially killing hundreds of millions of people.

Relatively smaller objects also pose a serious threat to the Earth, as their blasts to populated areas as a result of the shock wave and heating could cause significant destruction commensurate with the damage of an atomic blast. By just one coincidence, the one that fell in an uninhabited area in 1908. The Tunguska meteorite (one of the most mysterious phenomena of the 20th century) did not cause such consequences. A giant orb flew over a vast area of Siberia between the Lower Tunguska and

Lena rivers, its flight accompanied by sound and light effects and ending with a powerful explosion that devastated the taiga forest and destroyed wildlife. In the following nights, the skies over southern Siberia, Central Asia and almost the entire continent of Europe is illuminated in bright and unusual colors that have gone down in history as 'the bright nights of the summer of 1908'. In 2013, a meteorite with a diameter of about 17 m and a weight of about 10 thousand kg was found. It entered the Earth's atmosphere above the town of. It disintegrated into a large number of fragments. The Chelyabinsk meteorite became the largest celestial body to fall to Earth since the Tunguska meteorite. Asteroid studies continuing since the 1990s have discovered more than 26 thousand asteroids of various sizes by the end of 2021 . The key factors influencing risk levels are related to the probability of a collision with Earth, the size and composition of the asteroid, and the location on Earth where the event will occur.

In September 2022, the asteroid is expected to be on the Earth's surface. NASA conducted an unprecedented, world-first test of planetary asteroid defenses. NASA's Double Asteroid Redirect Test (DART) spacecraft crashed into the asteroid Dimorphous about 11 million km from Earth. The mission was designed to determine if a spacecraft could alter the trajectory of an asteroid through sheer kinetic force, pushing it off course enough to keep Earth out of danger.

Scientists hope the method can be used to push asteroids and prevent cataclysms. With vigilance and advance warning, an asteroid impact is a devastating disaster that can be prevented.

The International Asteroid Warning Network (IAWN) and the Space Mission Planning Advisory Group (SMPAG) provide mechanisms at the global level to address the global challenge posed by asteroids, including detection, tracking and impact risk assessment, and subsequently planetary protection measures such as civil defense and asteroid diversion.

The category of emerging risk threats to global catastrophes must include malicious artificial intelligence. It may not seem like an immediate source of concern. However, we must remember that the challenges that are widely recognised as the greatest and most significant today - climate change and nuclear weapons - were unknown only 100 years ago, and a delayed response as in the case of climate change has increased the level of risk significantly.

Human intelligence has led to human society's greatest successes, but it is also behind some of the greatest catastrophes. What would happen if we created an artificial intelligence that was significantly more intelligent than any human on the planet. Could it help us achieve even more remarkable successes, or would it trigger the emergence of the greatest catastrophe: the extinction of human civilization[7].

Modern artificial intelligence systems already outperform humans in the tasks for which they are trained, especially in terms of the speed at which they act. In just a few seconds, an AI system can reproduce the winning move in a chess game, translate an article, or plot a route to a destination by taking into account current traffic patterns. Despite the fact that it takes longer for each person to perform any of these actions, a key aspect of human intelligence is the fact that we can perform all of these tasks i.e. we have general intelligence. While AI systems can only perform the tasks they are programmed to do, humans can learn from experience and develop new skills and competencies or solve new problems.

Many experts worry that if an AI system achieves human-level general intelligence, it will quickly surpass us, just as AI systems have done with their narrow tasks. At this point, we don't know what artificial intelligence will do[8].

First, it is important to note that experts are not worried that artificial intelligence will suddenly become psychopathic and start randomly hurting or killing people. Instead, experts fear that AI programs will either be used intentionally to cause harm or will be too competent at a task that turns out to be ill-defined .

Artificial intelligence researchers are racing to find ways to prevent the spread of fake news, as well as with the emergence of blatant fakery, in which programs alter what is seen or heard in a video. At the same time, artificial intelligence systems deployed with the best of intentions to identify images, review job applications, have inadvertently increased institutional requirements, putting jobs at risk

and exacerbating inequality. It is not hard to imagine how dangerous advanced AI systems can become, operating across multiple platforms or falling into the hands of terrorists or despots. The world-renowned robotics professor N. Sharkey believes we have reached a stage in the development of artificial intelligence where we have created robots that may decide to get rid of their creators. "We are moving rapidly towards a revolution in robotics and we don't think about the myriad unpredictable problems that pop up under our noses. The time has come to take a step back, and we need to think about the future of technology before we've had enough of it" .
Until recently, robots were mostly applied in the manufacturing sector (mainly in industry), but the situation in a globalising world has changed rapidly with the automation of the service sector (service industry). Today, there are around 12 million robots in operation worldwide, while their industrial counterparts number only 1.3 million. The International Federation of Robotics predicts that by the end of 2022, the number of smart machines in the service sector will reach 31 million robots. According to H. Christensen, director of the Center for Robotics and Artificial Intelligence Machines at the Georgia Institute of Technology in the US, we will need to have ethical norms that allow for normal interaction with robots without crossing the line of what is allowed. It is no coincidence that the UK government is preparing a document on the status of robots in 2056, in which, if artificial intelligence becomes ubiquitous, there may be calls to grant them rights on a par with humans[6],[7] и [7].

CONCLUSION

It is undeniable that significant resources are being devoted to developing the potential of these technologies, but very little is being devoted to mapping and managing the new hazards they bring. As the pace of technology development cannot be expected to be linear, and given our limited knowledge and resources, more and more experts from around the world are calling for proactive action on these risks today. Science fiction often portrays AI systems as humanoid robots, but the AI systems we interact with in our daily lives are usually algorithms running in the background of some program we use. They work so seamlessly that people outside of the AI world often don't even realize they're just interacting with an AI. For now, these programs can only perform these narrow tasks. But it is generally accepted that we will be forced to create AI systems capable of performing most tasks like any human. According to the average expert surveyed, there is approximately a 50% chance of such artificial intelligence by 2050. Despite their size, the risk of global catastrophes such as the evolution of the stars in the universe, the asteroid hazard, and rogue AI is receiving less attention. One reason is that many of these risks are unlikely in any decade of the 21st century. But even when the likelihood is small, the obvious significance of these harmful impacts threatening the survival of human civilization demands that these risks be taken extremely seriously. Reducing the risks of global catastrophes is both a global and intergenerational public good.

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