

Proof that Carbon Dioxide, CO₂, does not control Earth's Temperature, nor do human emissions of CO₂ from today's burning of hydrocarbon fuels cause significant temperature increases.

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NOTATION CONVENTION: When a chemical compound is in brackets, e.g., "<CO₂> PPM," understand this as "atmospheric concentration of CO₂, in Parts per Million."

INTRODUCTION:

There are numerous claims by many Global Warming Adherents, Alarmists, and the UN's Intergovernmental Panel on Climate Change that burning fossil fuels and subsequent increasing <CO₂> is driving warmer temperatures because of an alleged CO₂ Radiative Forcing effect. However, the data graphics below show that present levels of CO₂ are not influencing Earth temperatures when compared with past Earth Temperatures, nor are human emissions of CO₂ causing any significant rise in temperatures.

Most of the data quoted by the IPCC is from the period of time subsequent to "The Great Climate Shift of 1976."

IMPORTANT DATA PRIOR TO 1976.

To start, let's consider pertinent data before 1976.

According to Oak Ridge National Laboratory and [EPA](#), from 1946-1976, emissions of CO₂ ~tripled, from ~5 GT/year (1946) to ~15 GT/ year (1976) over that time period.

Yet, temperatures PLUMMETED over that time, giving the technical and popular literature numerous stories of significant cooling and a coming "New Ice Age." The Northern Hemisphere Temperature time series plots in [Fig 3 of Hansen](#) et al, "Climate Impact of Increasing Carbon Dioxide," shows this distinctive fall in temperature.

Figure 1 below shows time series of CO₂ Emissions, top, and the Hansen et al plot of northern Hemisphere temperatures, just below.

TOP:

CO₂ Emissions, data from the EPA and Oak Ridge National Lab

BOTTOM:

NH Temperature from Hansen and NASA, 1981.

Red line shows date axis alignment at 1900 AD.

~1946, CO₂ emissions were about 5 Gigatons.
By about 1970, that had about **tripled** to 15 Gigatons of CO₂ emissions.

Yet, ~1940-1970, temperatures plummeted according to Fig 3 of Hansen's ["Climate Impact of Increasing Atmospheric Carbon Dioxide"](#)

Data show emissions tripled yet temperatures plummeted, which led to **"The New Ice Age is Coming!"** stories of the 1970s

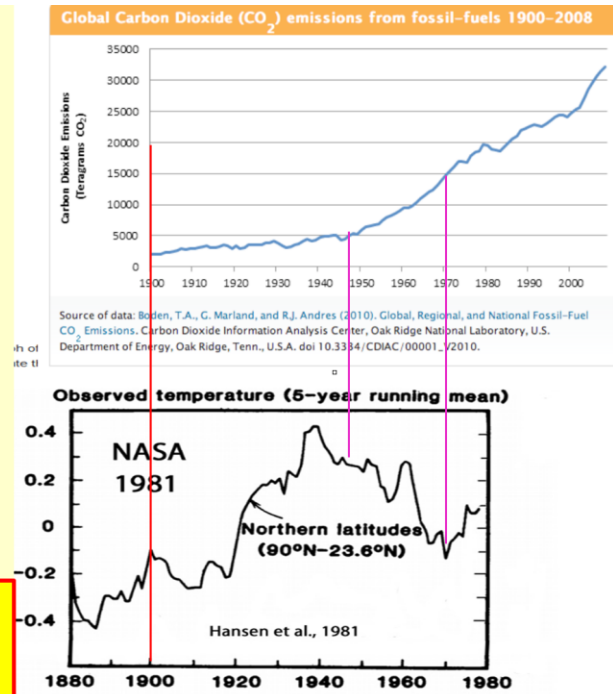


Figure 1. Data plots showing that during the post-WW2 economic boom period from 1946-1971 CO₂ emissions tripled, yet temperatures plummeted.

From the technical literature of the time, in **Monthly Weather Review**, "Global Temperature Variation, Surface-100 mb, An Update into 1977," by Angell, J. K. and J. Korshover, Vol. 106, No. 6, June 1978: Their Figure 4 shows Time Series from 1955-1975 decreasing temperatures at the Surface in the Northern Hemisphere, Southern Hemisphere, and Globally. That same Figure 4 displays more time series over the same dates, 1955-1975, all of which show a distinct drop in temperatures at the surface, and at numerous levels aloft, to 100 mb, about 53,000 ft.

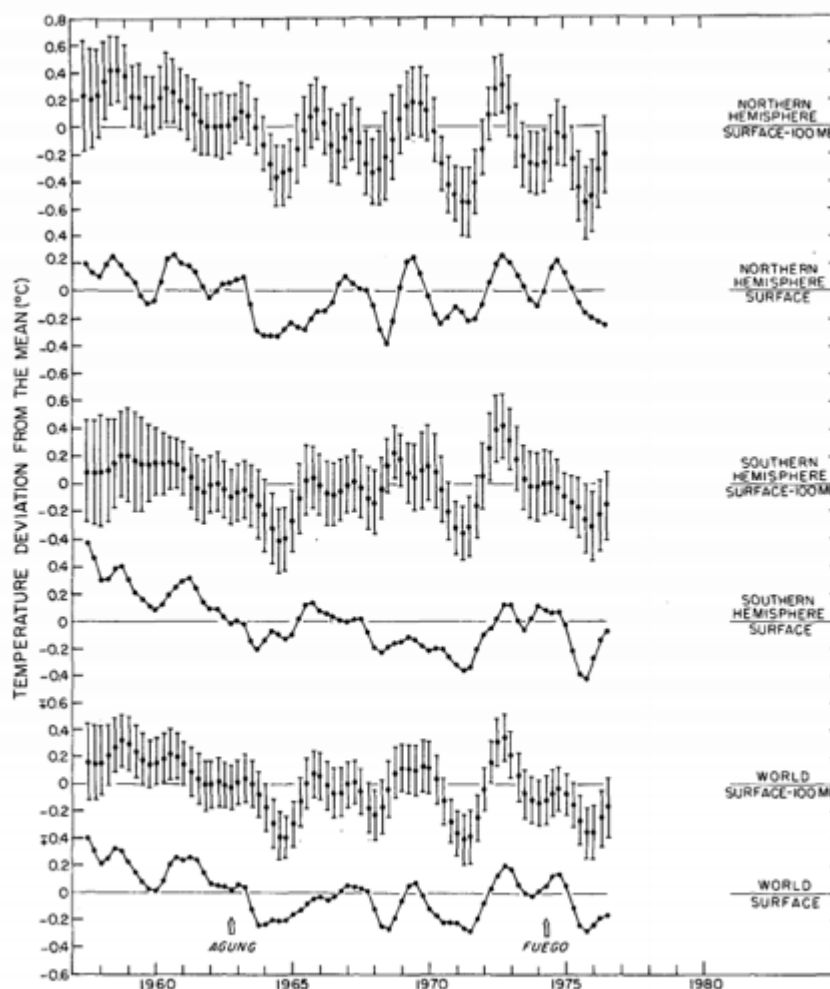


FIG. 4. Temperature variation for the Northern and Southern Hemispheres, and for the world as a whole. The eruptions of Mt. Agung and volcano Fuego (Guatemala) are indicated at bottom. Otherwise, see Fig. 1 legend.

Figure 2. From Monthly Weather Review, "Global Temperature Variation, Surface-100 mb, An Update into 1977," by Angell, J. K. and J. Korshover, Vol 106, No 6, Jun 1978, Fig 4. Note the preponderance of falling temperatures, surface and aloft.

From the popular literature of the time, these print articles:

TIME, Monday, 24 Jun 1974, "Another Ice Age?" One of the paragraph leads: "Since the 1940s the mean global temperature has dropped about 2.7° F."

NEWSWEEK, 28 Apr 1975, in the SCIENCE section: "The Cooling World." Some quotes: "But there is a peril more immediate than the prospect of another ice age. Even if temperature and rainfall patterns change only slightly in the near future in one or more of the three major grain-exporting countries—the U.S., Canada and Australia —global food stores would be sharply reduced."

NEW YORK TIMES, Thursday, Aug 8, 1974, "Climate Changes Endanger World's Food Output," by Harold M. Schmeck, Jr. Accompanying the article there is a global map, with black shading covering areas of the Earth with conditions "threatening future (food) output."

DER SPIEGEL, 12 Aug 1974, "Catastrophe in Installments," Leading paragraph in bold: "Is a new ice age coming? Not right away, but the rainy summer in Northern Europe, climate researchers fear, was only part of a worldwide change in weather - a preview of cooler and wetter times to come." <Translated by my daughter, High School German teacher, Cathy Gamble>

SCIENCE NEWS, 1 March 1975, "THE ICE AGE COMETH?" Cover art featured a glacier pushing from Mid-Town south to lower Manhattan.

TIME, 31 Jan 1977, article title on the cover, "The Big Freeze," cover shows photo of a man in a red knit hat covering all of his head except nose and eyes, snow on the knit hat over his head and throat.

TIME Cover from 1979, date obscured, Couple huddled in front of Christmas Tree and next to radiator, "The Cooling of America 1979," on page fold in green: story title, "A Challenge to Khomeini."

TV short, from the "In Search of" TV series, "In Search of The Coming Ice Age," <https://www.youtube.com/watch?v=1kGB5MMIAVA>

THE ICE CORES REVEAL IMPORTANT MEASUREMENT PATTERNS.

There is a second data set showing presumptions that CO₂ emissions and concentrations control Earth temperatures are fundamentally wrong.

For this we need to look at the data from the [Vostok Ice Cores](#) in Antarctica: in Fig 3, below.

In this data plot, variations from present Temperature are plotted in blue, "Delta Temperature," while <CO₂> is plotted in green, scale of concentrations on the right.

There are five interglacial periods in this plot, peaks in the temperature history, each numbered as a Marine Isotope Stage, or MIS, mentioned briefly below, and plotted left to right.

<The original definition of Marine Isotope Stages comes from Lisiecki, L.E, and M.E. Raymo in "A Pliocene-Pleistocene stack of 57 globally distributed benthic Delta18 O records," PALEOCEANOGRAPHY, VOL. 20, PA1003, 2005. >

On the left, plotted in blue, are temperature changes in the current interglacial, MIS 1, the past 10,000 or so years, frequently called the Holocene. Today <CO₂> is now over

425 Parts per Million, PPM, accessed from <https://www.co2.earth/> on 19 Aug 2025.

Today's <CO₂> 425 PPM would be off scale high, but today's temperatures are at the Zero mark in Figure 3.

Next peak in temperature to the right is the interglacial MIS 5, about 140,000 years ago, the Eemian, distinctly warmer than the present, but with <CO₂> only 270 PPM,

Next is the interglacial MIS 7, about 240,000 years ago, distinctly warmer than the present <CO₂> briefly 280 PPM,

Next is the interglacial MIS 9, about 340,000 years ago, distinctly warmer than the present, <CO₂> 290 PPM,

Last, furthest right, MIS 11, about 410,000 years ago, with a mean temperature warmer than the Holocene and <CO₂> 280 PPM.

<http://en.wikipedia.org/wiki/File:Vostok-ice-core-petit.png>

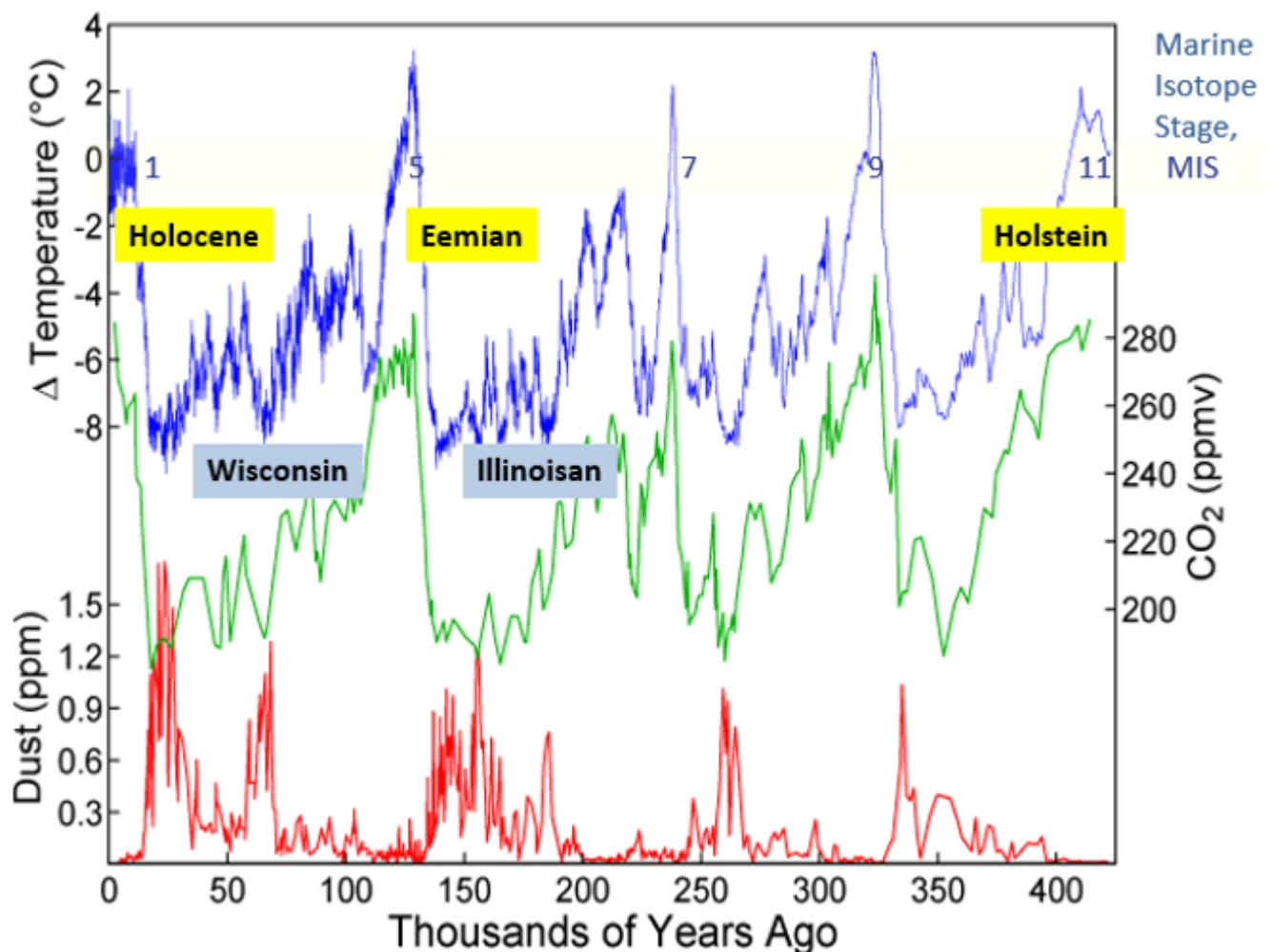


Figure 3. Vostok Ice Cores with Temperature difference from the present temperature plotted in blue, left, <CO₂> plotted in green, scale right. Names of three of the five interglacial periods are with yellow tags; names of two of the glacial periods are with blue tags. Marine Isotope Stage numbers for each interglacial are labeled, left to right, MIS1, 5, 7, 9, and 11.

At this point the reader should ask the question: How at present, with <CO₂> 425 PPM, off scale high, could the present temperatures be 2.5C COLDER than the Eemian, 140,000 years ago, MIS 5, which had <CO₂> 270 PPM?

There is only one answer: <CO₂> clearly does not control temperature.

A CLOSE-UP VIEW OF TEMPERATURE HISTORY

Below, in the close-up plot, are the Holocene temperatures from the Vostok Ice Cores, for the past 10,000 years.

(Note carefully, the present time is on the right in Figure 4 below.) Source:

<https://casf.me/wp-content/uploads/2025/08/Bringing-us-up-to-date-on-Trump-Energy-Department-s-Effort-to-Repeal-Obama-s-Endangerment-Finding-16-AUG-2025.pdf>, slide 37.

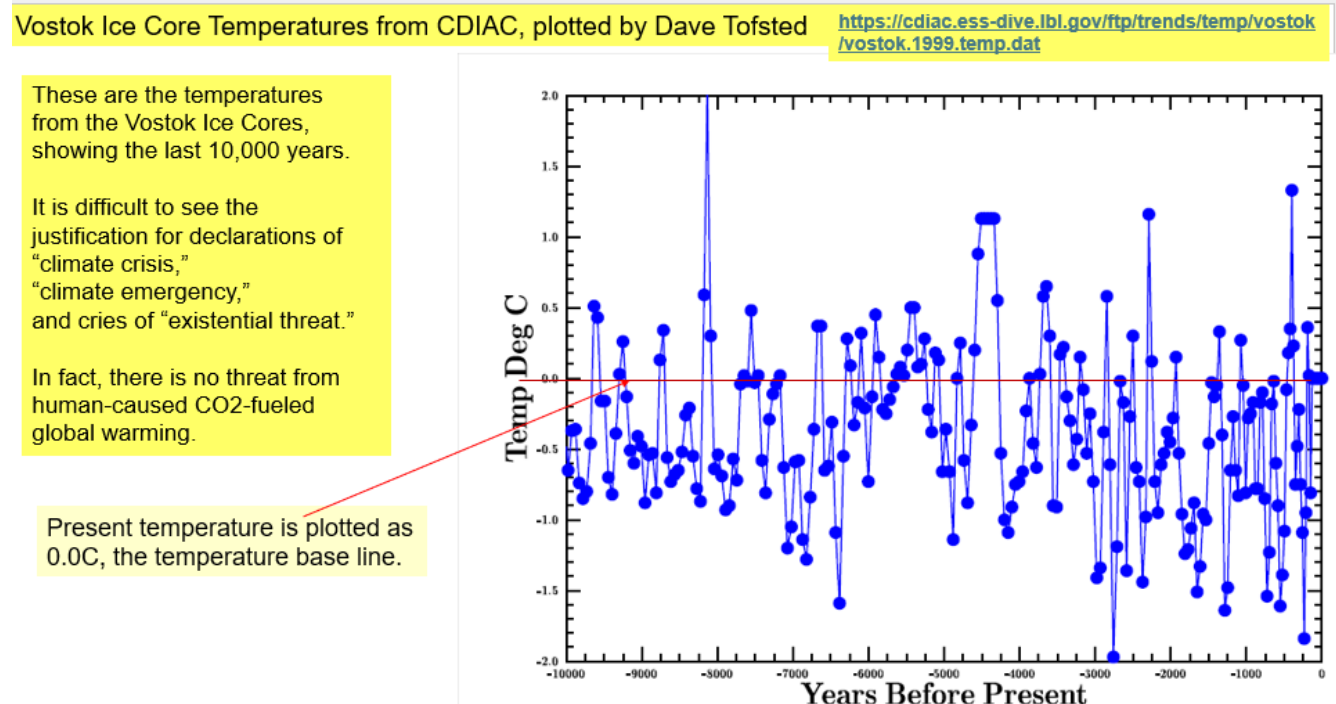


Figure 4. Close-up plot of Vostok Ice Core temperatures from the Carbon Dioxide Information and Analysis Center, CDIAC, for the last 10,000 years, kindly plotted by Dave Tofsted. There are numerous excursions of +/- 1.5C and some of +/-2C.

0.0 marks the present temperature and a baseline is drawn in red, the blue temperature plot shows many temperature changes of $\pm 1.5^{\circ}\text{C}$. There are also temperature excursions of $\pm 2^{\circ}\text{C}$. The next rhetorical question to be asked is, "How can the Climate Alarmists be so certain that THIS LATEST temperature fluctuation is a CATASTROPHIC ONE? Just looking at the chart, the question answers itself. There is nothing unusual about the present temperature or rate of change of temperature. There are no temperature changes which could be deemed "unusual," or "catastrophic."

Notice here the temperature trace never flat-lines. Temperature change, or "Climate Change" is always happening. The "never in stasis" characteristic is visible in all temperature time series. Temperature changes of $\pm 1.5^{\circ}\text{C}$ are a typical range which has occurred numerous times in the past 10,000 years.

Please note again, referring to Figure 3, that the present interglacial is by far the COLDEST of the five interglacials displayed in the last 410,000 years, despite the present CO_2 being off scale high, over 425 PPM.

Another rhetorical question: How could CO_2 emissions and CO_2 , now 425 PPM, be a problem for US residents and the climate when the present temperature is not even close to being the warmest of the present interglacial? Fig 4 above shows the maximum temperature of the present interglacial occurred some 8,000 years ago, some 2°C warmer than at present.

Again, Ice Core reconstructions of temperature from the Vostok Ice Cores show numerous fluctuations of $\pm 1.5^{\circ}\text{C}$; there are no reasons to think the present increase in temperature from the depth of the Little Ice Age two centuries ago is in any way leading to the climate catastrophe proclaimed by the climate alarmist community.

From New Astronomy, consider the [1 Aug 2016 journal article by Yndestad](#), Harald and J.E. Solheim, Their plot of Total Solar Irradiance, TSI, 1700-2023, is just below.

Non-Adjusted Temperature Data Appear To Correlate With 20th Century Solar Forcing

[Yndestad and Solheim \(2017\)](#) have released a reconstruction of solar activity (Total Solar Irradiance, or TSI) for 1700-2013.

1690
Depth of Little Ice Age

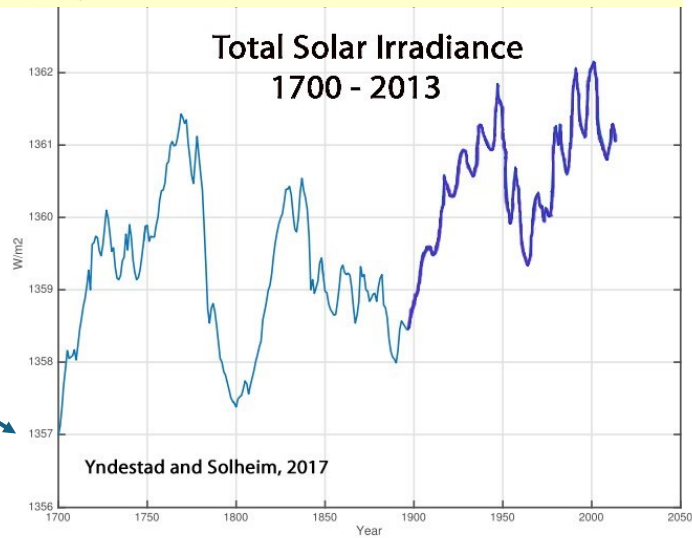


Fig. 3. TSI-HS total solar irradiance from 1700 to 2013 A.D. (Scafetta and Willson, 2014).

Figure 5. From Yndestad and Solheim, 2017, reconstructed Total Solar Irradiance from 1700 to 2023. Note particularly the temperature drop in the post-WW2 period, starting shortly before 1950 and extending to the 1970s. Simultaneously the world experienced the Post-WW2 Economic Boom, when CO2 emissions tripled.

There appear to be major swings of TSI, perhaps every 60 years, and the TSI reconstruction shows frequent minor changes in the direction of the TSI trace, seemingly annually.

[A close-up of the period 1845-2013 is in Soon, W.](#) in Fig 6, below showing TSI in Black, and the Berkeley Earth Surface Temperatures in Gray. The message from the data clearly is, "Earth Temperature changes are caused by changes in Total Solar Irradiance, TSI."

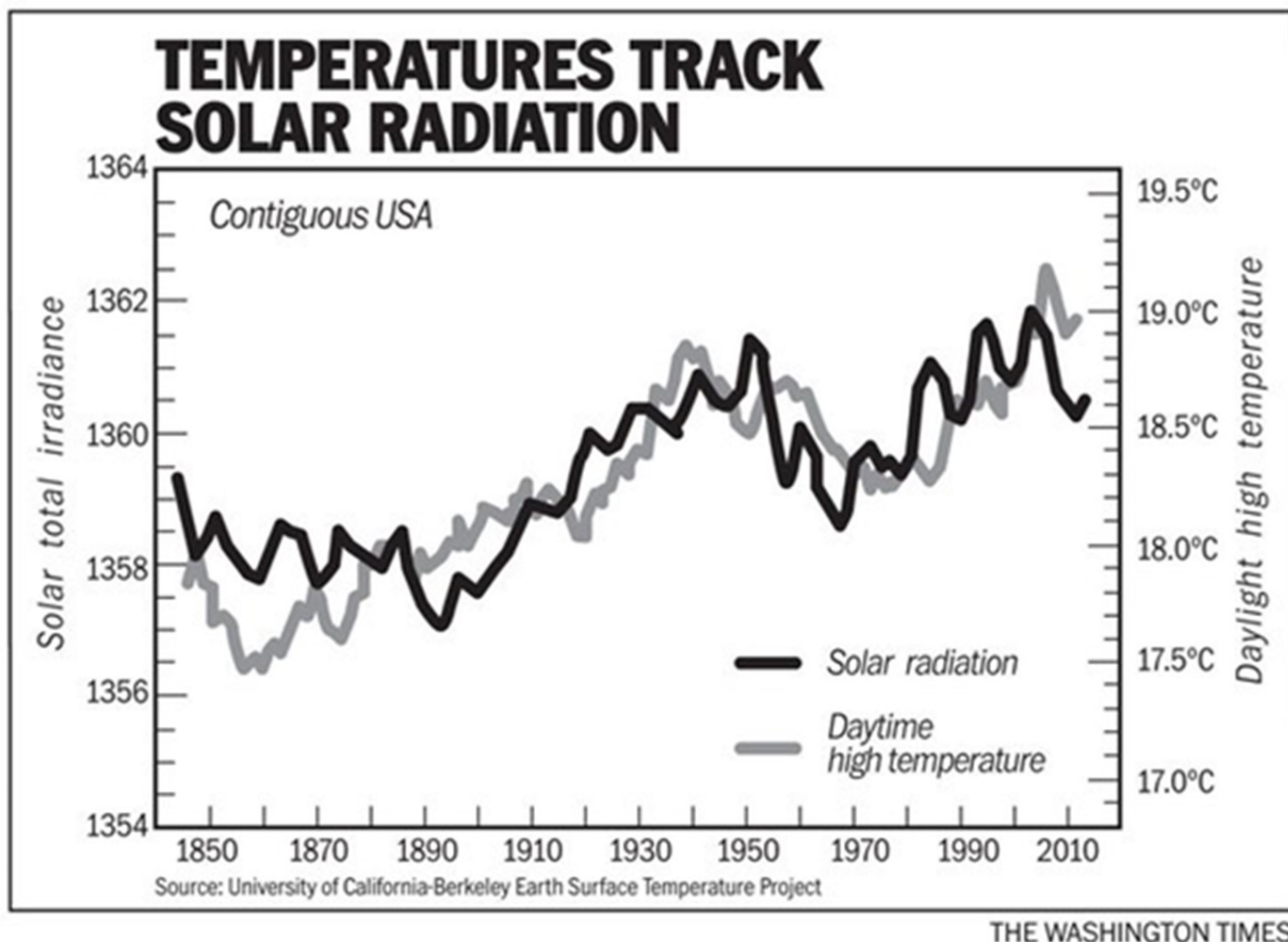


Figure 6. Plot of Total Solar Irradiance, TSI, from about 1845 to about 2013, in Black. The daytime high temperature for the same period, from the Berkeley Earth Surface Temperature Project is plotted in Gray. The message clearly is, Earth Temperature changes are caused by changes in Total Solar Irradiance, TSI. Note especially the post-WW2 period, after 1950, when TSI fell, and temperatures also fell. This is when CO2 emissions TRIPLED.

The data plotted in Figure 6 are significant; they show prominently the dramatic drop in temperature from 1940-1976, in Gray, accompanied by a significant drop in TSI from 1950-1970, in Black. During this time, CO2 emissions tripled.

Readers and scientists alike must take from these data that during the post-WW2 time frame, from the mid-1940s to the mid-1970s, despite the tripling of CO2 emissions, temperatures fell as TSI fell. This means that CO2 emissions did not control temperatures, TSI controlled temperatures.

High School and College students of Chemistry should learn Henry's Law, named for William Henry, British chemist. Loosely, where temperatures and pressures in the water and air are those commonly found at Earth's surface, "The amount of dissolved gas in a liquid is directly proportional at equilibrium to its partial pressure above the liquid."

Worthwhile [information on this topic](#) is on our web site.

Several publications demonstrate that as sea water warms, FIRST the sea water temperature increases, THEN the atmospheric <CO₂> increases. [In Humlum, et al](#), “The phase relation between atmospheric carbon dioxide and global temperature,” Figure 7, below, shows this feature: FIRST the sea water temperature increases (blue), THEN the atmospheric <CO₂> (green) increases. Clearly TEMPERATURE controls <CO₂>. Not the reverse.

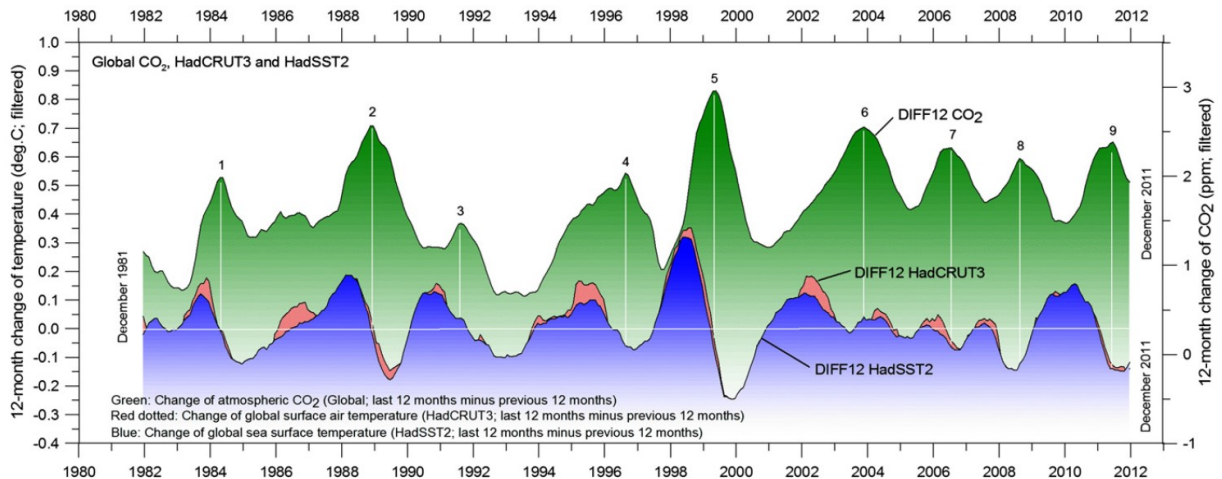


Fig 7. 12-month change of global atmospheric CO₂ concentration (NOAA; green), global sea surface temperature (HadSST2; blue) and global surface air temperature (HadCRUT3; red), filtered values (DIFF12, the difference between the average of the last 12 month and the average for the previous 12 months for each data series). The numbers (1–9) on DIFF12 CO₂ peaks and the thin white lines refer to Table 1. (In the original) (For interpretation of the references to color in this figure legend, the reader is referred to the web version of the article.)

Another pertinent diagram, from [Carbon Sense](#), is repeated as Figure 8 below.

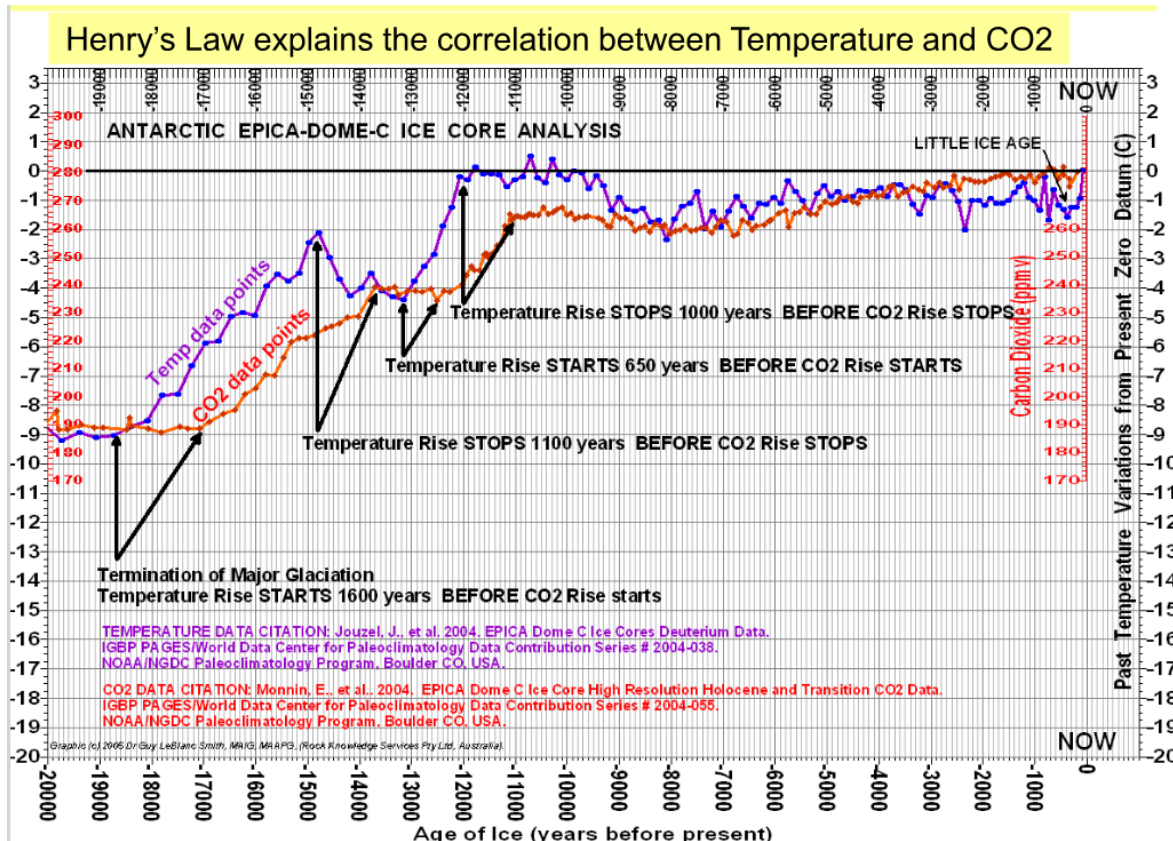


Figure 8. Time Series of Temperature (blue dots with purple trace) and CO2 (red dots with red trace) from 20,000 years BP, left, to the present, right. This diagram, from [The Carbon Sense Coalition](#), shows four sets of double black arrows joined at the vertex. In each case, Temperature changes first, followed by a change in CO2 an estimated 1500 years later.

This diagram shows an EPICA Dome C Ice core analysis from Antarctica, originally from The Carbon Sense Coalition. This Carbon Sense graphic plots blue dots, the time series of temperatures, and red dots, the time series of CO2 from that ice core. Time advances from left to right. From the left, FIRST the temperature changes, THEN, later, the CO2 changes. There are four separate demonstrations plotted, showing that TEMPERATURE controls CO_2 , not the reverse.

We show here that increased TSI caused temperatures to increase after the Great Climate Shift of 1976.

Higher concentrations of atmospheric CO2 clearly do NOT cause increasing temperatures, otherwise, at today's (August 2025) CO_2 of 425 PPM this would be the warmest interglacial of the past 410,000 years.

The analysis here further cements the notion that increasing concentrations of atmospheric CO2 is NOT the human endangerment proposed by the Obama Administration in 2009.

I recommended to regulations.gov the EPA and the DOE remove notions in their literature that say or imply that emissions of Carbon Dioxide or present concentrations of Carbon Dioxide are an “endangerment” to humans in the USA (or indeed, globally).

US Government publications purporting to show that increasing CO₂ emissions and increasing <CO₂> control Earth temperatures are incorrect and should be republished to show that temperatures follow Total Solar Irradiance, TSI, not <CO₂>.

CONCLUSIONS:

ONE: This paper shows that before the Great Climate Shift of 1976, as emissions and concentrations of CO₂ increased, Earth’s temperatures fell. There was rampant speculation in the popular press that a “New Ice Age” was imminent.

After 1976, after TSI significantly increased, temperatures increased. (this is when, on 23 Jun 1988, EPA’s James Hansen mistakenly testified to the Senate, “The greenhouse effect has been detected, and it is changing our climate now.”) It appears that Hansen did not understand that the increasing temperatures were caused by increasing TSI, not increases in <CO₂>.

The proposal in the 2009 Endangerment Finding and other analyses of <CO₂> vs. Temperature ignore the very plain data from 1946-1976 which show that as emissions of CO₂ tripled, temperatures plummeted. This was published in the technical literature, was on TV, and also published in the popular print literature, which decried “The Coming Ice Age.”

TWO: Examining the Vostok Ice Cores, we see among temperatures of the past 410,000 years that there were five interglacials, warm periods among this mostly glacial time of Earth History. The present interglacial, also called the Holocene, or MIS 1, now (2025) has <CO₂> 425 PPM, but it is clearly the **coldest** of the five interglacials. The other interglacials, MIS 5, MIS 7, MIS 9 and MIS 11, all have <CO₂> maxima around 280 PPM. Clearly, with all of the CO₂ in the air today, at 425 PPM, this remains the COLDEST of the five interglacials.

THREE: Henry’s Law from Chemistry says that in an aqueous solution, such as sea water containing dissolved air, as the temperature of the water increases, it drives the dissolved gases out of the solution and into the air above until the partial pressures of the gas in the water and the overlying atmospheric partial pressures are equal. The dissolved gases in sea water come from the atmosphere: 78% Nitrogen, 21% Oxygen, 1% Argon and now 425 PPM CO₂. [Ole Humlum showed](#) FIRST seawater temperature increases THEN the atmospheric <CO₂> increases as the CO₂ is driven from the ocean water into the atmosphere.

Clearly, statements that CO₂ controls today's atmospheric temperature and that today's increasing concentrations of CO₂ cause of sharply rising temperatures are incorrect.

Therefore, **the Obama Administration's 2009 claims that today's emissions of CO₂ are an endangerment to humans because of dramatic climate warming are plainly wrong.**

PERSONAL QUALIFICATIONS: I received a Bachelor's in Geology, Rutgers, 1962, Basic Meteorology certificate from Texas A&M, 1964, and an MS in Meteorology at The Pennsylvania State University, 1969. I served as a Weather Officer in the US Air Force for 21 years, 1963-1984, including overseas tours on Guam, in Thailand and Viet Nam, also in Germany, during the Cold War. In 1964, I was elected to Chi Epsilon Pi, the National Meteorology Honor Society, while an Air Force Basic Meteorology student at Texas A&M University. I worked as a Meteorologist for 49 years: 21 in the Air Force, 18 in the U.S. Army Atmospheric Sciences Laboratory, White Sands Missile Range, NM, and 10 in the Physical Science Laboratory at New Mexico State University. In later years I have been a principal in the Cruces Atmospheric Sciences Forum, a climate study group in Las Cruces, NM. Many of my contributions are on that group's Web Site at <https://casf.me/> .