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Article

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Reference: Casadiego, Rogelio Pérez (2022). Observing the absorption of ultraviolet radiation from the sun by oxygen from the atmosphere as the cause of global warming. In: Technology audit and production reserves 5 (3/67), S. 29 - 33. http://journals.uran.ua/tarp/article/download/266490/262573/615134. doi:10.15587/2706-5448.2022.266490.

UDC 504.75:546.217:523.9-7
DOI: 10.15587/2706-5448.2022.266490
Article type «Reports on Research Projects»

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OBSERVING THE ABSORPTION OF ULTRAVIOLET RADIATION FROM THE SUN BY OXYGEN FROM THE ATMOSPHERE AS THE CAUSE OF GLOBAL WARMING

The object of the research is global warming also called climate change, which is presented by the increase in the temperature of the planet. The main theory explains that heat on the planet is caused, after the solar constant by a so-called greenhouse effect, which is caused by gases from the atmosphere that absorb infrared energy emitted from the surface of the earth, so the problem of global warming, is described as an increase in the greenhouse effect, due to the increase of these gases. One of the most problematic places is that, based on the observation of the absorption spectrum of gases from the atmosphere, we know that the gases that absorb infrared radiation are only 0.04 %, the other 99.9 % does not absorb infrared radiation. In addition, 100 % of the gases in the atmosphere emit infrared radiation due to their kinetic movements, which allows to measure their temperature. In the course of research, the absorption spectrum of gases from the atmosphere is used to indicate that oxygen, which constitutes 21 % of the air, absorbs ultraviolet radiation, making it the main source of absorption of solar radiation from the atmosphere. In the future, the proposed approach should consider the absorption of ultraviolet by oxygen from the atmosphere, and physicochemical processes (ionization), to explain heat and the increase of this on the planet, in addition to electricity in the air, part of daylight, and forest fires.

Keywords: *oxygen, ultraviolet radiation, ionization, infrared radiation, air electricity, kinetic energy, GHGs, global warming.*

Received date: 19.10.2022
Accepted date: 31.10.2022
Published date: 31.10.2022

How to cite
Casadiego, R. P. (2022). Observing the absorption of ultraviolet radiation from the sun by oxygen from the atmosphere as the cause of global warming. Technology Audit and Production Reserves, 5 (3 (67)), 29–33. doi: https://doi.org/10.15587/2706-5448.2022.266490

1. Introduction

In the world it is under the influence of global warming, which we also understand under the concept of climate change. The problem of climate change is mainly presented by an increase in the temperature of the planet. The temperature of the planet can be understood primarily as the average speed of all the molecules that make up the atmospheric system [1], by the absorption of the energies emanating from the sun or another source. Then we understand that an increase in the velocity of molecules will be caused by an increase in energy absorption, or the increase of molecules in the atmosphere, would cause a greater global warming. Science teaches us that the average temperature of the planet after the solar constant would be –19 °C, but thanks to the gases that absorb infrared and re-emit it to the earth, the average temperature of the planet is 14 °C [2]. This process describes it as a greenhouse effect, and the increase in global warming describes it as the increase in gases that cause this effect (Greenhouse gases), mainly due to human activity [3, 4], and points to fossil fuels as the main source of increase of these gases [5].

When we observe that 99.9 % of the molecule in the atmosphere does not absorb infrared, then we understand that the so-called greenhouse effect is not effective in increasing the kinetic energy (temperature) of the atmosphere, because infrared energy absorbing gases are only 0.04 % of all molecules in the atmosphere. Under this kinetic motion equivalence, we understand that this percentage of gases is not significant to sustain the average temperature of the planet. The problem with the greenhouse theory is that it interprets the temperature of the atmosphere as infrared light retained by GHGs, when infrared is light [6], and temperature is an average measure of the kinetic motion of all the atoms or molecules that make up a system [1]. Another error in the theory of the greenhouse effect is that it does not take into account that the infrared we see in the atmosphere is emitted by all the molecules that make it up, due to their kinetic movements. The greenhouse effect theory explains that the infrared we see in the atmosphere is emitted by the earth's surface, which is absorbed and re-irradiated by greenhouse gases [7]. This error could be due to the fact that air is matter invisible to the human eye, so when we

ISSN 2664-9969

see infrared in the air, we do not see the matter that emits it, unlike visible bodies such as humans.

Thus, the *object of the research* is global warming also called climate change, which is presented by the increase in the temperature of the planet. *The aim of the research* is to show that oxygen in the atmosphere when it absorbs ultraviolet radiation from the sun [8] increases the kinetic energy (temperature) of the air molecules, in addition, because it is a highly reactive gas, physicochemical processes (ionization) [9], also cause light, ozone [10], air electricity and forest fires.

2. Research methodology

The research was conducted by the hypothetical deductive method, the same one that consisted of observing the theory and the known scientific data and applying them to the theory of global warming.

3. Research results and discussion

3.1. Formulation of the theory and the definitions. For more than 100 years scientists know the importance of sun energy in the heat of the air. First to predict global warming: The Nobel Prize Svante Arrhenius, in the 1896 document shows a context in his writings, where scientists agreed that the air retains the heat of light, and that the increased heat retention of the air is the energy that and they called it Dark (ultraviolet). The concept of the greenhouse effect began to appear at this time, as retention of both infrared and ultraviolet radiation, they called it, dark light, giving greater importance to the percentage of these gases in the atmosphere.

At the time of 1896 was not known with accuracy the percentage level of gases in the atmosphere, as now, by which favored some by the vapors from the air, and others by the carbonic acid, called carbon dioxide, because they were the gases in the atmosphere that absorbed heat.

The work of Nobel Prize proposed an increase in the temperature of 8 °C and 9 °C for Arctic areas if the quantity of CO_2, increased in 2–3 times its value [11]. It is known today that the amount of CO_2 emitted in the Arctic is ten times more than what they have estimated, the CO_2, increased in the last 100 years, in 105 ppm in the whole planet, increasing only a 1.09 °C in the average temperature of the planet [12].

3.2. Greenhouse effect. Thanks to the atmosphere, the earth has no great thermal contrasts. Due to the natural greenhouse effect, this is produced by all gaseous components of the air, which absorb much of the infrared radiation re-emitted by the terrestrial surface. This greenhouse effect has a key role in the smooth average temperatures of the planet. Thus, taking into account the solar constant (calories that reach the surface of the land per square centimeter and per minute), the average temperature of the earth would be –18 °C, incompatible with life as we know it. In contrast, its real value is approximately 15 °C due precisely to the greenhouse effect [13].

3.3. The atmospheric electricity. Is it the diurnal variation of the network to electromagnetic the atmosphere (or, more general, any electrical system in the atmosphere of a planet) the surface of the Earth, the ionosphere and the atmosphere is known as the «electrical circuit global atmospheric». The atmospheric electricity is a cross-curricular theme. There is always free electricity in the air and in the clouds, which act by induction on earth and electromagnetic devices. Experiments have shown that there is always free electricity in the atmosphere, which is sometimes negative and other times positive, but most of the time is generally positive [14].

3.4. Ionization. It is the chemical or physical phenomenon by which ions are produced, these are atoms or molecules electrically charged due to the excess or lack of electrons with respect to an atom or neutral molecule [15].

3.5. Composition of the Earth's atmosphere. The atmosphere of the planet is made up of 78 % of nitrogen which is an inert gas that usually does not react with other substances. 21 % oxygen which is a highly reactive gas, 9 % argon, and 0.1 % of other gases, almost the whole of the air (95 %) has less than 30 km high, being more than 75 % in the troposphere. The air form in the troposphere a mixture of gases homogeneous to the point that their behavior is equivalent to that which would have if it were composed of a single gas:

– Nitrogen: constitutes 78 % of the volume of air. It is composed of molecules that have two nitrogen atoms, so that its formula is N_2. It is an inert gas, i. e. that usually does not react with other substances.
– Oxygen: represents the 21 % of the volume of air. It is formed by molecules of two atoms of oxygen and its formula is O_2. It is a gas very reactive and most of the living beings need to live.
– Argon: contributes in 0.9 % of the volume of air. It is a noble gas that does not react with any substance.
– Carbon dioxide: it is composed of molecules of a carbon atom and two oxygen atoms, so that its formula is CO_2. Represents the 0.03 % of the volume of air and participates in the biological processes and climatically very important. The plant needs to carry out photosynthesis and is the residue of the breathing and combustion reactions that occur, for example, in a forest fire or in the engine of a car.
This gas helps retain mainly the heat of radiation terrestrial and atmospheric, so that is the main cause of the greenhouse effect.
– Ozone: It is a minority of gases found in the stratosphere. Its formula is O_3, because its molecules have three oxygen atoms. It is of great importance for life on our planet because its production of atmospheric oxygen absorbs most of the ultraviolet rays of the sun.
– Water vapor: It is in very variable quantity and participates in the formation of clouds or fog. It is one of the gases that cause the greenhouse effect.
– Solid Particles and liquid: in the air there are many solid particles in suspension, like, for example, dust that raises the wind or the pollen. These materials have a very variable distribution, depending on the wind and the human activity. Between the liquids, the most important substance is the water in suspension that is located in the clouds [16].

3.6. Ultraviolet radiation. Is called ultraviolet radiation or UV radiation to the electromagnetic radiation whose wavelength is covered approximately between 400 nm ($4 \cdot 10^{-7}$ m) and 15 Nm ($1.5 \cdot 10^{-8}$ m).

The greater part of the ultraviolet radiation that reaches the Earth occurs in the forms UV-C, UV-B and UV-A [17].

3.7. Increased ultraviolet radiation. NASA scientists who analyzed 30 years of satellite data found that the amount of ultraviolet (UV) radiation that reaches the surface of the Earth has increased significantly in in the years of (1979–2008). Most of the increase has occurred in the middle and high latitudes, and there has been little or no increase in tropical regions [18].

The researchers speculate that this increase in the flow of ultraviolet light may have been caused by the depletion of the ozone layer, as a result of the increase of aerosols due to the seasonal storms and fires in the area. In addition, there was a large solar flare just two weeks before it is recorded flows UV higher.

Although the evidence that relates the event solar with radiation record is only circumstantial, it is known that the particles of these eruptions affect atmospheric chemistry and can increase the ozone depletion [19].

The investigation in Australia for a period of fifty years (1959–2009) found that there has been a total annual increase in UV levels from 2 % to 6 % since the 1990s, to locations throughout Australia [20].

3.8. Oxygen. Is a chemical element of atomic number 8 and represented by the symbol O, under normal pressure and temperature conditions, oxygen is a colorless and odorless gas with O_2 molecular formula, in which two oxygen atoms are linked to the electronics of Triple-State configuration. This link has a two-link order and is generally simplified in the descriptions as a double link or as a combination of a two-electron link and two three-electron links.

The oxygen is a very reactive than form oxides with all elements.

Triplet oxygen-which should not be confused with ozone, O_3-is the fundamental state of the O_2 molecule, which has two unpaired electrons occupying two generated molecular orbits. This orbital is classified as anti-binders, weaken the binding order of three to two, so the dioxygen bond is weaker than the triple bond of diatomic nitrogen, in which all the orbital bonds of the molecular bonds are filled, but some Anti-orbital binding is not.

In its normal triplet form, the O_2 molecules are paramagnetic. In other words, in the presence of a magnetic field, they form a magnet, due to the magnetic momentum of the rotation of the decoupled electrons in the molecule and the interaction of the negative exchange between the contiguous O_2 molecules [21].

3.9. Creation of ozone. Ozone occurs naturally in the stratosphere when radiation High Energy Solar hits the oxygen molecules, O_2, and makes the two oxygen atoms are separated in a process called photolysis [22].

3.10. Oxygen as a source of heat. Oxy-combustion is a technique that consists in separating the nitrogen of the atmosphere of an oven, and replaces it with pure oxygen, which increases the temperature. When the temperature is 3000 °C by the injection of pure oxygen, then is re-circulated the CO_2 produced by the oven to reduce the temperature, which lowers the temperature of the oven until the 1900 °C [23].

3.11. Heat and temperature. Temperature is a measure of the average kinetic energy of the atoms or molecules in the system. Heat, is thermal energy transferred from a hotter system to a cooler system that are in contact [24].

It is possible to calculate the heat released or absorbed using the specific heat capacity C, the mass of the substance m, and the change in temperature ΔT in the equation:

$$q = m \cdot C \cdot \Delta T.$$

3.12. Presentation of results. Oxygen is the second most abundant gas in the atmosphere, equivalent to 21 % of all atmospheric gases; it is the only highly reactive gas in the atmosphere, which absorbs ultraviolet energy, generates heat, electricity, ozone, and light.

The evidence that oxygen absorbs UV radiation, it is possible to see in the absorption spectrum of the earth's atmosphere, and the second it is possible to see in the formation of ozone, which it is possible to see in the explanation of Fig. 1.

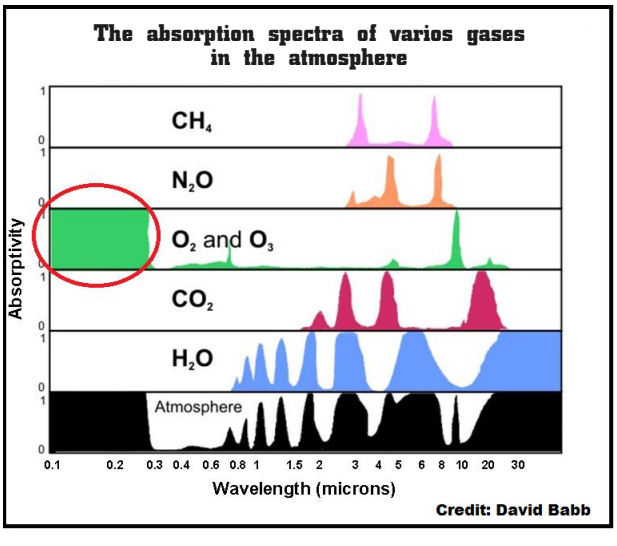

Fig. 1. The absorption spectra of various gases in the atmosphere and of the atmosphere as a whole. Note that oxygen absorbs the entire ultraviolet band, which is indicated by the red circle on the graph [8]

3.13. How does the absorption of ultraviolet by oxygen from the air cause temperature? Air temperature is not infrared light accumulated by greenhouse gases, temperature in the atmospheric system, is a measure of the average speed at which all the gas molecules that make up it move, of course all atoms and molecules when moving emit radiation, except dark matter.

This process of generating atmospheric temperature occurs when oxygen molecules absorb ultraviolet energy increases the kinetic speed of oxygen molecules in the air, which results in higher temperature. The Joule effect explains this as an irreversible phenomenon by which, if electric current circulates through a conductor, part of the kinetic energy of the electrons is transformed into heat.

It is also possible to see it in industry where oxygen is used as a heat producer in industrial furnaces, a process known as oxy-combustion.

The evidence that UV radiation from the sun is responsible for global warmings possible to see it in Fig. 2, where it shows the places that receive ultraviolet rays directly are the hottest areas on the planet. It is also possible to see it in industry where oxygen is used as a heat producer in industrial furnaces, a process known as oxy-combustion.

ISSN 2664-9969

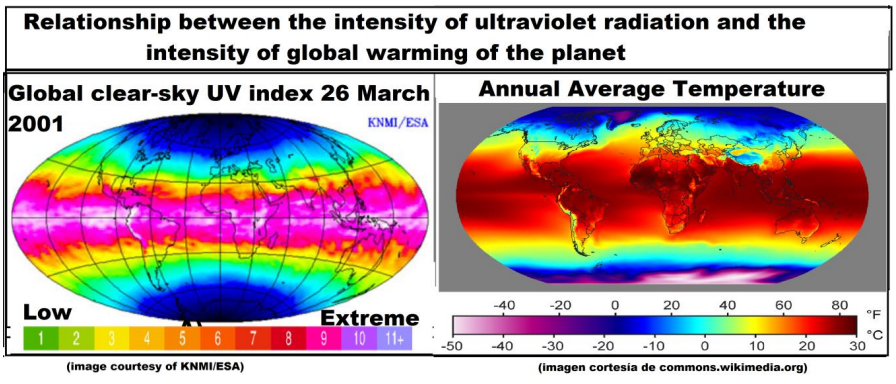

Fig. 2. The places that receive ultraviolet rays directly are the hottest areas on the planet [25, 26]

3.14. How does oxygen and UV from the sun create electricity in the air? When the Oxygen in the Atmosphere is ionized by the UV rays of the Sun, the air becomes an Electrical Conductor and therefore its Kinetic Energy (Temperature) increases. We all know that ionization is a chemical or physical phenomenon by which ions are produced, these are charged atoms or molecules, so let's attribute the electricity of the air not only that of the ionosphere layer but also to all layers of the atmosphere where there is oxygen absorbing UV energy from the sun.

The evidence is seen in all layers of the planet's atmosphere, where electricity from the air originates the northern lights high in the atmosphere, lightning also occurs in the lower parts, and static electricity from the air originates at ground level.

3.15. How does oxygen and UV from the sun produce white light? The absorption of ultraviolet light by oxygen not only results in ozone, temperature and electricity, but oxygen molecules also absorb ultraviolet light and re-radiate it into visible light. In other words, some of the planet's daylight is caused by oxygen molecules absorbing UV radiation from the Sun and re-irradiating it in visible light.

Evidence: It is possible to see it in the northern lights, where the ionization of oxygen in the ionosphere creates the northern lights, now this same thing happens in the equatorial zones of the planet where ultraviolet radiation hits with all its force the oxygen molecules of the air, creating daylight.

3.16. How much daylight does oxygen and ultraviolet radiation produce? This question can be explained by the daylight observed on the moon, when the sun is in the middle of the sky, which is a day with black skies and shadows.

Why attribute only oxygen in the atmosphere to radiate some of the white light of the day? Because it is the only gas in the atmosphere that absorbs ultraviolet radiation from the sun, in addition UV radiation is next to white light, in the electromagnetic spectrum. Therefore, oxygen molecules absorb ultraviolet and re-radiate it as white light.

3.17. Results discussion. The limitation that this work had is that it was mainly theoretical, so the results are similar to other works, the difference is that this work if take into account the characteristics of oxygen ionization by ultraviolet, as the cause of some natural phenomena. The importation of this work into academia goes far beyond climate science, because it encompasses virtually all natural sciences.

4. Conclusions

This paper concludes the following: The heat and global warming of the planet are due to the absorption of ultraviolet radiation by oxygen from the atmosphere. It also concludes that electricity, air, part of daylight, forest fires, are a consequence of physical-chemical phenomena (ionization), which originate when oxygen in the air absorbs ultraviolet radiation. Therefore, the greenhouse effect paradigm must be reconsidered, as the explanation of heat and global warming.

Conflict of interest

I declare that there is no conflict of interest regarding this research, including financial, personal nature, authorship or other nature that could affect the research and its results presented in this article.

Financing

Presentation of research in the form of publication through financial support in the form of a grant from SUES (Support to Ukrainian Editorial Staff).

Data availability

Manuscript has no associated data.

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