



Climate Control on Earth

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Abstract

We are headed for Earth's sixth mass extinction due to overheating, and in this work we seek to reduce the Earth's surface temperature by 2 K over a few years. When we see buds becoming branches, puppies growing, children shouldering backpacks and going out to face life, and we think about climate change due to global warming, we must consider the increased toll everyone faces; it's unfortunately likely that if we continue like this, we might not see our sixth human generation, about two hundred years. It all seems pointless, and our sixth mass extinction is approaching with the continued rise in temperature. This paper will propose several methods to reduce the greenhouse effect to which the Earth is subjected, producing a gradual and inexorable increase in temperature and suggesting the sixth mass extinction. These methods could be implemented with significant funding and international collaboration, both public and private. Some methods may seem whimsical and impractical, others too imaginative, some feasible and interesting, but all will need to be carefully simulated, both technically and economically, and above all, environmentally. The methods described here for managing heat related to the greenhouse effect, temperature, and oxygen are primarily astrophysical, aerospace, and terrestrial. As is well known from thermodynamics: temperature represents the thermal state of a body on various scales. Therefore, if we want to lower the temperature, we must reduce the input of thermal energy into the body in question, "the Earth," and facilitate its expulsion. Managing oxygen in the atmosphere is a very broad and at times controversial issue; radical but questionable solutions will be proposed. The astrophysical method proposed here essentially involves placing several satellites into orbit with large filters to reduce the Earth's solar radiation, a method whose main criticality is its control in the event of failure. The second method involves managing contrails, both in terms of color, persistence in the atmosphere, and the introduction of catalysts to reduce the lifetime of the contrails and other greenhouse gases. The third and most comprehensive method proposed involves managing flames and the civil and industrial circumstances that produce heat; protecting the "trees," and, last but not least, recommendations for oxygen management. All these issues are treated as if we were fundamentalists, but the problem is fundamental and no shortcuts are being taken: it will be up to the legislator to find and enforce the necessary means and measures. The most...

climate change

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global warming

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mass extinction

orbital sunshade

oxygen management

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FULL ABSTRACT

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Keywords: *climate change, contrail management, global warming, greenhouse effect, mass extinction, orbital sunshade, oxygen management, temperature reduction*

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1. Introduction

A philosopher once said, "The biggest mistake we make is thinking we have time," which is the archetype each of us has regarding global warming. This warming has the same effects as a nonradioactive, sustained-release, distributed-trigger nuclear world war. This will lead us inexorably to the same end: burning everything and everyone, annihilating life. The question is:

Is there still time to intervene?

This paper will consider this problem from three perspectives: astronomical (satellite), aerospace (altitude strips), and terrestrial (oxygen management). The increase in global temperature is due to many contributing factors, all of which are reflected in the following figure.

Global temperatures – change from pre-industrial

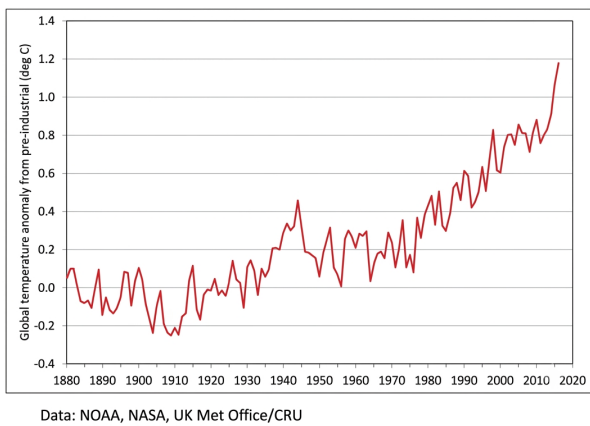


Figure 1. This figure shows the variation and progressive increase in global temperature over the last hundred years, based on data interpolation.

The primary source, not the contributing factors, is solar radiation; the arrival of neutrinos from the centre of the Milky Way and other cosmic particles does not appear to be of significant importance. It is worth noting the evident exponential trend in recent years, which, combined with the increasing trend of recent years, unfortunately leads us to overlook the possible cyclical nature of the phenomenon, a hypothesis supported by some eminent scientists.

2. An Orbital Point of Interest

Global warming on Earth is primarily due to our star, the “Sun,” and other factors we’ll discuss later. We initially approximate the topology of interest in the following figure with the sizes of the objects, neglecting other intervening planets and their trajectories, revealing a region of interest regarding the Sun’s radiation on Earth. The following figure approximates the objects of interest and their distances.

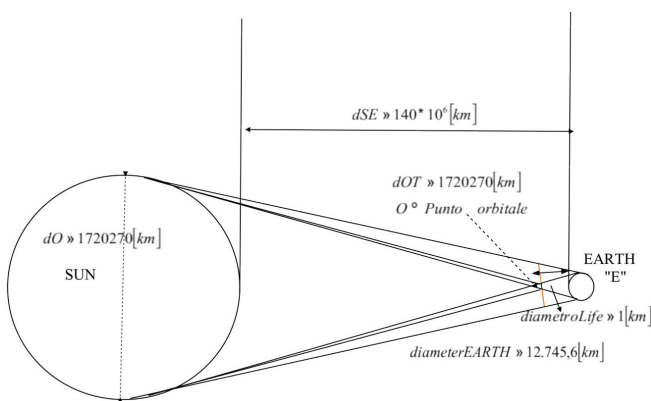


Figure 2. This figure represents the essential geometry of the system on which we wish to initially act. The Life diameter is a point of interest regarding irradiance.

3. A Hypothetical Sun Filter

We can imagine a solar filter that attenuates the energy radiated by the solar disk with special satellite filters positioned as shown in figure 2 and schematically shown in figure 3. These filters are orbiting, motorized, and remotely controlled satellites, each with a

photovoltaic panel and a disk that opens and closes like a large umbrella. A very important aspect is the orbital and functional control of the approximately six satellites envisaged in this work; in fact, it will need to be implemented from different points (including space, the Moon, and Mars) to avoid loss and have only permanent negative effects in the event of failure.

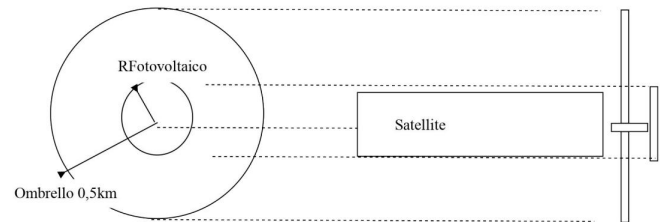


Figure 3. This figure approximately represents the geometric dimensions and its essential structure of one of the proposed satellites.

The satellite must shadow the Earth, avoiding interference with other objects in space and then orbit around the Sun and the Earth, this orbit will be called Orbit in this work.

In the following figure we want to represent the solar disk as seen from the Earth with seven filters and with just one with a rough approximation.

The spot we call the solar disk on Earth emerges, which should not be observed directly with unprotected eyes to avoid eye damage. This disk appears to be the main source of solar radiation; the rest of the external area radiates less intensely and will not be considered. It is this disk that will be the subject of future observations.

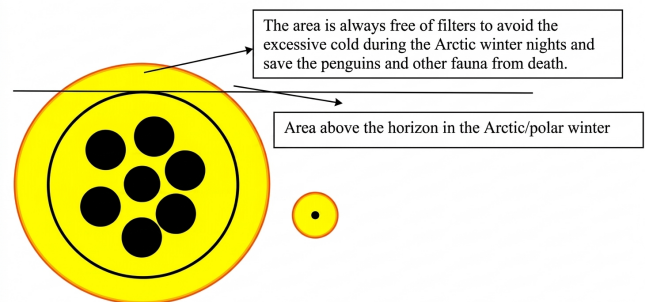


Figure 4. This figure shows the solar disk seen from the Earth with seven and one satellite in a modest proportion.

4. A Hypothetical Aerospace Approach

This section describes some of the advantages of using contrails left by civilian and military aircraft below the ozone layer. A special paint containing a photosynthesis-mimicking substance could be injected and sprayed into the contrails, catalyzing the decay of CO₂ and reducing the greenhouse effect. Other substances that catalyze other greenhouse gases could also be injected and sprayed below the ozone layer to avoid harmful and irreversible effects. The maximum altitude varies depending on the type of aircraft. For airliners, the limit is usually below 10,000 meters. The duration of dark or gray exhaust trails in the atmosphere varies from a few seconds to several minutes (up to several dozen hours). The streaks in the sky also form below 10 km altitude. The contrails left by aircraft (called condensation trails) can be primarily white, but under certain conditions they can take on different shades.

Oxygen consumers	
PRODUCER	CONSUMER
Equivalent in standard tree A_s: 30 cm circumference	
15 A_s	MAN
X_A_s	Forest fires
Y_R_e	Building heating
	Various fires
	Transportation
	Industrial processes
	Smoking
	Human Nutrition
	...

5. A Hypothetical Earth-Based Approach to Oxygen-Flame Management

A very broad and problematic aspect lies in the management of the flameoxygen pair. Indeed, there are multiple contributions to overheating, and the flame is a major component, also as a consumer of oxygen, which is a common good.

If those in power address global warming and implement even half of the suggestions in this report, there will be no risk; the bees will be happy, and everyone will be happy. I say this because it's not wrong to think your work is useless. Ultimately, it's an article about saving the world, because according to many documentary filmmakers, we have about seventy years left; I thought we had a hundred and forty. No one will see our great-grandchildren, because global warming will reach extremely high levels, given that, in addition to the seasonal cycle, there is a worrying exponential trend

The melting of the glaciers will cause sea levels to rise by fifty meters; many cities will be submerged, and people will seek refuge in the mountains. There's an apocalyptic undertone, if you think about it. This article only touches on a few important topics, and we all have a role to play. This article refers to banks. Banks as "guarantees" for trees, because there's no point in planting if everyone sets it on fire: assuming it's possible to deposit a tree in a bank (providing the ownership certificate and GPS coordinates), it provides a certain amount of oxygen. Each person needs fifteen trees with a trunk circumference of at least 30 cm for a hundred years of life. After this reasoning, it becomes clear that, for example, a smoker "pollutes" and, with both his lighter and his tobacco, catches fire. With intensive cultivation of plantations, biodiversity is reduced. How can this be done? With a surcharge added to legal consumption, or you ban smoking, but if you smoke, you pay for oxygen, which is a common good: everyone's money that can be used to plant trees. Therefore, you pay for the oxygen consumed thanks to the deposited trees. Having deposited trees allows you to sell the oxygen to those who don't have trees deposited in the bank. The good produced, and once it's banked, the tree can no longer be damaged, and if someone burns it, investigative activity increases dramatically because the bank insures the tree, or the forest, and a virtuous cycle is created where oxygen has value. For example, someone goes to set fire to a small car factory, and armed guards shoot at you, but if you set fire to an old but functioning car, no one shoots you and there are few investigations; because the manufacturing company is listed on the stock exchange, the "product" is not. So listing the tree on the stock exchange increases vigilance and punishment; this is a small idea present in this work that is not yet an archetype.

The bank as a "guarantee" for trees, because there's no point in planting if everyone sets it on fire. Supposing it were possible to deposit a tree in the bank (providing the ownership certificate

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The paradigm: bank the tree as a producer of a commodity: oxygen. Oxygen will be a commodity for those who don't have trees to compensate for the flames produced... thus listing the forest on the stock exchange.

List trees with a circumference greater than 30 cm on the stock exchange for their oxygenproducing capacity.

Over an average lifespan of 100 years, the total volume of oxygen consumed by a human being is around 13 million liters (about 13,000 cubic meters). A mature tree with a trunk or crown circumference of 30 cm or more produces on average between 15 and 30 kg of oxygen per year (with a specific estimate of about 21.9 kg per year). A tree with a trunk diameter of about 30 cm produces about 2,190 kg (about 2.2 tons) of oxygen in 100 years, assuming this average release rate remains stable. A human with an average life expectancy of 83 years consumes about 10 million liters of oxygen over their lifetime.

For every human being, at least 15 trees are needed to balance this oxygen consumption (lower estimate of the oxygen surplus).

6. Greenhouse Effect

The main gases responsible for the greenhouse effect are divided into those naturally present in the atmosphere and those generated by human activities. Water vapor is the gas with the greatest impact on global warming, but carbon dioxide and methane are the main drivers of recent climate change.

Here are the main gases:

- Water vapor: H_2O It is the most abundant and effective greenhouse gas in triggering the natural greenhouse effect...
- Carbon dioxide CO_2
- Methane CH_4 is much more harmful to the climate than CO_2 . It is due to intensive farming, landfills and the extraction of fossil fuels, from rice fields.
- Nitrous oxide N_2O : use of fertilizers, industrial processes, biomass combustion.
- Ozone O_3 : found in the lower atmosphere, it acts as a greenhouse gas and is generated by human activities.

- Fluorinated gases *CFC, HFC, ...* : artificial gases used in re-frigeration, air conditioning and aerosols and absent in nature, which have a high global warming potential.

7. Oxygen Management Manual

These actions are often overlooked:

- Planting in suitable or unsuitable areas, but possible, by those who govern and own public lands and/or roads.
- Every living human being should own at least 15 trees.
- Anyone expecting a pregnancy should own shares of or 15 trees to donate upon the arrival of the happy event.
- Anyone who negligently sets fire to forested areas should be sentenced to harsher penalties such as the expropriation of properties up to the second generation, from relatives or partners who passively profit from the fires often started by elderly relatives with no assets, or ordered to purchase shares until full compensation is received and finally planted in suitable prison facilities.
- Study of new catalysts.
- Tree georeferencing: GPS, trunk circumference, height before reaching the congestion bank remotely.
- Cemeteries can be created on ground surfaces as shown in the following figure:

X			X			X
X			X			X
X			X			X

The width of the cells will be 2 m, the height 1 m, the depth 2 m where the body will be lowered and a tall tree (sequoia, acacia, eucalyptus...) will be planted on the surface and will be left as an inheritance to relatives or alternatively to the Earth.

8. Conclusion

Considering the growing energy demand and the obvious decline in carbon dioxide emissions, wind power seems like a healthy option, but it converts wind into heat, which then rises to the ozone layer, fueling the greenhouse effect. Solar power seems to be the only system that doesn't increase global warming, without further deforestation to make more space available for panels and without further degrading biodiversity. And finally, considering the declining population, if each of us had a little more common sense, global warming wouldn't exist with such severity. One could imagine a screenless satellite with a 'cuttlefish' effect: a fine dark matter nebulizer with regulation and control of cleaning at the orbital point of interest.

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