



World War II Holds the Key to Understanding Global Warming and the Challenges Facing Science and Society

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ABSTRACT

At about the same time that Russian President Putin declared that "*We are really witnessing global warming, the reasons, however, remain obscure....*", I published the first of six scientific articles disclosing the evidence and basis for understanding that particulate pollution, not anthropogenic greenhouse gases, is the main cause of global warming. The global warming that occurred during World War II, but which quickly subsided after hostilities ceased, was key to that understanding. The disquieting parallel of scientific behaviour during World War II and at present is key to understanding the challenges humanity faces today concerning science and society.

Keywords: Aerosol particulate heating; aerosol particulates; geoengineering; climate change; atmospheric convection; particulate pollution.

1. INTRODUCTION

Russian President Vladimir Putin recently stated [1]: “*We are really witnessing global warming, the reasons, however, remain obscure....*” President Putin’s remark should humble the vast number of climate scientists, especially Americans and Europeans, who accept the unproven assertion that anthropogenic greenhouse gases cause global warming, and who, as a result, also express willingness to geoengineer Earth’s atmosphere to compensate [2,3].

The Western climate-science community is divided into two main schools of thought: (1) anthropogenic greenhouse gases (mainly carbon dioxide) cause global warming by trapping heat that otherwise should be radiated into space [2,4,5]; and, (2) no unnatural global warming exists [6,7].

At about the same time President Putin made the statement quoted above, I published the first of six scientific articles showing that neither of the two main schools of climate science’s understanding of global warming is correct [8]. Human activity is indeed causing global warming, but not primarily due to anthropogenic greenhouse gas emissions [8-12].

New evidence suggests, instead, that *particulate pollution emissions* are the main cause of ongoing global warming [8-12].

Here I briefly review this new evidence to show that President Putin is correct in saying, “*we are really witnessing global warming*” and to encourage a new era of international scientific objectivity, free from politically-driven motivations and consensus conformity, so scientists are free to investigate the true causes of global warming and its concomitant harm to the biosphere.

2. WORLD WAR II EVIDENCE

World War II (WW2) holds the key to understanding global warming. The trail of discovery began with a global surface temperature image printed on the front page of January 19, 2017, *New York Times* [8]. Gottschalk [13,14] noticed a thermal peak coincident with WW2 in that surface temperature presentation. By applying sophisticated curve-fitting techniques, Gottschalk [13,14] demonstrated that the WW2 peak is a robust feature evident in eight independent global temperature datasets from the U. S. National Oceanic and Atmospheric Administration

(NOAA). Gottschalk [13] concluded that the thermal peak “is a consequence of human activity during WW2.”

Inspired by Gottschalk’s work, I realized that two WW2 consequences, particulate pollution and carbon dioxide, were capable of altering the sun-earth radiation balance to cause the abrupt global warming during WW2 [8].

Fig. 1, from [13] is a copy of Gottschalk’s figure to which I added three relative-value proxies which represent major activities that produce particulate pollution [8]. The proxies are: Global coal production [15,16]; global crude oil production [16,17]; and, global aviation fuel consumption [16]. Each proxy dataset was normalized to its value at the date 1986 and each relative-value curve was then anchored at 1986 to Gottschalk’s boldface, weighted average, relative global warming curve. The particulate-proxies track well with the eight NOAA global datasets used by Gottschalk [8].

During WW2, a great spike in air pollution inevitably occurred from maximized industrial production, from smoke and coal fly ash spewing forth from the smokestacks of industries, utilities, and locomotive engines, from greatly increased marine and aeronautical transport, and from extensive military activities that polluted the air with aircraft, ship, and vehicle exhaust and with the consequences of vast numbers of munition detonations, including the demolition of entire cities, and their resulting debris and smoke. The implication is that global warming during WW2 was caused by the aerosolized pollution particulates that trapped heat that otherwise should have been returned to space, and thus altered Earth’s delicate thermal balance [8].

The wartime activities that cause particulate pollution also produce carbon dioxide. WW2 global warming, however, was not produced by atmospheric CO₂ for the following reasons [18]: Ice core data during the period 1936-1952 show no significant increase in CO₂ during the war years, 1939-1945 [19]. Moreover, the extremely-long atmospheric residence time of carbon dioxide (decades or longer) [2] eliminates it as the principal cause of WW2 global warming because after WW2 the global temperature abruptly plummeted. Rapid cessation of WW2 global warming is understandable because tropospheric pollution-particulates typically fall to the ground in days to weeks [20], while CO₂ remains in the atmosphere for decades [2,3].

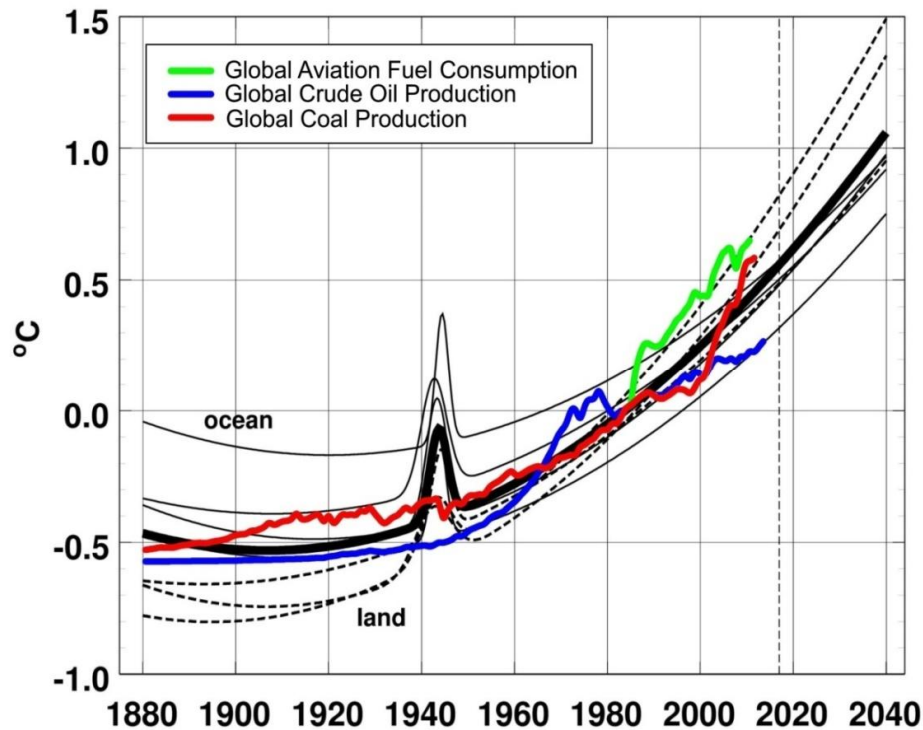


Fig. 1. From [8]. Copy of Gottschalk's fitted curves for eight NOAA data sets showing relative temperature profiles over time [13] to which are added proxies for particulate pollution

As the aerosolized particulates settled to the ground after the war, Earth radiated its excess trapped heat, and global warming abruptly subsided. But only for a brief time, as particulate pollution began to rise again from ramped-up post-WW2 industrial growth, initially in Europe and Japan, and later in China, India, and the rest of Asia, dramatically increasing worldwide aerosol particulate pollution [21]. Consequently, even though tropospheric pollution-particulates typically fall to the ground in days to weeks [20], their concentration in the troposphere is maintained or increased by the ramped-up post-WW2 industrial particulate-pollution release, as well as by the combination of tropospheric geoengineering and natural processes, such as forest fires [22].

3. AEROSOL PARTICULATES SUPPRESS ATMOSPHERIC CONVECTION

As noted previously [18], the effects of particulate pollution have been misunderstood by many scientists. The climate science community, including the United Nations' Intergovernmental Panel on Climate Change (IPCC), in particular,

has promulgated the false idea that aerosol particulates cause global cooling by blocking sunlight [2,23-25]. However, it has recently become clear that aerosol particles are efficient absorbers of solar radiation, either separately as large particles or as assemblages of small particles which rapidly transfer that heat to the surrounding atmospheric gases [10,26-29]. Atmospheric heating by particulate matter has been said to cause "changes in the atmospheric temperature structure" [30] without mentioning the consequences on atmospheric convection and the concomitant surface-heat-transfer reduction that results from such changes.

Geophysical models of atmospheric convection are generally complex [31,32], typically involving the solution of hydrodynamic equations of motion coupled with various assumptions [33,34]. Use of parameterization makes the calculation-results especially opaque [35]. Consequently, critical details of the actual physical process of convection may be obscured, details necessary to make substantive advances in scientific understanding, and to correct misperceptions.

Chandrasekhar described convection in the following, easy-to-understand way [36]: *The simplest example of thermally induced convection arises when a horizontal layer of fluid is heated from below and an adverse temperature gradient is maintained. The adjective 'adverse' is used to qualify the prevailing temperature gradient, since, on account of thermal expansion, the fluid at the bottom becomes lighter than the fluid at the top; and this is a top-heavy arrangement which is potentially unstable. Under these circumstances, the fluid will try to redistribute itself to redress this weakness in its arrangement. This is how thermal convection originates: It represents the efforts of the fluid to restore to itself some degree of stability.*

Atmospheric convection calculations relating to the consequences of adverse temperature gradients are necessarily complex and may not be possible without *ad hoc* assumptions and simplifications. The consequences of adverse temperature gradient are rarely, if ever, explicitly considered in geophysical convection calculations [2]. Nevertheless, a simple classroom-demonstration experiment can serve as guidance for our understanding [11].

The convection classroom-demonstration experiment was conducted using a 4-litre beaked-beaker, nearly filled with distilled water, and heated on a regulated hot plate. As an indicator of convection, celery seeds were added to be dragged along by convective motions in the water. After stable convection was obtained, a ceramic tile was placed atop the beaker to retard heat loss, increasing the temperature at the top relative to that at the bottom, thus decreasing the adverse temperature gradient. The reduction of the number of celery seeds in motion indicated the reduction in convection, which was recorded photographically [37].

Fig. 2, from [11], shows a dramatic reduction in convection after placing the tile atop the beaker [37], that reduced heat-loss from the surface, raising the temperature at the top of the solution relative to that of the bottom, which reduced the adverse temperature gradient. In just one minute the number of celery seeds in motion, driven by convection, decreased markedly, demonstrating the principle that reducing the adverse temperature gradient decreases convection. This reduction in convection is reasonable, considering zero adverse temperature gradient is by definition zero thermal convection.

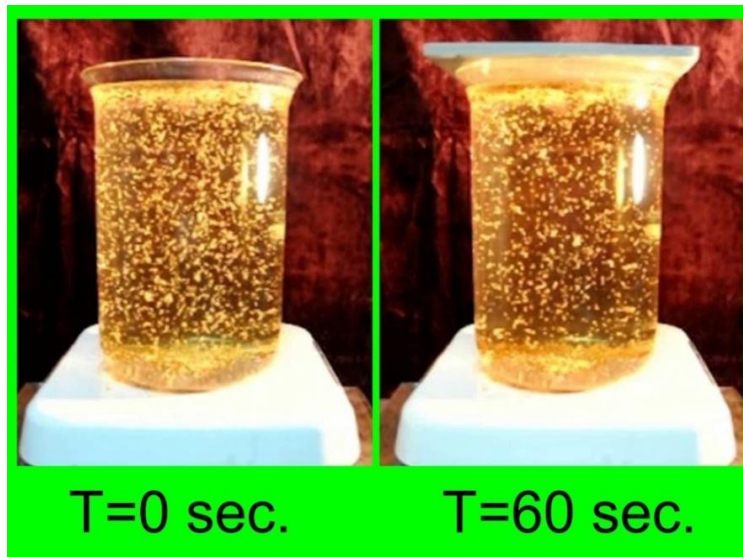


Fig. 2. From [11]. A beaker of water on a regulated hot plate with celery seeds pulled along by the fluid convection motions [37]. Placing a ceramic tile atop the beaker a moment after T=0 reduced heat-loss, effectively warming the upper solution's temperature, thus lowering the adverse temperature gradient, and reducing convection, indicated by the decreased number of celery seeds in motion after just one minute

One primary consequence of heating the upper troposphere through heat-absorbing particulate matter can be directly inferred from the experimental observations presented here. Particles in the troposphere, heated by solar radiation and by radiation from Earth's surface, do not simply re-radiate that energy as infrared (heat) radiation but transfer some of that heat to the surrounding atmosphere by molecular collisions. The upper tropospheric air-temperature is thus raised by the molecular-transported heat relative to the air-temperature at Earth's surface. In other words, the adverse temperature gradient between the upper troposphere and the surface is diminished, which reduces atmospheric convection, and concomitantly reduces convection-driven surface heat loss *and thereby causes increased global warming*.

Anyone who has spent time in a desert environment will recall that on cloudy days and nights, the temperature is usually cooler in the day and warmer at night than on cloudless days and nights. That should be understandable from the above discussion as cloud droplets are also particulates. The effect of particulates on suppressing atmospheric convection and, concomitantly, inhibiting surface heat-loss is supported by the following lines of evidence described in Sections 3.1 to 3.4.

3.1 Diurnal Temperature Range Evidence

As previously described [12,18], reduction in convection-driven heat loss, rather than radiation-driven heat loss as usually assumed, makes the seemingly inexplicable diurnal temperature range (DTR), the daily high temperature minus nightly low temperature, understandable and, indeed, evidentiary.

Diurnal temperature range (DTR) data are usually presented as averages over a large geographic area and averaged over suitable increments of time. These data represent a *model-independent* measure of climate change.

Fig. 3 from Qu et al. [38] presents yearly mean DTR values, as well as the corresponding high temperature (TMAX) and low temperature (TMIN), mean values over the continental USA.

Note in Fig. 3 that the yearly mean DTR, the upper graph, decreases, as indicated by the regression line. The reason is that even though the yearly mean TMAX increases, the yearly mean TMIN increases at a faster rate so that the difference (DTR) decreases over time. This behaviour is indicated in many [39-42], but, for unknown reasons, not in all DTR presentations [43].

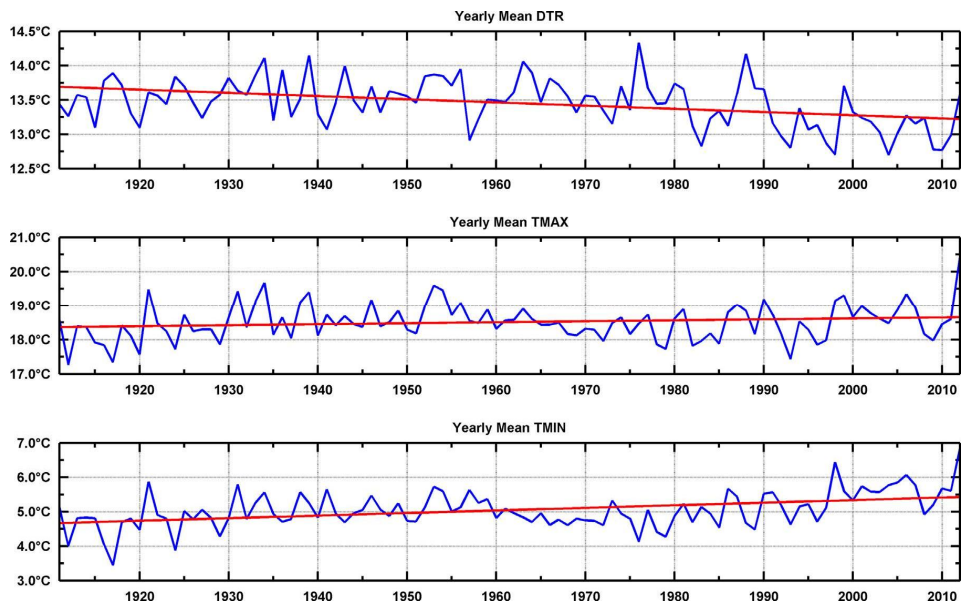


Fig. 3. From [9]. Yearly mean DTR, TMAX, and TMIN over the continental USA. The red lines are linear regressions. Original publication: [38], (<http://creativecommons.org/licenses/by-nc-nd/3.0/>)

In the typical radiation-balance-based climate considerations, the decrease in TMAX can be explained by particulate matter blocking solar radiation from reaching Earth's surface. However, the increase in TMIN is inexplicable because radiation heat-loss from Earth's surface is greater during the day than during the night, a consequence of the Stefan-Boltzmann radiation law.

The increase in TMIN, however, is an understandable consequence of the reduction in convection-driven heat loss caused by particulate matter heating the upper troposphere and decreasing atmospheric convection.

3.2 Mount St. Helens Evidence

As previously noted [12,18], data from the Mt. St. Helens 1980 volcanic eruption in Washington State (USA) [44] demonstrated that a short-term reduction in the atmospheric adverse temperature gradient increased the night-time minimum temperature of diurnal temperature range data [45]. As the volcanic plume passed overhead in the troposphere, daytime temperatures dropped as the sunlight was absorbed and scattered by the particulates; nighttime temperatures, however, increased, and for a few days thereafter remained elevated presumably due to aerosol dust that persisted for a few days before falling to ground [45]. The diurnal temperature range was significantly lessened by the plume, but almost completely recovered within two days [45].

These observations are consistent with the Mt. St. Helens aerosol particulates in the plume absorbing long-wave radiation and becoming heated, transferring that heat to the surrounding atmosphere by molecular collisions, which lowered the atmospheric adverse temperature gradient relative to the Earth's surface, thus reducing atmospheric convection, and concomitantly reducing convection-driven surface heat loss that is evident by the increase in the night-time minimum temperature. These observations support the concept that natural and/or anthropogenic *particulate pollution*, not anthropogenic *carbon dioxide*, is the principal cause of global warming [8-12].

3.3 Radiosonde and Aethalometer Evidence

As previously noted [18], the long-duration series of radiosonde and aethalometer investigations

undertaken by Talukdar et al. [46] provide further support for the idea that tropospheric particulate heating reduces atmospheric convection. Their investigations showed that higher amounts of tropospheric black carbon (BC) aerosols can disturb the normal upward movement of moist air by heating the atmosphere, resulting in a decrease in the atmospheric convection parameters in association with the increase in the concentration of BC aerosols.

Convection occurs throughout the troposphere, with differing degrees of the scale, both geographically and altitudinally, and with various modifications caused by atmospheric circulation and lateral flow. Convection-efficiency in all instances is a function of the prevailing adverse temperature gradient. Aerosolized particulates, heated by solar radiation and/or terrestrial radiation, rapidly transfer that heat to the surrounding atmosphere, which reduces the adverse temperature gradient relative to the surface and, concomitantly, reduces surface heat loss and thereby over time causes increased surface warming [11]. The same particulate-pollution-driven process operates locally, as in the case of urban heat islands [47-51], regionally, and globally, which further supports the concept that particulate pollution, not anthropogenic carbon dioxide, is the principal cause of global warming [8-12].

3.4 Saharan-blown Dust Evidence

As previously noted [18], during summer months Saharan-blown dust covers an area over the tropical ocean between Africa and the Caribbean about the size of the continental United States [52-54]. The dust-layer extends to an altitude of 5-6 km; measurements indicate greater dust density and associated haziness at 3 km than at the surface [54]. The warmth of the upper portion of the Saharan-blown dust layer initially is a consequence of its origin over the Sahara, but the warmth is maintained by the absorption of solar radiation by the dust [53], which is known to contain radiation-absorbing iron oxide [55,56]. As noted by Prospero and Carlson [54]: "... *the warmth of the Saharan air has a strong suppressive influence on cumulus convection*" Dunion and Velden [53] further note: "... *the SAL [Saharan air layer] may play a major role in suppressing TC [tropical cyclone] activity in the North Atlantic.*" Wong and Dessler [57] also recognized the suppression of convection over the tropical North Atlantic by the Saharan air layer.

4. CHASING THE WRONG CULPRIT

As described previously [9], science progresses by replacing less-precise understanding with more-precise understanding, a process that necessitates the constant questioning of current ideas [58]. The climate science community, however, has failed to question the thoroughly publicized belief that anthropogenic carbon dioxide is the principal causal agent of global warming. No one seems to have asked the basic scientific question, "What could be wrong with this picture?"

Global warming unquestioningly warms the Earth's oceans, its main reservoir of CO₂. Warming the oceans by reducing surface heat-loss and by Earth's internally produced heat [59] not only lowers the solubility of CO₂ but also releases dissolved CO₂ into the atmosphere [9,60]. The increasing levels of atmospheric CO₂, rather than necessarily causing global warming, are symptomatic of entirely different causes of global warming, which is apparent from the ice-core data shown in Fig. 4. It appears that the climate-science community took at face value the erroneous assertion that particulates cool the atmosphere [2,23-25].

The good news is that a drastic reduction in particulate-pollutant emissions will likely be quickly followed by a drastic reduction in global warming, as indicated by Gottschalk's curve-fitted World War II heat bump. As tropospheric pollution-particulates typically fall to the ground in days to weeks [20], the atmospheric adverse temperature gradient relative to the surface increases, thus increasing convective-driven heat loss from the surface and concomitantly reducing global warming. And, the additional benefit of reducing particulate-pollution will lessen the world's greatest environmental health-threat, potentially saving millions of lives and reducing the suffering of many more [64].

The bad news is that the advances described above [8-11] will almost certainly be ignored by climate scientists. Allowing scientist-competitors to evaluate each other's funding-proposals anonymously [65], as done in the West for almost seven decades, has led to a consensus mentality within the broad scientific community. The consequences include widespread failure to acknowledge contradictory ideas, false belief by the popular press that consensus means scientific correctness, and the inability to resist being co-opted into politically-motivated scientific activities.

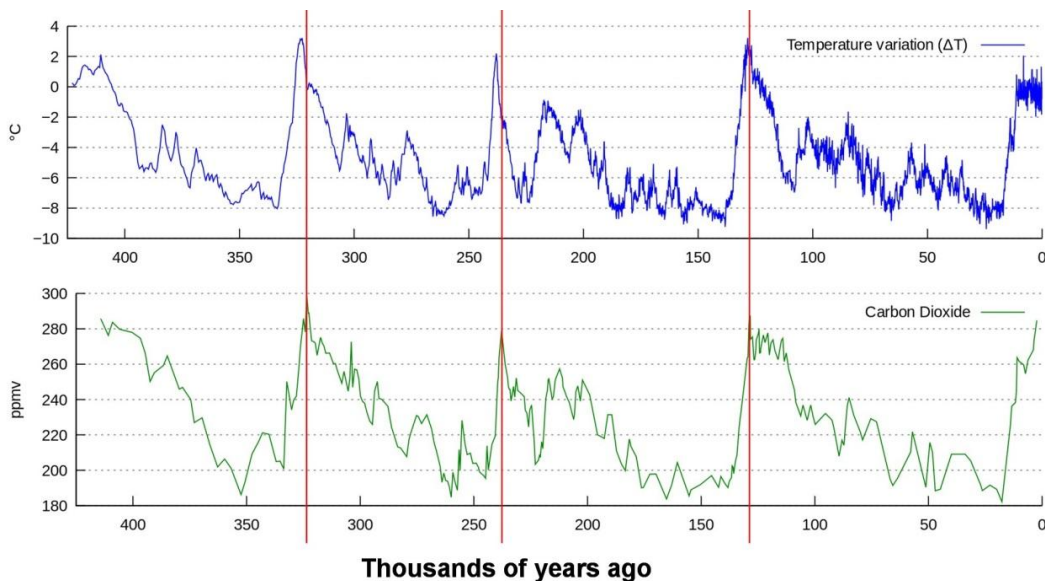


Fig. 4. From [9]. Temperature and carbon dioxide data from the Vostok ice-core [61-63]. Note that temperature rises before carbon dioxide, not vice versa. This figure shows compelling evidence that temperature rise results in a subsequent increase in atmospheric carbon dioxide content, in striking contradiction to the IPCC model-driven assumption that CO₂ causes global temperature increases. The rise or fall of CO₂ follows the increase or decline of Earth's variable heat, absorbed from above and produced from below

5. DANGER OF ENVIRONMENTAL WARFARE

Anthropogenic CO₂-caused climate change has been fully politicized for 25 years [66] and is driving political, commercial, and science-research agendas. These agendas include the deliberate inundation of the atmosphere with particulate-aerosols (geoengineering), as shown in Fig. 5 which, not only causes global warming and polar melting but is devastating to life on Earth [12,22,67-79].

There have been concerted efforts to deceive people into believing that particulate trails, such as shown in Fig. 5 are ice-crystal 'contrails' from the moisture vapour in jet exhaust [80,81]. There

are also systematic efforts to coerce editors and publishers to retract, without due process, peer-reviewed and published public health papers warning of the health risks of the jet-sprayed aerial particulate-pollution trails [82].

Fig. 6 shows both the typically white trails, like those in Fig. 5, which are consistent with coal fly ash [22,68,70,71] and show much-scattered light, and black trails, likely produced by carbon black which absorbs light much more efficiently with far less scatter. Ice crystal contrails are never black. I recently witnessed white trails beneath the cloud cover over Frankfurt, Germany, and black trails above the clouds, presumably to be out of sight. The use of carbon black is for heating the atmosphere [12].



Fig. 5. From [12]. Geoengineering particulate trails with photographers' permission. Clockwise from upper left: Soddy-Daisy, Tennessee, USA (David Tulis); Reiat, Switzerland (Rogerio Camboim SA); Warrington, Cheshire, UK (Catherine Singleton); Alderney, UK looking toward France (Neil Howard); Luxembourg (Paul Berg); New York, New York, USA (Mementosis)



Fig. 6. From [12]. Both white and black particulate trails above Danby, Vermont, an impossible combination for alleged ice-crystal ‘contrails’

World War II holds the key to understanding the challenges facing science and society. Waging war requires a readily discernible enemy. The Nazis utilized the very-flawed "scientific" justification of "race hygiene" [83] as a basis to propagandize and to indoctrinate the German population to wage war against "genetically inferior" enemy people, races, and nations, as well as to enact laws legitimizing atrocities such as forced sterilization against "genetically inferior" Germans [84,85].

In discomfiting parallel, Western nations are presently utilizing the consensus-driven, flawed "scientific" justification of "anthropogenic CO₂-caused global warming" as a basis to propagandize, to indoctrinate, and to incite humanity to wage global geoengineering warfare on our own planet [3], the consequences of which would be devastating [86-88]. The danger is clear, present, and deeply-entrenched.

6. CONCLUSIONS

Who would have believed beforehand that the Germany of Wolfgang von Goethe and Friedrich Schiller would endeavour to exterminate entire populations deemed "genetically inferior"? Beneath the veneer of our civilization and our

humanity lurks a dark side of human nature. There are those willing to propagandize and deceive human populations willingly to participate in or to turn a blind eye to atrocities. That was the case in Hitler's Germany, and it is the case today. The ongoing global geoengineering is exacerbating global warming, causing climate chaos, and harming human and environmental health, but the adverse consequences are incorrectly being blamed on anthropogenic greenhouse gases. Neither the scientific community nor governmental entities, including the United Nations, acknowledges the very-obvious jet-emplacement of tropospheric particulates which cause global warming. Instead, there are calls to initiate massive stratospheric particulate geoengineering, an activity certain to cause additional planetary harm. The perpetrators and their motives must be revealed, and their practices stopped before our planet becomes unable to sustain human existence.

Russian President Putin's remarks, quoted above, represent a courageous stand against that very-flawed "anthropogenic carbon dioxide global warming" scientific consensus. Perhaps President Putin and U. S. President Donald Trump could explore ways to end the consensus

nonsense that plagues science generally, and is especially deplorable in climate science. The successful consequence of such a scientific collaboration could forge an alliance built upon a shared pursuit of scientific truth about global warming and make the world a healthier and safer place for humankind.

The author holds that technical, scientific, medical, and public health representations made in the scientific literature in general, including this particular journal, should be and are truthful and accurate to the greatest extent possible, and should serve to the highest degree possible to protect the health and well-being of humanity and Earth's natural environment.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is no conflict of interest between the author and producers of the products because we do not intend to use these products as an avenue for any litigation but the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by the personal efforts of the author.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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