

Short Communication

Comment to the Article “Physics of Global Warming-Cooling Cycles”

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Citation: IV Kuzminov (2023 Comment to the Article “Physics of Global Warming-Cooling Cycles”. *SciEnvironm* 6: 180.

Received: April 14, 2023; **Accepted:** April 23, 2023; **Published:** May 4, 2023.

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Abstract

This article is a commentary on the article “Physics of global warming -cooling cycles” published in the journal Environment Pollution and Climate Change, vol. 6(1). This article provides a summary of this article and a comment. Currently, a book, a collection of articles “The Picture of the World by the Second Law of thermodynamics” is being prepared for publication. The article is included in this collection. In the article the mechanism of formation of the oscillatory process is given. The action of the second law of thermodynamics explains the nature of this oscillatory process, the process of damping. Indirect evidence of the existence of an oscillatory process of the Earth's climate is fluctuations in the level of the World Ocean.

Keywords: *Global Warming, Global Cooling, Fluctuations in the Level of The World Ocean, Heat and Moisture Exchange in the Atmosphere, Continuous Cloud Cover.*

Physics of warming and cooling cycles

The main factor affecting the climate is the optical properties of the atmosphere, which vary depending on its composition and condition. According to the proposed hypothesis, these processes under normal conditions acquire an oscillatory character. The process has a multifunctional dependency. The article presents one complete oscillation cycle; the subsequent processes are repeated with decreasing amplitudes and periods as the oscillatory process fades. Consideration of the cycle began with the warming phase corresponding to the present time. Now we are in the warming stage. During the warming period, the polar caps melt, the level of the World Ocean rises, the average water temperature rises, and the average humidity of the air increases. During this period, cyclonic heat and moisture exchange is characteristic of the atmosphere. It seemed that the average humidity of the atmosphere was constant and maintained by the balance of evaporation and precipitation. However, over time, the average humidity in the atmosphere increases (this is confirmed by modern observations). At a certain point, as humidity increases, conditions develop in the upper layers of the atmosphere to create a dew point effect. This effect is a stable (continuous) formation of clouds over the entire surface of the atmosphere upon reaching a stable dew point in the upper atmosphere. The stability of the dew point is supported by a change in the nature of atmospheric air circulation from cyclonic to global breeze. The formation of a stable (permanent) continuous cloud cover is a turning point in optical and thermal engineering processes on the earth's surface, in the atmosphere. Continuous cloud cover dramatically increases the amount of reflected solar energy (albedo), respectively, the amount of solar energy absorbed by the earth decreases, and the cooling process begins. A detailed description of the processes is presented in article [1].

The process of transition of climate warming to cooling can be explained by a sequence of phenomena: the heating of the oceans, an increase in the average humidity of the atmosphere, the transformation of the cyclonic circulation of the atmosphere into a global breeze, the formation of continuous clouds, the reflection of almost all solar energy into space (a significant increase in albedo). The process of transition from a cold climate to a warm one: the beginning of ocean heating, the violation of continuous clouds, solar energy reaching the earth's surface, heating of the atmosphere.

The hypothesis explains the cyclical nature of the phenomena of cooling and climate warming by well-known thermal engineering processes. The processes of fluctuations in the level of the World Ocean can be taken as a mirror of these processes. Analysis of these fluctuations will give more accurate information about the period of fluctuations of the last available historical interval. It is quite possible that some climate fluctuations can be reflected in this analysis depending on the geological activity of the Earth, volcanic activity. Volcanic activity, for example, is able to change the optical properties of the atmosphere, respectively affecting the climate.

The place of cycles of climate fluctuations in the temperature regime of the Earth

It should also be noted that the cycles of global warming and global cooling occur against the background of a decrease in the average temperature of the Earth as a whole, against the background of cooling of the Earth in the long term. The cooling process of the Earth takes place according to the Second Law of Thermodynamics. In other words, the resulting vector of temperature fluctuations on Earth is directed towards a decrease in the temperature of the Earth in the macro process. In forming a picture of the world, it is necessary to take into account, in addition to cooling the Earth, the constancy of the amount of water (in all transformations), a change in the geomorphology of

the Earth, namely, an increase in the thickness of the Earth's crust during cooling. Increasing the thickness of the Earth's crust increases the thermal insulation of the Earth, reducing heat losses into Space. Climate fluctuations have practically no significant effect on the average temperature of the Earth.

Characteristics of the oscillation cycle

In general, the oscillation process is attenuated. The oscillation amplitude and the oscillation period decrease over time. The attenuation of the oscillatory process is a topic of separate research.

The cycles at the present stage of the Earth's life are characterized by the following points. Since the fluctuation of the world ocean level is a direct reflection of climate fluctuations, it is enough to study this process. So, for example, the cooling stage is characterized by the rapidity of the process in time. The duration of this stage is approximately measured in hundreds of years. The duration of the warming stage is measured in thousands of years. The difference in duration is explained by thermal and thermodynamic processes. So, for example, the meltwater of glaciers slows down the heating of the water of the World Ocean during the warming period, respectively, prolongs this period.

The cooling stage is characterized by: a decrease in the average air temperature, a decrease in the level of the world ocean, the drying up of inland reservoirs, and the growth of polar snow caps. The warming stage is characterized by: melting of polar snow caps, rising sea levels, and an increase in average air temperature. At the beginning of the warming stage, the basins of the inland reservoirs adjacent to the polar snow caps are filled (for example, the Pont-Caspian Basin, the basin of the Great Lakes). At the end of the warming stage, inland reservoirs dry up.

Combating the effects of global warming

At the present stage of human development, radical measures to combat the consequences of the warming process are impossible. The main negative consequences of the warming process are rising sea levels (flooding of territories), problems of agriculture, increased consumption of resources to ensure comfortable climatic conditions, melting of permafrost. It makes sense to discuss measures to minimize the negative effects of global warming. For example, an event is proposed to combat the rise in the level of the world's oceans. In the article [2], it is proposed to use the Pont-Caspian Basin as a natural reservoir for dumping excess meltwater.

Conclusions

Fluctuations in air temperature and climate changes on Earth are naturally cyclical. The cycles of global warming and cooling are of a natural nature, have natural causes. Anthropogenic impact can only distort these processes, but not control them. Currently, the Earth is in the stage of warming in the short term, in the stage of cooling in the long term.

References

1. Kuzminov I V. "Physics of global warming -cooling cycles", Environment Pollution and Climate Change, vol. 6.

2. Kuzminov I V. (2014)"Caspian and Manych save the world" (in Russian) Eastern *European Scientific Journal* No 6: 133.