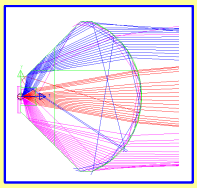
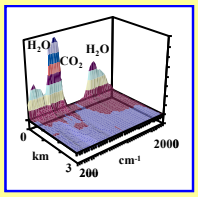


Ventura Photonics

*Photonics Solutions*




# A Greenhouse Gas Radiative Forcing does not produce a Measurable Change in the Surface Temperature of the Earth

**Roy Clark PhD**

**Ventura Photonics Climate Post 25, VPCP 0025.1a**
Ventura Photonics
Thousand Oaks, CA
August 2023
Revised September 2023

This is the first of two posts that address the climate fraud. The second, VPCP 26, *The Corruption of Climate Science* addresses the mission creep in government agencies associated with the pseudoscience of radiative forcing and the political exploitation of the fictional global warming apocalypse. A more detailed discussion of climate energy transfer is given in the book '*Finding Simplicity in a Complex World – The Role of the diurnal Temperature Cycle in Climate Energy Transfer and climate Change*' by Roy Clark and Arthur Rörsch, available on Amazon.

Go to the Finding simplicity web site
Purchase on Amazon.US

**Table of Contents**

**Summary**

The foundation of the modern computer based climate modeling fraud was established between 1967 and 1981 by the work of Manabe and Wetherald (M&W) at NOAA and Hansen's group at NASA Goddard. The energy transfer processes that determine the surface temperature of the earth were oversimplified and replaced by an equilibrium average air column. When the $CO_2$ concentration was increased in this model, the surface temperature increased as a mathematical artifact of the simplified calculation. The initial temperature increase was then amplified by a 'water vapor feedback' produced by the fixed relative humidity distribution assumed by the model. Hansen's group added more 'greenhouse gases' to the initial M&W model. Then they went on to add a slab ocean model, the $CO_2$ doubling ritual and the calculation of a global temperature record using a contrived set of radiative forcings. Meanwhile, M&W spent the next eight years incorporating the mathematical warming artifacts produced by their 1967 model into each unit cell of a highly simplified global circulation model.

As computer technology improved, a contrived set of pseudoscientific radiative forcings was used by the climate models to simulate the global mean temperature record. The forcings were then divided into anthropogenic and natural forcings. This was used to create the illusion that the observed warming in the global average temperature record is 'human caused' and this in turn has led to an increase in the intensity and frequency of 'extreme weather events'. The increase in surface temperature calculated by the climate models for a doubling of the $CO_2$ concentration is called the equilibrium climate sensitivity (ECS). In the real climate this is too small to measure.

There are five fundamental scientific errors in the radiative forcing argument. First, a greenhouse gas forcing is a decrease in LWIR flux at the top of the atmosphere (TOA) that changes the rate of cooling in the atmosphere. When the radiative transfer calculations are extended to include this change in cooling rate, the effects of a $CO_2$ doubling in the troposphere are too small to measure. Second, the upward LWIR flux at TOA is decoupled from the surface by molecular line broadening effects. Third, over the oceans, the increase in downward LWIR flux from the lower troposphere to the surface produced by a greenhouse gas radiative forcing is fully coupled to the much larger and more variable wind driven latent heat flux and cannot heat the oceans. Fourth, over land, any increase in surface temperature produced by a greenhouse gas radiative forcing is too small to measure in the day to day variations of the surface temperature. Fifth, there can be no '$CO_2$ signature' in the global average temperature record. The dominant term is the Atlantic Multi-decadal Oscillation (AMO) augmented by urban heat island effects, changes to the number and urban/rural mix of the weather stations used in the averaging process and homogenization adjustments.

It is time to shut down the 'equilibrium' climate models and dismantle the multi-trillion dollar climate fraud.

## Introduction

Since 1800, the atmospheric concentration of $CO_2$ has increased by approximately 140 parts per million (ppm), from 280 to 420 ppm. This is illustrated in Figure 1a [Keeling, 2023]. Radiative transfer calculations show that this has produced a decrease near 2 W $m^{-2}$ in the longwave IR (LWIR) flux emitted to space at the top of the atmosphere (TOA) within the spectral range of the $CO_2$ emission bands. There has also been a similar increase in the downward LWIR flux from the lower troposphere to the surface. For a hypothetical '$CO_2$ doubling' from 280 to 560 ppm, the decrease in outgoing longwave radiation (OLR) is estimated to be 3.7 W $m^{-2}$ [IPCC, 2013], with a similar increase in downward LWIR flux to the surface. At present, the average annual increase in $CO_2$ concentration is near 2.4 ppm $yr^{-1}$. This produces an increase in the downward LWIR flux to the surface of approximately 0.034 W $m^{-2}$ per year. The change in both the outgoing longwave radiation (OLR) emitted to space and the downward LWIR flux to the surface LWIR flux as the $CO_2$ concentration increases is shown in Figure 1b [Harde, 2017]. The fundamental climate issue that has to be addressed is therefore: how do these changes in LWIR flux alter the surface temperature of the earth?

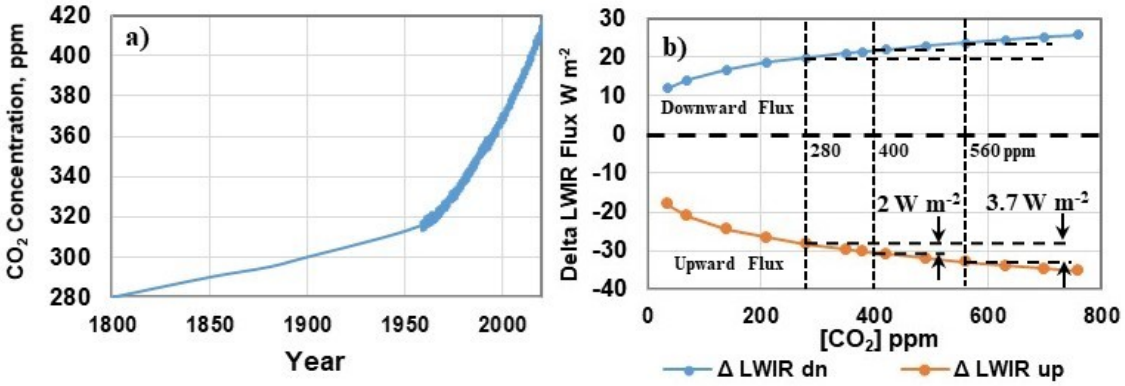



**Figure 1: a) the measured increase in atmospheric $CO_2$ concentration from 1800 (Keeling curve) and b) calculated changes in atmospheric LWIR flux produced by an increase in atmospheric $CO_2$ concentration from 0 to 760 ppm.**

Two different approaches have been used to determine the change in temperature.

Thermal engineering calculations consider the time dependent flux terms coupled to a thermal reservoir. This may be an air parcel in the atmosphere, or a thin ground or ocean layer at the surface-air interface. The change in flux is integrated over time to give the change in heat content or enthalpy of the thermal reservoir and this is divided by the heat capacity to determine the change in temperature. At the surface, there are four main interactive flux terms that have to be considered. These are the absorbed solar flux, the net LWIR emission, the evapotranspiration (moist convection) and the subsurface thermal transport. The net LWIR cooling flux is limited by the LWIR exchange energy. The surface warms up until the excess absorbed solar heat is removed by evapotranspiration or is transported by ocean currents.

The climate models use a concept called radiative forcing. The earth is assumed to be in thermal equilibrium so that there is an exact planetary average flux balance between the absorbed solar flux and the LWIR flux returned to space. The decrease in LWIR flux at TOA produced by an increase in atmospheric $CO_2$ concentration perturbs this energy balance. The additional heat released into the atmosphere by the increase in $CO_2$ absorption is then assumed to warm the surface so that the earth adjusts to a new a new equilibrium state with a higher surface temperature that restores the flux balance at TOA [Hansen et al, 1981, (H81), Knutti and Hegerl, 2008]. Various feedback mechanisms are presumed to modify the initial forcing. In particular, a 'water vapor feedback' amplifies the surface temperature response. The computer models are often compared to each other using the calculated temperature increase produced by a doubling of the $CO_2$ concentration, usually from 280 to 560 ppm. This is called the equilibrium climate sensitivity (ECS).

When the two approaches are compared, the thermal engineering calculations show that any $CO_2$ induced change in surface temperature is 'too small to measure'. This has been discussed in detail by Clark and Rörsch [2023] (CR23). The whole concept of radiative forcings, feedbacks and climate sensitivity as described in Chapter 7 of the AR6 Working Group 1 Report is pseudoscientific nonsense [IPCC, 2021]. The history of radiative forcing was reviewed by Ramaswamy et al [2019]. The UN Intergovernmental Panel on Climate Change (IPCC) has based its climate change arguments on radiative forcing since it was established in 1988.

There are three parts to the climate fraud. First, starting in the nineteenth century the climate energy transfer processes that determine the surface temperature were oversimplified using the equilibrium climate assumption. This created global warming as a mathematical artifact in the early climate models. Second, as funding was reduced for NASA and later DOE, there was 'mission creep'. Various government modeling groups jumped onto the climate bandwagon. Third, there was a deliberate decision by certain environmental and political groups to exploit global warming to further their own interests [Hecht, 1975]. Here we focus on the technical fraud and consider the historical background, the development of the early equilibrium climate models and the subsequent growth of the pseudoscience of radiative forcing.

**Historical Background**

Joseph Fourier discussed the temperature of the earth in 1824 and 1827 [Fourier, 1824; 1827]. He correctly described the time dependent heating of the earth's land surface by the solar flux. He also described ocean solar heating and atmospheric cooling by convection. However, he did not use the term 'greenhouse effect'. Instead he described a solar calorimeter with glass windows that had been developed by Saussure. An important part of Fourier's work was the description of the seasonal time delay or phase shift in the subsurface heat transfer. This is clear evidence for a non-equilibrium thermal response to the solar flux. Similar phase shifts are found in the diurnal cycle and the seasonal ocean and weather station temperature responses to the solar flux. They are discussed in more detail in CR23. Such seasonal and diurnal phase shifts have been ignored in mainstream climate science for almost 200 years.

The equilibrium hypothesis was first proposed by Pouillet [1836] as part of his studies on the solar heating of the earth. He was apparently unaware of the importance of Fourier's earlier work on time dependent surface heating and the phase shift in the temperature response. In 1840, Agassiz proposed the existence of an Ice Age based on observations of the glaciers in the Alps [Agassiz, 1840]. The climate debate then shifted from surface temperature to the cause of Ice Age. This led Tyndall in the early 1860s to speculate that changes in the atmospheric $CO_2$ concentration could alter the earth's climate [Tyndall, 1861; 1863]. This in turn was the motivation for Arrhenius [1896] to try and calculate changes in surface temperature produced by $CO_2$. Arrhenius used an 'equilibrium air column' in his calculations, so his results were invalid. He replaced the time dependence with 24 hour average solar and LWIR fluxes and neglected the effects of convection, evaporation and subsurface transport. His model surface was a partially reflective black body with zero heat capacity. When the $CO_2$ concentration was increased, this approach had to produce an increase in surface temperature as a mathematical artifact of the calculation. Physical reality had been abandoned in favor of mathematical simplicity. Arrhenius repeated his calculations in 1906 and obtained smaller temperature changes [Arrhenius, 2014].

One of the earliest uses of computers was for weather forecasting, pioneered by a group led by John von Neumann [Harper, 2004]. However, the global circulation models (GCMs) used in this application require the solution of large numbers of coupled nonlinear equations. Lorenz [1963, 1973] found that such solutions were unstable, even for a simple convection model with 3 equations. A practical limit for weather forecasting was 12 days ahead. This work should have made it clear that such GCMs had no predictive capabilities over the time scales associated with climate change. Unfortunately, by the early 1960s, the equilibrium climate assumption had become firmly entrenched as scientific dogma. The idea that an increase in atmospheric $CO_2$ concentration produced by fossil fueled combustion $CO_2$ could cause an increase in surface temperature was accepted without question.

**The Early Climate Models**

The development of a computer climate model required two main steps. First, radiative transfer algorithms had to be improved so that the IR radiation field in the atmosphere, including the cooling rates could be calculated. Second, these algorithms had to be incorporated into each unit cell of a GCM modified for calculations over a climate time scale. The first generally accepted one dimensional radiative convective (1-D RC) model was that of Manabe and Wetherald (M&W) [1967] (MW67). They went on to incorporate their 1967 model into each unit cell of a 'highly simplified' global circulation model [M&W, 1975] (MW75). The NASA Goddard group extended the 1967 M&W model to include other IR active species [Wang et al, 1976] (H76) and then added a slab ocean model and other features in 1981 [Hansen et al, 1981] (H81). This provided the pseudoscientific foundation for the concepts of radiative forcing, feedbacks and climate sensitivity to $CO_2$ that are still found in the climate models today.

M&W added a 9 or 18 layer radiative transfer calculation to the equilibrium air column model used by Arrhenius. They also added a fixed distribution of relative humidity for the air layers. This created a 'water vapor feedback'. When the $CO_2$ concentration was increased, the initial mathematical warming artifact was amplified by the increase in water vapor concentration required by the fixed relative humidity assumption. M&W spent the next 8 years incorporating the 1967 model algorithms into each local cell of a basic global circulation model (GCM). They used a 'swamp' ocean and no surface heat capacity or surface thermal energy storage [M&W, 1975]. The mathematical warming artifacts/feedbacks from their 1967 model were built in to each unit cell of their GCM. M&W created the equilibrium climate fantasy land where the climate modelers still play with their computer games even today.

The climate modelers at NASA started out by studying radiative transfer in planetary atmospheres, mainly Mars and Venus. For both planets, the atmospheric composition is near 95% $CO_2$. Mission creep then started and a group of NASA modelers including Hansen extended the M&W 1967 model to include $N_2O$, $CH_4$, $NH_3$, $HNO_3$, $C_2H_4$, $SO_2$, $CCl_2F_2$, $CCl_3F$. $CCl_4$ as well as the species $H_2O$, $CO_2$ and $O_3$ included in MW67 [Wang et al, 1976] (H76). The NASA group blindly copied the 1967 M&W model. They failed to understand that the 'greenhouse effect' temperature changes that they calculated were just mathematical artifacts generated by the simplified modeling assumptions. They had no understanding of the real energy transfer processes that determine the surface temperature. They were just using melodramatic claims of the global warming apocalypse to obtain funding for their research on radiative transfer. They soon became trapped in a web of lies of their own making.

Instead of correcting their mistakes, the Hansen group went on to build the pseudoscientific foundation of radiative forcing, feedbacks and climate sensitivity still used by the climate modelers today. This is illustrated in Figure 2 using Table 1 and figures 1 through 5 from H81. The model could be 'tuned' to create any desired temperature increase (climate sensitivity) for a doubling of the $CO_2$ concentration by adjusting the feedbacks as shown in Figure 2a (H81 table 1). For H81 they selected a climate sensitivity of 2.8 °C. A 'slab' ocean model was included that could be magically heated by the increase in downward LWIR flux to the surface. In reality, the penetration depth of the LWIR flux into the ocean is 100 micron (0.004 inches) or less and the LWIR flux is fully coupled to the wind driven evaporation at the surface (CR23). A 'greenhouse gas' radiative forcing cannot heat the oceans. The 'slab' ocean just added heat capacity to the H81 1-D RC model and changed the model response time as shown in Figure 2b (H81 figure 1). The model was used to calculate changes in surface temperature using a variety of 'forcing agents' including greenhouse gases, clouds and aerosols. This is shown in Figure 2c (H81, figure 2). The $CO_2$ doubling ritual was then introduced as shown in Figure 2d (H81, figure 4). A step doubling of the $CO_2$ concentration produces a small decrease in the LWIR flux emitted at TOA and the fictional 1-D RC model 'adjusts' to restore the LWIR flux at TOA. In the real atmosphere, the effects of these small flux changes are too small to measure in the natural diurnal and seasonal temperature cycles. A global average temperature record was determined from weather station and ocean temperature data as shown in Figure 2e (H81, figure 3). The prominent peak from the Atlantic Multi-decadal Oscillation (AMO) near 1940 was conveniently ignored. Time series of radiative

forcings, in this case just $CO_2$, volcanic aerosols and changes in solar flux were then used as model input to create the illusion of a match to the temperature record. This is shown in Figure 2f (H81, figure5).

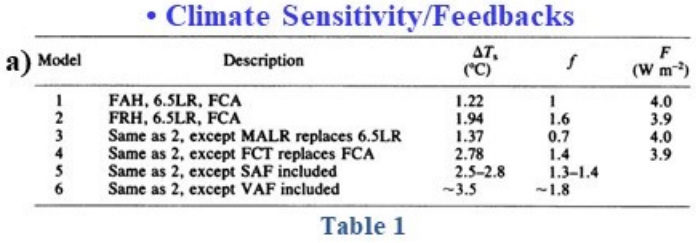



Table 1

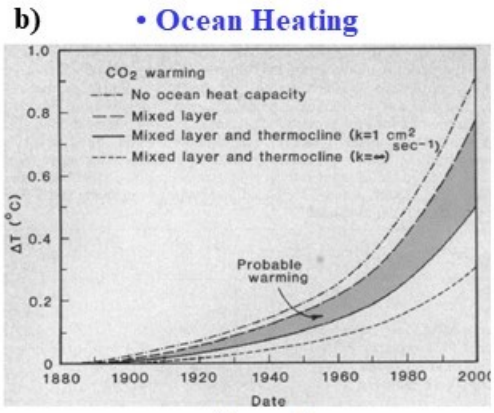



Figure 1

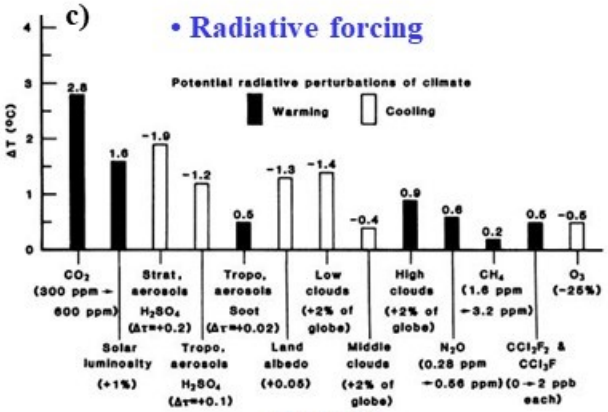



Figure 2

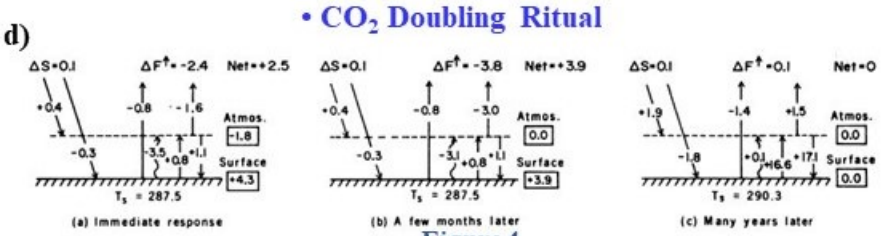



Figure 4

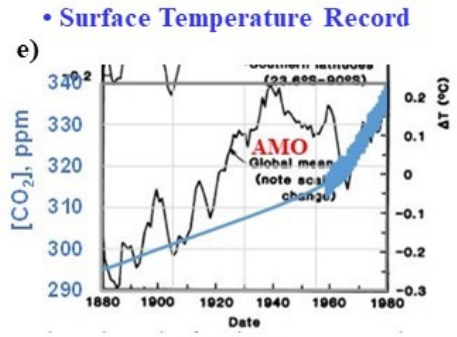



Figure 3

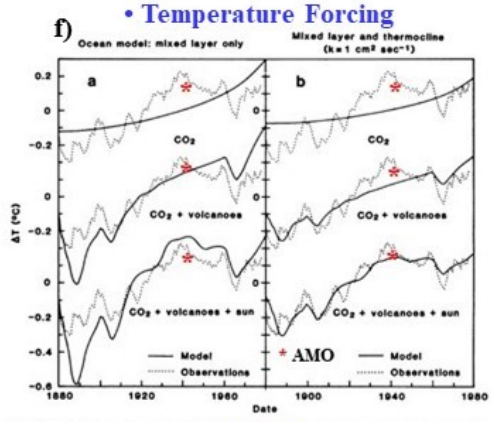


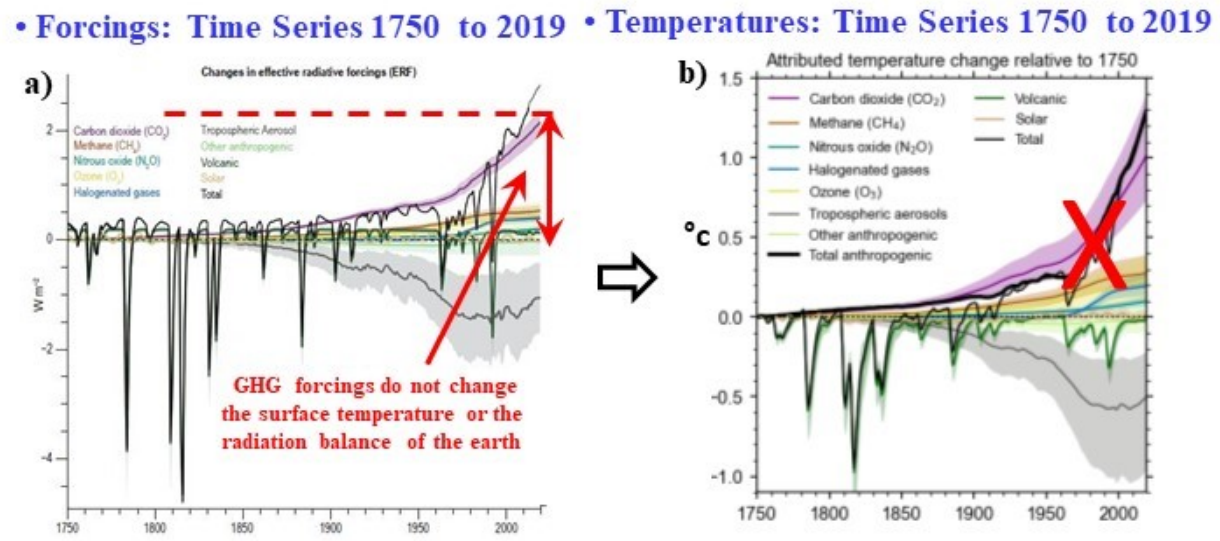

Figure 5

**Figure 2: The foundation of the pseudoscience of radiative forcings, feedbacks and climate sensitivity established by H81. The 1940 AMO peak in the global mean temperature record is indicated by an asterisk in Figure 2f.**

Figure 2f (H81 figure 5) is an early example of the used of a contrived set of pseudoscientific radiative forcings to create the illusion that a climate model can calculate an average surface temperature based on a global mean of the weather station record. This practice was accepted by the climate modelers and has been used by IPCC since it was established in 1988 [Ramaswamy, 2019].

**Forcings, Feedbacks and Climate Sensitivity in AR6**

As computer technology has improved, the climate models have become more complex, but the underlying assumptions have not changed significantly. 'Effective' radiative forcings were introduced by Hansen et al in 2005. These were used to provide additional 'tuning' in the climate models [Hansen et al, 2005]. The time series of the radiative forcings used in the CMIP6 models and the related temperature changes are shown in Figures 3a and 3b. The comparison to the global temperature record is shown in Figure 3c. The pseudoscientific radiative forcings are then divided into 'human factors' and 'natural factors' and the climate models are re-run with just the 'natural' factors. This is used to create the illusion that the observed warming in the global average temperature record is 'human caused' and that this in turn has led to an increase in the intensity and frequency of 'extreme weather events' [Herring et al, 2022]. The real causes of the observed temperature changes are shown in Figure 3e. They are a combination of ocean temperature changes, urban heat island effects, changes to the rural/urban mix in the weather station averages and various 'adjustments' used to 'homogenize' the temperature data. The climate models are simply 'tuned' to match the global temperature record. The models are then used to simulate the increase in global average temperature produced by a doubling of the $CO_2$ concentration. This gives the climate sensitivities shown in Figure 3f.



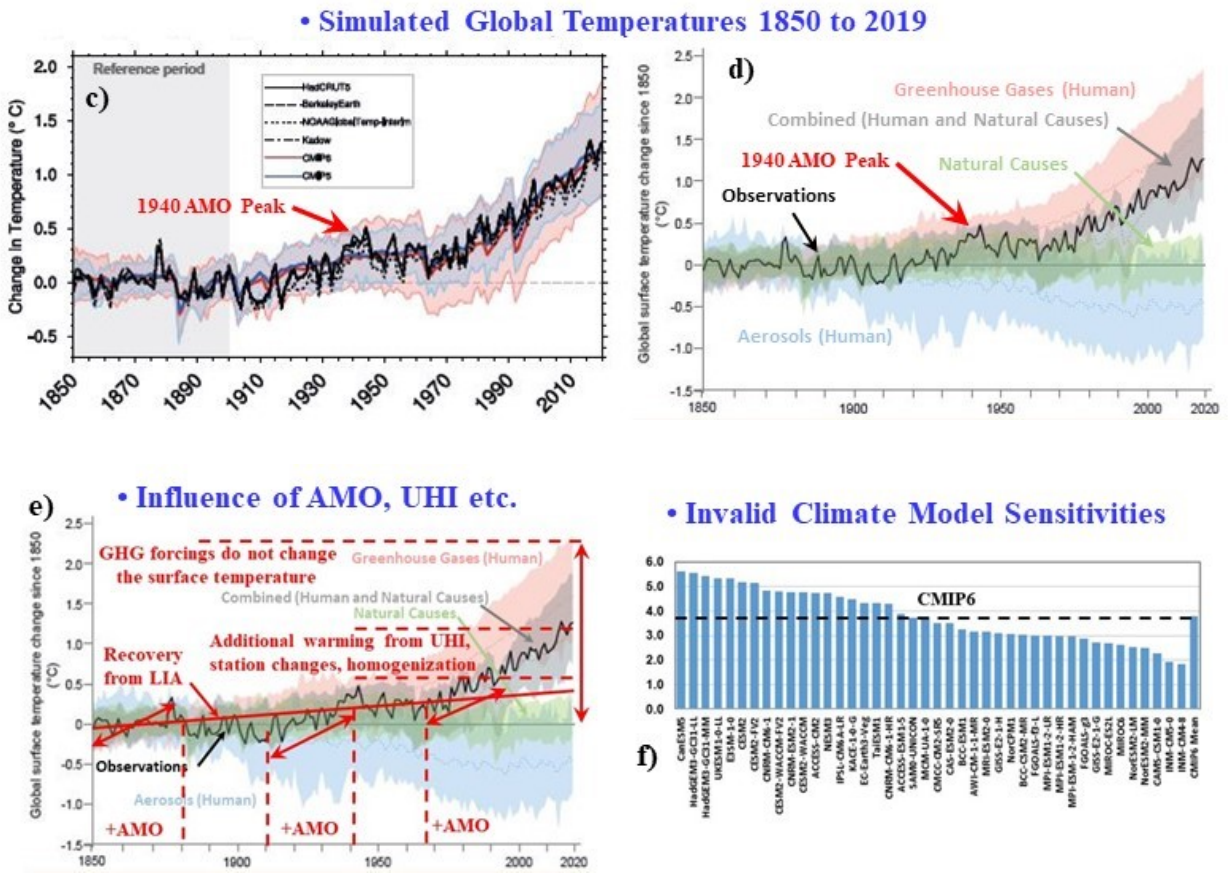



**Figure 3: a) time dependence of the radiative forcings and b) time dependence of the temperature changes derived from a), c) 'tuned' temperature record using a contrived set of radiative forcings that appear to simulate the global mean temperature record, d) the separation of the contrived forcings to create fraudulent 'human' and 'natural' temperature records, e) the contributions of the AMO, UHI etc. to the global mean climate record, f) the [pseudoscientific] equilibrium climate sensitivity (ECS) estimated from the CMIP6 models (IPCC AR6, WG1, figures 2.10, 7.8, 3.4b and FAQ 3.1 Fig. 1, ECS data from Table 7.SM.5).**

The 'attribution' scam was described in IPCC AR3 WG1, the Third Assessment Working Group 1 Report [2001]. An increase in the intensity and frequency of 'climate extremes' has been a major part of the IPCC melodrama since then. The calculated global mean temperature record using a contrived set of natural, anthropogenic and combined forcings is shown in Figures 3a through 3c (figure AR3 WG1 SPM 4). The forcing components are shown in Figure 3d and 3e and the 'attribution' argument based on changes to a normal statistical distribution of temperature is shown in Figure 3f. (Figs. 3d and 3f are from AR3 WG1 SPM 3 and fig, 2.32. Fig. 3e is from Tett et al, 2000, fig. 1). The climate model results are from Stott et al [2000] using the Hadley HadCM3 model. In addition, the warming of the air in the lower troposphere by air compression related to downslope winds and high pressure domes has been ignored. This is discussed in detail in CR23.

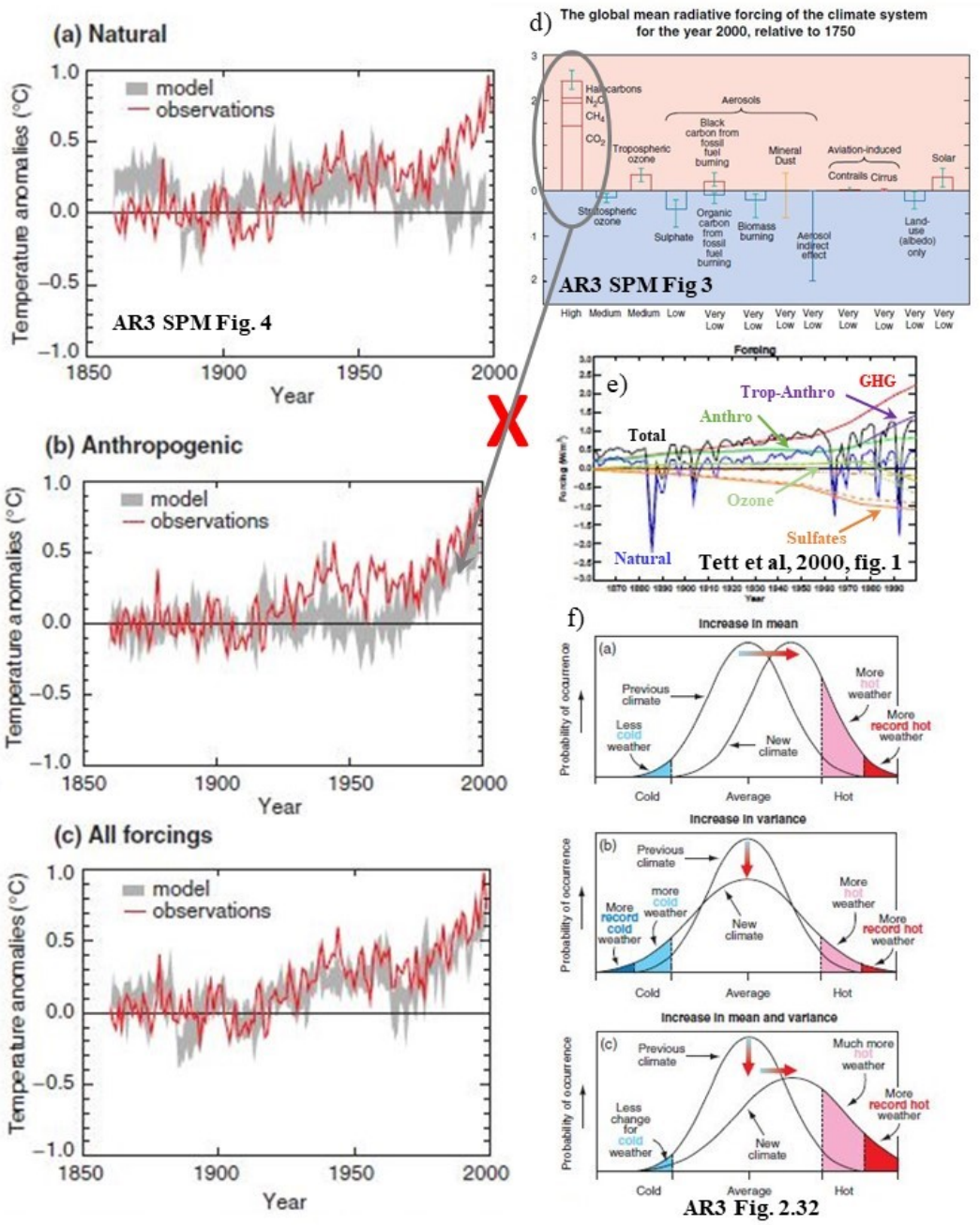



**Figure 4: The 'attribution' argument from the Third IPCC Climate Assessment. A contrived set of pseudoscientific radiative forcings shown in d) and e) is divided into 'natural' and 'anthropogenic' forcings and used to create the illusion that the climate models can simulate a 'natural' climate baseline as shown in a), the 'anthropogenic' contribution as shown in b) and be combined to match the temperature record in c). Presumed changes to a normal (Gaussian) statistical temperature distribution are then used to 'attribute' increases in the intensity and frequency of 'extreme weather' to the anthropogenic temperature increase. In reality, the LWIR 'greenhouse gas' forcings do not change the surface temperature.**

There are 5 basic technical errors in the radiative forcing argument. These are discussed in detail in CR23 and in posts VPCP 17, VPCP 20 and VPCP 24). Only a brief summary is given here.

**The Technical Errors in the Radiative Forcing Argument**

1) The radiative transfer analysis is incomplete. The LWIR flux emitted at TOA has to be interpreted as a rate of cooling at different levels in the atmosphere. In the troposphere at low and mid latitudes, this cooling rate is approximately 2 to 2.5 K per day [Feldman, 2008]. A doubling of the $CO_2$ concentration produces a slight decrease in the rate of cooling of the troposphere or a warming rate of up to +0.08 K per day [Iacono et al, 2008]. At a lapse rate of -6.5 K $km^{-1}$, a warming of +0.08 K is produced by a decrease in altitude of about 12 meters. This is equivalent to riding an elevator down four floors. A warming rate of this magnitude is too small to measure in the normal diurnal and seasonal temperature variations in the troposphere.

2) The upward and downward LWIR flux terms are decoupled by molecular line broadening. Almost all of the downward LWIR flux to the surface originates from within the first 2 km layer of the troposphere. Approximately half of this flux originates from the first 100 meter layer above the surface [CR23, Clark, 2013]. Within the troposphere, any change in temperature related to LWIR cooling is fully coupled to the temperature changes produced by turbulent convection [Gibert, 2007]. This means that the small amount of tropospheric heating produced by a 'greenhouse gas forcing' is simply re-radiated to space as wideband LWIR emission (there may also be a change in altitude and therefore gravitational potential). THERE IS NO CHANGE TO THE ENERGY BALANCE OF THE EARTH. (The changes in cooling rates in the stratosphere require very small changes in flux because of the low air density).

3) At the surface, the penetration depth of the LWIR flux into the oceans is less than 100 micron (0.004 inches) [Hale and Querry, 1973]. Here it is fully coupled to the much larger and more variable wind driven evaporation (latent heat flux). Using long term zonal averages, the sensitivity of the latent heat flux to the wind speed within the ±30° latitude bands is at least 15 W $m^{-2}$/m $s^{-1}$ [Yu et al, 2008]. The 2 W $m^{-2}$ increase in downward LWIR flux to the surface from 140 ppm $CO_2$ is dissipated by an increase in wind speed of 13 centimeters per second. The annual increase of 0.034 W $m^{-2}$ from 2.4 ppm $CO_2$ is dissipated by an increase in wind speed of 2 mm $s^{-1}$. Any $CO_2$ induced ocean temperature changes are too small to measure.

4) Over land, all of the flux terms are absorbed by a thin surface layer. The surface temperature initially increases after sunrise as the solar flux is absorbed. This establishes a thermal gradient with both the cooler air above and the subsurface ground layers below. The surface-air gradient drives the evapotranspiration and the subsurface gradient conducts heat below the surface during the first part of the day after sunrise. Later in the day, as the surface cools, the subsurface gradient reverses and the stored heat is returned to the surface. As the land and air temperatures equalize in the evening, the convection stops and the surface cools more slowly by net LWIR emission. This convection transition temperature is reset each day by the local weather system passing through. Almost all of the absorbed solar heat is dissipated within the same diurnal cycle. The day to day changes in convection transition temperature are much larger than any temperature change produced by $CO_2$.

5) When the global climate anomaly record, such as the HadCRUT4 data set is evaluated, the dominant term is found to be the Atlantic Multi-decadal Oscillation (AMO) [HadCRUT4, 2022, Morice et al, 2012, AMO, 2022]. The additional part of the recent warming may be explained as a combination of three factors. First there are urban heat islands related to population growth that were not part of the earlier record. Second, the mix of urban and rural weather stations use to create the global record has changed. Third, there are so called 'homogenization' adjustments that have been made to the raw temperature data. These include the 'infilling' of missing data and adjustments to correct for 'bias' related to changes in weather station location and instrumentation. It has been estimated that half of the warming in the 'global record' has been created by such adjustments [Andrews 2017a, 2017b and 2017c, D'Aleo and Watts 2010, Berger and Sherrington, 2022, O'Neill et al, 2022]. This is illustrated above in Figure 3e.

The role of the AMO in setting the surface air temperature has been misunderstood or ignored for a long time. The first person to claim a measurable warming from an increase in $CO_2$ concentration was Callendar in 1938. [Callendar, 1938]. The warming that he observed was from the 1910 to 1940 warming phase of the AMO not $CO_2$. During the 1970s there was a 'global cooling' scare that was based on the cooling phase of the AMO from 1940 to 1970 [McFarlane, 2018, Peterson et al, 2008, Douglas, 1975, Bryson and Dittberner, 1976]. In their 1981 paper Hansen et al chose to ignore the 1940 AMO peak in their analysis of the effects of $CO_2$ on the weather station record [Hansen, 1981]. Similarly, Jones et al conveniently overlooked the 1940 AMO peak when they started to ramp up the modern global warming scare in 1986 and 1988 [Jones et al, 1986, 1988]. The IPCC also ignored the AMO peak in its first assessment report in 1990 [IPCC FAR WG1 fig. 11 SPM p. 29] and it has continued to ignore it as shown in AR6 WG1 TS CS Box 1 fig. 1c p. 61 [2021]. This is illustrated in Figure 4. The AMO and the periods of record used are shown in Figure 4a. The AMO consists of a long period oscillation near 60 years superimposed on a linear temperature recovery from the Little Ice Age (LIA) [Akasofu, 2010]. The temperature records used by Callendar, Douglas, Jones et al, Hansen et al and IPCC 1990 and 2021are shown in Figures 4b through 4g. The Keeling curve showing the increase in atmospheric $CO_2$ concentration is also shown in Figures 4d through 4g [Keeling, 2023].

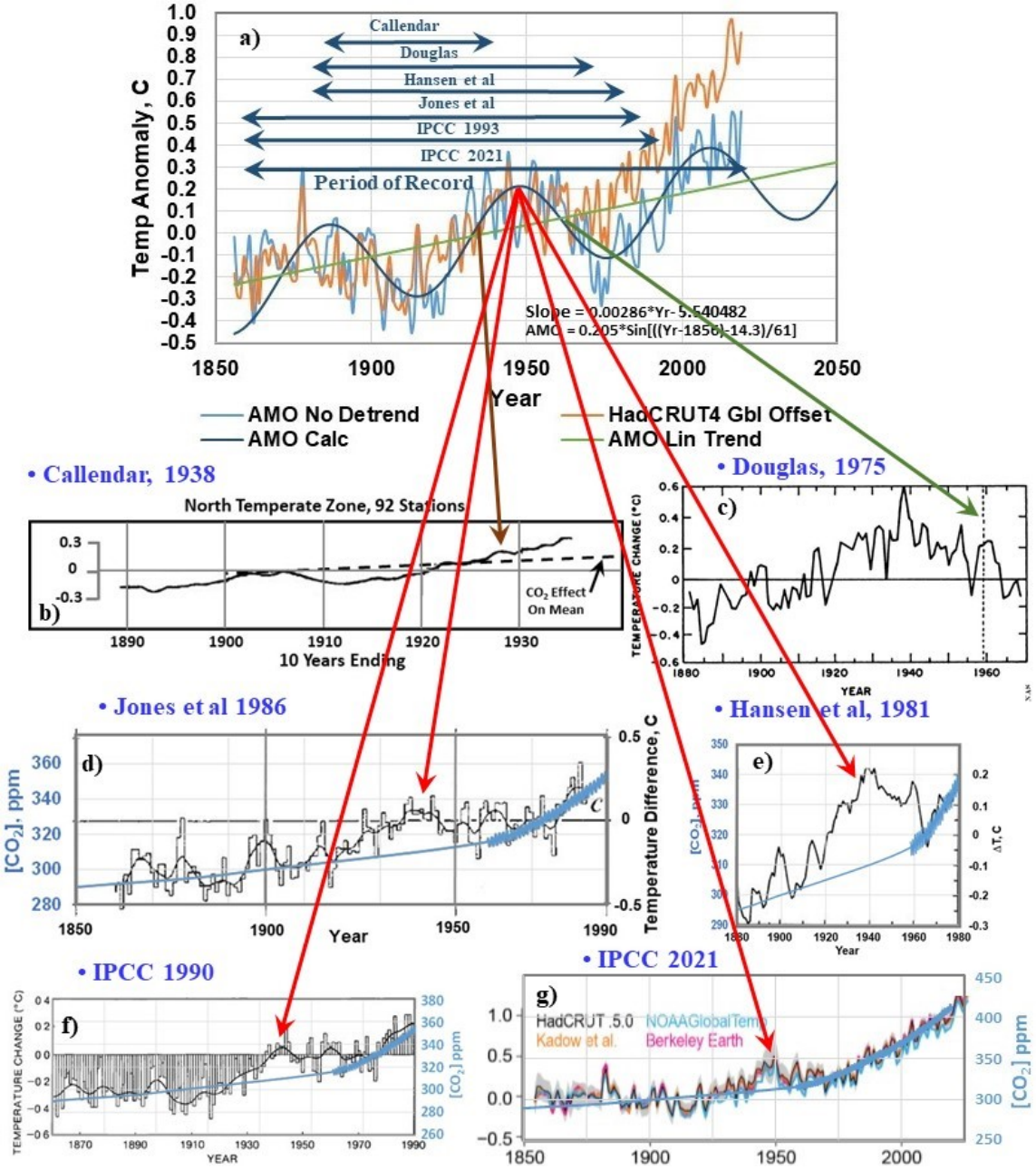



**Figure 5: a) AMO anomaly and HadCRUT4 global temperature anomaly, aligned from 1860 to 1970, b) temperature anomaly for N. temperate stations from Callendar [1938], c) global cooling from Douglas [1975], d) global temperature anomaly from Jones et al, [1986] e) global temperature anomaly from Hansen et al, [1981], f) and g) global temperature anomaly from IPCC 1990 and IPCC 2021. The changes in $CO_2$ concentration (Keeling curve) are also shown in d) through g). The periods of record for the weather station data are also indicated.**

## Conclusions

The foundation of the modern computer based climate modeling fraud was established between 1967 and 1981 by the work of Manabe and Wetherald (M&W) at NOAA and Hansen's group at NASA Goddard. H81 established the foundation of the pseudoscience of radiative forcings,

feedbacks and climate sensitivity that continues today. A contrived time series of radiative forcings is used to create the illusion that the climate models can simulate the global mean temperature record. The forcings are divided into 'anthropogenic' and 'natural' forcings. It is then claimed that the 'anthropogenic' forcings produce the warming observed in the global mean temperature record and that this enhances 'extreme weather events'. There are five fundamental scientific errors in the radiative forcing argument. The change in flux in TOA produces a change in the rate of cooling, not a change in 'equilibrium' surface temperature. Thermal engineering analysis of the time dependent flux terms shows that any changes in ocean, land or tropospheric air temperatures produce by the observed increase of 140 ppm in the atmospheric $CO_2$ concentration are too small to measure. There can be no '$CO_2$ signal' in global mean temperature record. Unfortunately, melodramatic claims of anthropogenic global warming rapidly became a lucrative source of funding. The climate modelers soon became trapped in a web of lies of their own making. As funding was reduced for space exploration and nuclear programs, government scientists jumped on the climate modeling bandwagon and blindly copied and 'improved' the equilibrium climate models that had already been developed. This led to 'mission creep' at government agencies such as NASA and DOE. The exploitation of the fictional global warming apocalypse by outside political and environmental groups coincided with the warming phase of the AMO that was first detected in 1985. The climate fraud grew rapidly after the formation of the IPCC in 1988. In the US, the IPCC reports were blindly copied by the US Global Change Research Program (USGCRP) and reduction in the use of fossil fuels became US policy. Eisenhower's warning about the corruption of science by government funding has come true. It is time to dismantle a massive climate fraud. A good place to start is the USGCRP and the fraudulent 'National Climate Assessments'.

## Acknowledgement

This work was performed as independent research by the author. It was not supported by any grant awards and none of the work was conducted as a part of employment duties for any employer. The views expressed are those of the author. He hopes that you will agree with them.

## References

Normally, the references given in an article of this nature would be almost exclusively to the peer reviewed literature, with limited references to websites that provide access to climate data. Unfortunately, climate science has been thoroughly corrupted by the global warming fraud. The peer review process has collapsed and been replaced by blatant cronyism. Many of the publications in 'prestigious' journals such as Nature, Science, PNAS and others that relate to climate modeling predictions of global warming are fraudulent and should never have been published. Consequently many of the important references given here are to website publications. This should not detract from the integrity of the information provided. Many of these website publications have received a more thorough review than they might have received through the traditional peer review process.

Agassiz, L. (1840) *Etudes sur les Glaciers*, Neuchatel

Akasofu, S.-I. (2010), "On the recovery from the Little Ice Age" *Natural Science* **2**(11) pp. 1211-1224. [http://dx.doi.org/10.4236/ns.2010.211149]

AMO (2022), [https://www.esrl.noaa.gov/psd/data/correlation/amon.us.long.mean.data]

Andrews, R. (2017a), "Adjusting Measurements to Match the Models – Part 3: Lower Troposphere Satellite Temperatures" *Energy Matters* Sept 14. [http://euanmearns.com/adjusting-measurements-to-match-the-models-part-3-lower-troposphere-satellite-temperatures/#more-19464]

Andrews, R. (2017b), "Making the Measurements Match the Models – Part 2: Sea Surface Temperatures" *Energy Matters* Aug 2. [http://euanmearns.com/making-the-measurements-match-the-models-part-2-sea-surface-temperatures/]

Andrews, R. (2017c), "Adjusting Measurements to Match the Models – Part 1: Surface Air Temperatures" Energy Matters July 27. [http://euanmearns.com/adjusting-measurements-to-match-the-models-part-1-surface-air-temperatures/]

Arrhenius, S. (1896), "On the influence of carbonic acid in the air upon the temperature of the ground" *The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science* **41** pp. 237-276. [https://doi.org/10.1080/14786449608620846]

Arrhenius, S. (2014), "The Probable Cause of Climate Fluctuations: –Svante Arrhenius, *Friends of Science*, A Translation of his 1906 Amended View of "Global Warming" Original title:"Die vermutliche Ursache der Klimaschwankungen" Meddelanden från K. Vetenskapsakademiens Nobelinstitut Band 1 No 2. [https://www.friendsofscience.org/assets/documents/Arrhenius%201906,%20final.pdf]

Berger, T. and G. Sherrington, (2022), "Uncertainty of Measurement of Routine Temperatures–Part Three" WUWT Oct 14 [https://wattsupwiththat.com/2022/10/14/uncertainty-of-measurement-of-routine-temperatures-part-iii/]

Bryson, R. A. and G. J. Dittberner (1976), "A non-equilibrium model of hemispheric mean surface temperature" *J. Atmos. Sci.* **33**(11) pp. 2094-2106. [https://journals.ametsoc.org/view/journals/atsc/33/11/1520-0469_1976_033_2094_anemoh_2_0_co_2.xml]

Callendar, G. S. (1938), "The artificial production of carbon dioxide and its influence on temperature" *J. Roy. Met. Soc.* **64** pp. 223-240. [https://doi.org/10.1002/qj.49706427503] available at: [http://www.met.reading.ac.uk/~ed/callendar_1938.pdf]

Clark, R. (2013), "A dynamic, coupled thermal reservoir approach to atmospheric energy transfer Part I: Concepts" *Energy and Environment* **24**(3, 4) pp. 319-340. [https://doi.org/10.1260/0958-305X.24.3-4.319]

"A dynamic, coupled thermal reservoir approach to atmospheric energy transfer Part II: Applications" *Energy and Environment* **24**(3, 4) pp. 341-359. [https://doi.org/10.1260/0958-305X.24.3-4.341]

Clark, R. and A. Rörsch, (2023) *Finding Simplicity in a Complex World - The Role of the Diurnal Temperature Cycle in Climate Energy Transfer and Climate Change*, Clark Rörsch Publications, Thousand Oaks, CA. Available from Amazon. [https://www.amazon.com/dp/B0BZBPV32Q]

Further details and supplementary material are available at [https://clarkrorschpublication.com/index.html]

D'Aleo, J. and A. Watts (Aug. 27, 2010) "Surface temperature records: policy driven deception? [http://scienceandpublicpolicy.org/images/stories/papers/originals/surface_temp.pdf] (Link not working) Available at: [https://venturaphotonics.com/files/6.0_D'Aaleo.Watts.Surface_temp.SPPC%202010.pdf]

Feldman D.R., K. N. Liou, R. L. Shia and Y. L. Yung (2008), "On the information content of the thermal IR cooling rate profile from satellite instrument measurements" *J. Geophys. Res.* **113** D1118 pp. 1-14. [https://doi.org/10.1029/2007JD009041]

Fourier, J.-B. J (1827), "Mémoire sur les températures du globe terrestre et des espaces planétaires" *Mém. Acad. R. Sci. Inst. Fr.*, **7** (1827) pp. 527-604. [https://www.academie-sciences.fr/pdf/dossiers/Fourier/Fourier_pdf/Mem1827_p569_604.pdf] English translation: [http://www.wmconnolley.org.uk/sci/fourier_1827/]

Fourier, J.-B. J. (1824), "Remarques générales sur les températures du globe terrestre et des espaces planétaires" *Annales de Chimie et de Physique* **27**, pp. 136–167. [https://gallica.bnf.fr/ark:/12148/bpt6k65708960/f142.image#] English translation: [http://fourier1824.geologist-1011.mobi/]

Gibert, F., J. Cuesta, J.-I. Yano, N. Arnault and P. H. Flamant (2007), "On the Correlation between Convective Plume Updrafts and Downdrafts, Lidar Reflectivity and Depolarization Ratio" *Boundary Layer Meteorology* **5** pp. 553-573. [https://doi.org/10.1007/s10546-007-9205-6]

HadCRUT4 (2022), [https://www.metoffice.gov.uk/hadobs/hadcrut4/data/current/time_series/HadCRUT.4.6.0.0.annual_ns_avg.txt]

Hale, G. M. and M. R. Querry (1973), "Optical constants of water in the 200 nm to 200 µm wavelength region" *Applied Optics* **12**(3) pp. 555-563. [https://doi.org/10.1364/AO.12.000555]

Hansen, J. et al., (45 authors), (2005), "Efficacy of climate forcings" *J. Geophys Research* **110** D18104 pp.1-45. [https://pubs.giss.nasa.gov/docs/2005/2005_Hansen_ha01110v.pdf]

Hansen, J., D. Johnson, A. Lacis, S. Lebedeff, P. Lee, D. Rind and G. Russell (1981), "Climate impact of increasing carbon dioxide" *Science* **213** pp. 957-956. [https://pubs.giss.nasa.gov/docs/1981/1981_Hansen_ha04600x.pdf]

Harper, K. C. (2004), "The Scandinavian tag team: Providers of atmospheric reality to numerical weather prediction efforts in the U. S. (1948-1955)" *Proc. Int. Commission on History of Meterology* **1.1** pp. 84-91. [https://journal.meteohistory.org/index.php/hom/issue/view/2]

Herring, S. C., N. Christidis, A. Hoell and P. A. Stott (2022), "Explaining Extreme Events of 2020 from a Climate Perspective" *Bull. Amer. Meteor. Soc.* **101** (1), pp. S1–S128. [https://doi.org/10.1175/BAMS-ExplainingExtremeEvents2020.1] (and prior years in this series)

Iacono, M. J., J. S. Delamere, E. J. Mlawer, M. W. Shephard, S. A. Clough, and W. D. Collins (2008), "Radiative forcing by long-lived greenhouse gases: Calculations with the AER radiative transfer models" *J. Geophys. Res.* **113**, D13103 pp. 1-8. [https://doi.org/10.1029/2008JD009944]

IPCC, *Climate Change 2021: The Physical Science Basis*. *Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. (2021). In Press. doi:10.1017/9781009157896, [https://www.ipcc.ch/report/ar6/wg1/]

IPCC, *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, (2014)1535 pp. ISBN 9781107661820. [https://www.ipcc.ch/report/ar5/wg1/]

IPCC, *Climate Change 2001: The Scientific Basis. Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change* [Houghton, J.T.,Y. Ding, D.J. Griggs, M. Noguer, P.J. van der Linden, X. Dai, K. Maskell, and C.A. Johnson (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 881pp. [https://www.ipcc.ch/site/assets/uploads/2018/03/WGI_TAR_full_report.pdf]

IPCC (1990), *Climate Change, The IPCC Scientific Assessment*, Houghton, J. T., G. J. Jenkins and J. J. Ephraums (Eds.), Cambridge University Press, New York. [https://www.ipcc.ch/site/assets/uploads/2018/03/ipcc_far_wg_I_full_report.pdf]

Jones, P. D., T. M. L. Wigley, C. K. Foland, D. E. Parker, J. K. Angell, S. Lebedeff and J. E. Hansen (1988) "Evidence for global warming in the past decade" Nature 332, p. 790. [https://doi.org/10.1038/332790b0]

Jones, P. D., T. M. Wigley and P. B Wright (1986), "Global temperature variations between 1861 and 1984" *Nature* **323**(31) pp. 430-434. [https://www.nature.com/articles/322430a0]

Keeling (2023), *The Keeling Curve*. [https://scripps.ucsd.edu/programs/keelingcurve/]

Knutti, R. and G. C. Hegerl (2008), "The equilibrium sensitivity of the Earth's temperature to radiation changes" *Nature Geoscience* **1** pp. 735-743. [https://www.nature.com/articles/ngeo337]

Lorenz, E. N. (1973), "On the Existence of Extended Range Predictability" *J. Applied Meteorology and Climatology* **12**(3) pp. 543-546. [https://journals.ametsoc.org/view/journals/apme/12/3/1520-0450_1973_012_0543_oteoer_2_0_co_2.xml?tab_body=fulltext-display]

Lorenz, E.N. (1963), "Deterministic nonperiodic flow" *Journal of the Atmospheric Sciences* **20**(2) pp. 130-141. [https://journals.ametsoc.org/view/journals/atsc/20/2/1520-0469_1963_020_0130_dnf_2_0_co_2.xml]

Manabe, S. and R. T. Wetherald (1975) "The effects of doubling the $CO_2$ concentration in the climate of a general circulation model" *J. Atmos. Sci.* **32**(1) pp. 3-15. [https://journals.ametsoc.org/view/journals/atsc/32/1/1520-0469_1975_032_0003_teodtc_2_0_co_2.xml?tab_body=pdf]

Manabe, S. and R. T. Wetherald (1967) "Thermal equilibrium of the atmosphere with a given distribution of relative humidity" *J. Atmos. Sci.* **24** pp. 241-249. [http://www.gfdl.noaa.gov/bibliography/related_files/sm6701.pdf]

McFarlane, F. (2018), "The 1970s Global Cooling Consensus was not a Myth" Watts Up with That, 11.19.2018 [https://wattsupwiththat.com/2018/11/19/the-1970s-global-cooling-consensus-was-not-a-myth/]

Morice, C. P., J. J. Kennedy,N. A. Rayner and P. D. Jones (2012) "Quantifying uncertainties in global and regional temperature change using an ensemble of observational estimates: The HadCRUT4 data set" *J. Geophysical Res. Atmospheres* 117 D08101 pp. 1-22. [https://doi.org/10.1029/2011JD017187]

O'Neill, P., R. Connolly, M. Connolly, Willie Soon, B. Chimani, M. Crok, R. de Vos, H. Harde, P. Kajaba, P. Nojarov, R. Przybylak, D. Rasol, O. Skrynyk, O. SkrynykP. Štěpánek, A. Wypych and P. Zahradníček, (2022), "Evaluation of the Homogenization Adjustments Applied to European Temperature Records in the Global Historical Climatology Network Dataset", *Atmosphere* **13**(2) 285 pp. 1-21. [https://doi.org/10.3390/atmos13020285]

Peterson, T. C., W. M. Connolley and J. Fleck, (2008) "The myth of the 1970's global cooling consensus" *Bull. Amer. Meteor. Soc.* **86** pp. 1325-1337. [https://doi.org/10.1175/2008BAMS2370.1]

Pouillet, M. (1837), "Memoir on the solar heat, on the radiating and absorbing powers of the atmospheric air and on the temperature of space" in: *Scientific Memoirs selected from the Transactions of Foreign Academies of Science and Learned Societies*, edited by Richard Taylor, **4** pp. 44-90.

[http://nsdl.library.cornell.edu/websites/wiki/index.php/PALE_ClassicArticles/archives/classic_articles/issue1_global_warming/n2-Poulliet_1837corrected.pdf]

Original publication: (1836), "Mémoire sur la chaleur solaire: sur les pouvoirs rayonnants et absorbants de l'air atmosphérique et sur la température de l'espace" *Comptes Rendus des Séances de l'Académie des Sciences*, Paris. 7, pp. 24-65.

Ramaswamy, V., W. Collins, J. Haywood, J. Lean, N. Mahowald, G. Myhre, V. Naik, K. P. Shine, B. Soden, G. Stenchikov and T. Storelvmo (2019), "Radiative Forcing of Climate: The Historical Evolution of the Radiative Forcing Concept, the Forcing Agents and their Quantification, and Applications" *Meteorological Monographs* Volume **59** Chapter 14. [https://doi.org/10.1175/AMSMONOGRAPHS-D-19-0001.1]

Stott, P.A., S.F.B. Tett, G.S. Jones, M.R. Allen, J.F.B.Mitchell and G.J. Jenkins (2000), "External control of twentieth century temperature variations by natural and anthropogenic forcings" *Science* **290**, pp. 2133-2137. [https://www.science.org/doi/abs/10.1126/science.290.5499.2133]

Tett, S.F.B., G.S. Jones, P.A. Stott, D.C. Hill, J.F.B. Mitchell, M.R. Allen, W.J. Ingram, T.C. Johns, C.E. Johnson, A. Jones, D.L. Roberts, D.M.H. Sexton and M.J. Woodage (2000), *Estimation of natural and anthropogenic contributions to 20th century temperature change*, Hadley Centre Tech Note 19, pp 52, Hadley Centre for Climate Prediction and Response,

Meteorological Office, RG12 2SY, UK.,
[https://adsabs.harvard.edu/full/2000ESASP.463..201T/0000201.000.html]

Tyndall, J., (1861) "On the Absorption and Radiation of Heat by Gases and Vapours, and on the Physical Connexion of Radiation, Absorption, and Conduction" *Philosophical Transactions of the Royal Society of London* **151** pp. 1-36.
[https://www.jstor.org/stable/pdf/108724.pdf?refreqid=excelsior%3A86f44613289e621f0b8d37d54020bf60]

Tyndall, J. (1863), "On radiation through the Earth's atmosphere" *Proc. Roy Inst.* Jan 23 pp. 200-206.

Wang, W. C., Y. L. Yung, A. A. Lacis, T. Mo and J. E. Hansen (1976), "Greenhouse effects due to man-made perturbations of trace gases" *Science* **194** pp. 685-690.
[https://pubs.giss.nasa.gov/docs/1976/1976_Wang_wa07100z.pdf]

Yu, L., X. Jin, and R.A. Weller (Jan. 2008), *Multidecade global flux datasets from the objectively analyzed air-sea fluxes (OAFlux) project: latent and sensible heat fluxes, ocean evaporation, and related surface meteorological variables* OAFlux project technical report OA-2008-01. [http://apdrc.soest.hawaii.edu/doc/OAFlux_TechReport_3rd_release.pdf]