

## GLOBAL WARMING AND ANTHROPOGENIC FACTOR

Andreyev S.S., Popova E.S.

Branch of the Russian State Hydrometeorological University,  
Rostov-on-Don, e-mail: rggmurd@yandex.ru

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In this paper attempt is made to objectively appraise causes of the observable global warming and to determine place and role of anthropogenic factor.

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One of the most discussed topics nowadays is the problem of changes in climate, specifically – global warming. Moreover, not only professionals make discussions and conclusions, but everyone, thus frightening commoners with either dramatic rise of temperature, or a new ice age, or even the Flood. Such ideas are based on different scenarios and forecasts which are misjudged, misunderstood and are often really far from the truth.

Discussions on changes in climate that are based on personal life experience are usually subjective as they grow on comparing *weather* conditions of different life periods. However, one should understand that climate and weather are far not the same things! Weather

condition (weather) are specific actual values of meteorological indications (air temperature and humidity, wind parameters, atmospheric pressure, etc) in a specific place and in real time. While the climate is the same values that are generalized for no less than thirty years, as it is accepted by the World Meteorological Organization. Moreover, changes in climate do not only mean temperature rises. General term «*global climate change*» should be understood as *re-construction of the planetary ecological-climate system and ecosystems of lower levels.*

In order to understand what happens to the climate nowadays and will happen to it in future, it is necessary to consider a multiplicity of natural and antropogenic factors:

Antropogenic	Natural
Burning of organic fuel (heating energy, transport, household)	Solar activity
Industry	Parameters of heliocentric orbit
Agriculture	Mood movement
Wood production	Movement of heavy planets
Hydro-construction, melioration	Volcanic activity
	Auto-oscillations in atmosphere
	Geomagnetic activity
	Earth spinning speed
	Oceanic circulation
	Tectonic activity

The most important, evident, and unquestioned factors are: solar activity, the Earth's position on heliocentric orbit along which it circles around the sun; and less evident such as: Mood movement and position of heavy planets (Jupiter and Saturn).

But the impact upon the climate system isn't limited by these outer factors, as it is an example of non-linear stochastic system that can generate considerable alterations within itself. As examples we can recall El-Ninho (a boy in Spanish) and, less popular but still having a great influence on European nations, the phenomenon of North-Atlantic oscillation.

Studies that take place nowadays in national department of oceanic and atmospheric research of the USA allowed us to reveal why the global warming went on slower that it has been

shown by climatic models, that were based on accumulation of hotbed gas, during the first decade of the XX century. The main reason is rather high concentration of aerosols in the air that integrate atmosphere from natural origins and due to antropogenic factors and reflect solar emission back into space.

Through mathematic calculations it has been revealed that aerosol impact decreases expected warming by 25% in general. As a result, the observed global warming has slowed down due to density of the atmosphere.

It is extremely difficult to define the part of natural and antropogenic factors in this process, as the atmosphere level of aerosols is a constantly alternating value.

Scientists of the Alabama university in Huntsville, USA who have analyzed the data

of American satellite Terra, have concluded that the climate warms up, Earth atmosphere emits heat into space more actively as it is in calculations of various climatic models. As it has been shown, the atmosphere does not simply give away more energy than we thought, but this process also starts earlier. According to the forecasts, climatic system must absorb solar energy up to the highest heat level, but actually, it starts to lose energy more than three months prior to maximum.

Obviously, natural alterations in cloudness, solar radiation, heat, generated by oceans and a number of other factors that affect atmosphere with a time lag, do not allow us to reveal climatic changes of anthropogenic origin. There are too many variables. The problem of measuring reaction to changes in atmosphere is not solved yet, and it is impossible to divide radiation impact and radiation heat exchange.

Nevertheless, climate warming on our planet shows itself. It is caused, obviously, by the increase in Solar activity, as it was before. It is confirmed by the member of the Russian Academy of Science Andrei Kapitsa and many foreign scientists.

However, even if we agree with adepts of the anthropogenic hotbed theory, the part of the human factor is significantly overestimated. French geologists have proven that earlier calculations of amounts of carbon oxide that are discharged during volcano eruptions are incorrect, as the greatest amount of CO<sub>2</sub> enters the atmosphere due to the processing of carbonate grounds, along which lava of an extremely high temperatures flows. Besides, as it has been proved by scientists from Arizona university, damage of forest fires is considered incorrectly. They discharge much more carbon oxide into the atmosphere than it has been thought (here the role of anthropogenic factor is high). Economic activity of the humanity equals up to 27 million tons of CO<sub>2</sub> discharges a year, and forest fires add about 15 million tons to it. In total, up to 230 million tons of this gas is discharged into the atmosphere, so the anthropogenic part in it forms only 10% of the total volumes of discharge.

The head of department of the Institute of space research (ISR) of Russian Science Academy Evgeniy Sharkov, during his report at the all-Russian conference «Distant probing of Earth from space» outlined that numerous hy-

pothesis that industrial activity of human had become the cause of the global warming of the planet climate are were incorrect. Planet Earth has a unique thermostabilizing system «ocean-atmosphere» that is in a state of stable balance, and the humanity with its modern energetics and volumes of hotbed gases discharge cannot break this balance on its modern development stage.

A further increase in temperature is expected, and it will reach ~1,0°C by 2050 y. and ~1,5°C by 2100 in general all over the world.

Causes of climatic changes:

1. Radiation balance of Earth has a defining role in forming the planet's climate.

2. The main cause that influences long-term climate oscillations is a change of eccentricity of the Earth's orbit around the sun and precession of the Earth's spinning axis (in accordance to the astronomic theory of cyclic alterations in climate by Milankovich [5]).

3. Mixture of deep oceanic waters with shallow water leads to the temperature fall, as an average ocean temperature equals 3,5°C, and earth surface – 15°C (alterations in circulation of the world ocean).

4. Anthropogenic factor, or an influence of human activity.

5. Unstudied cyclic processes in the system of space – ecological-climate system of the planet.

6. Unknown factors that do not possess a lot of energy but provide for the function of the global climatic system.

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