

# EARTH'S THERMAL LONG-WAVE RADIATION

AND CLIMATE CHANGE  
CHARLES SAMUELS AND TOM LINDHOLTZ.

## SYNOPSIS

A study was undertaken to look at the entire earth climate as a whole. The study uses the average yearly climate data from ESRL, Physical Science Division, and NOAA for Total Solar Irradiance data.

We will show that the sun is the source for all changes in air temperature, precipitable water, sea level pressure, and outgoing thermal long-wave radiation

## INCOMING SHORT-WAVE AND OUTGOING LONG-WAVE RADIATION

When radiation from the sun warms the earth, the earth gets rid of the heat by long-wave radiation (OLR).

From Wikipedia: "The reduction of the surface long-wave radiative flux drives the greenhouse effect. Gasses such as methane, nitrous oxide, water vapor, and carbon dioxide absorb certain wavelengths of OLR, preventing the thermal radiation from reaching space."

However, when we look at plotted data, OLR is increasing, not decreasing; at the same time, CO<sub>2</sub> and water vapor have increased substantially. The theories behind the Wikipedia article are inaccurate.

While OLR is increasing, Total Solar Irradiance (TSI) is decreasing, as shown in Fig 1.

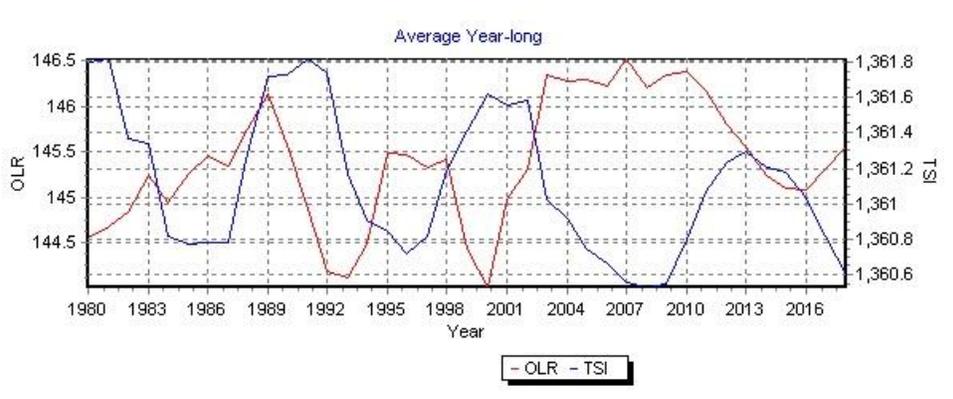


Fig 1. Total Solar Irradiance and Outgoing Long-wave Radiation

OLR data was available for the period 1975 to 2018. However, 1978 and 1979 data were missing, and some of the first year's data were suspect. It was decided to only use the period 1980 to 2018.

In general, as TSI decreases, OLR increases, it has already been shown that OLR should be decreasing, and TSI decreasing makes it worse. If TSI is decreasing, the sun is not driving the increase in OLR, and since CO2 is increasing, it is not driving OLR either. Houston, we have a problem.

We attempt to solve the problem by extracting the infrared portion of TSI and adjusting for the cooling effects of sunspots.

Using the formula  $IR = (TSI * .52) - SS * .07$ .

- .52 is the percent of IR in TSI. Some claim 49.4%, but it would make no difference.
- SS is the number of sunspots
- .07 is the constant used to estimate cooling by sunspots, which equates to two percent cooling. Any figure above .005 would result in the same curve.

The result is that IR closely matches OLR, and we can now say that IR drives OLR.

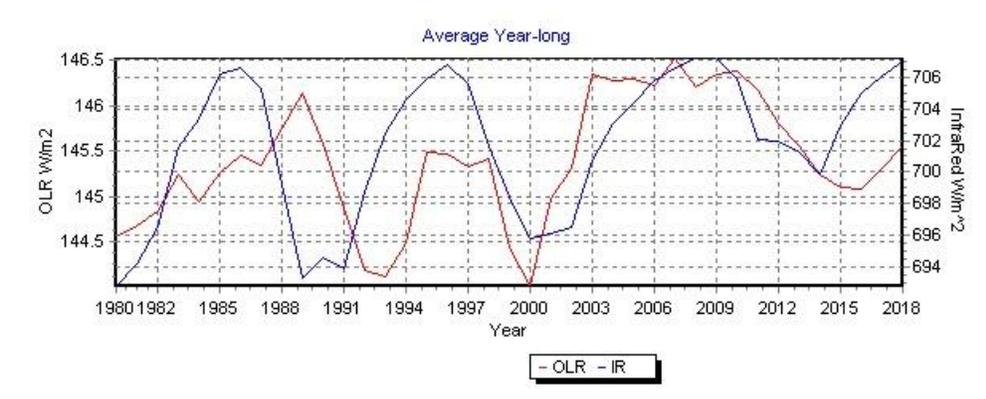


Fig 2. IR (blue) and OLR (red)

It is easier to visualize smoothed.

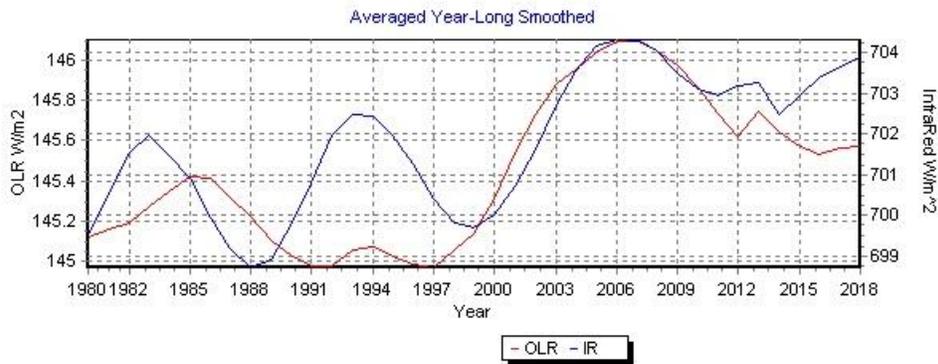


Fig 3. IR and OLR smoothed.

The difference between IR incoming and OLR outgoing, as well as the visible spectrum of TSI, powers the earth's energy needs, including biomass and chemical reactions.

### *LONG-WAVE RADIATION AND CHANGES TO WEATHER*

This section is to show that the data is self-consistent with solar-induced changes in the atmosphere. For example; Temperature and OLR are closely related, as seen in the graph below.

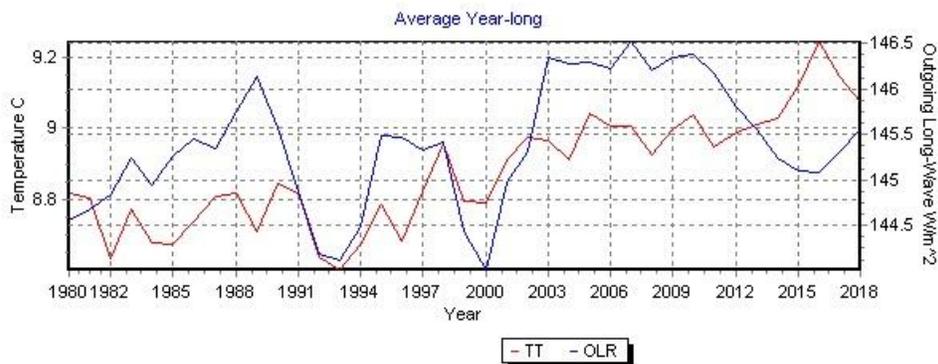


Fig 4. OLR and Air Temperature.

Since warm air can hold more water than cold air, an increase in global temperature results in an increase in precipitable water.

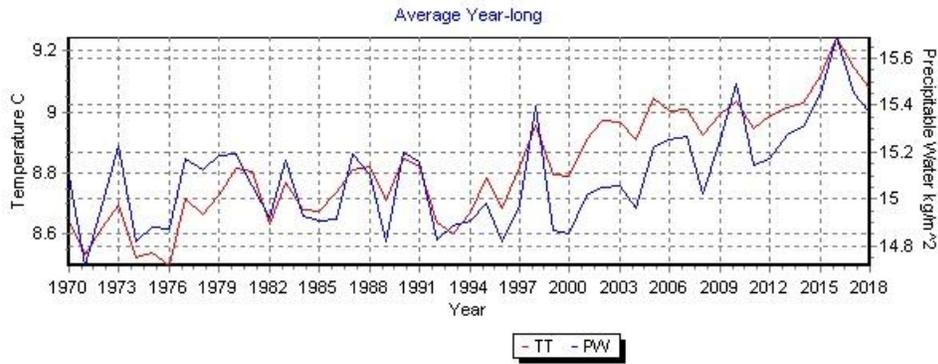


Fig 5. Temperature and Precipitable Water

When the air warms, it becomes less dense, and therefore the sea level pressure should decrease. And that is what happens, as shown in the graph below.

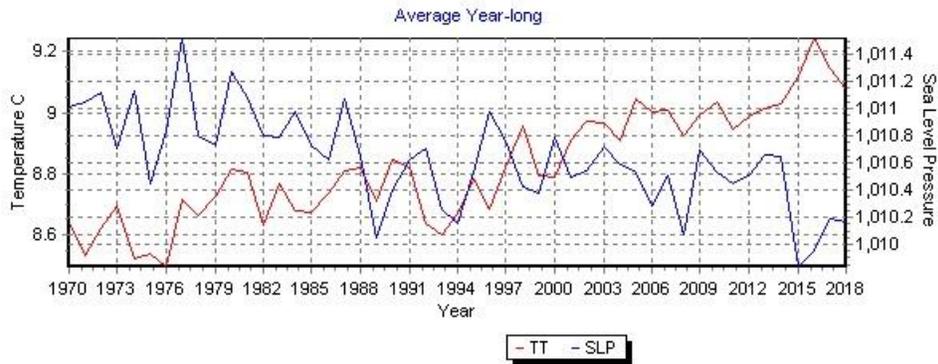
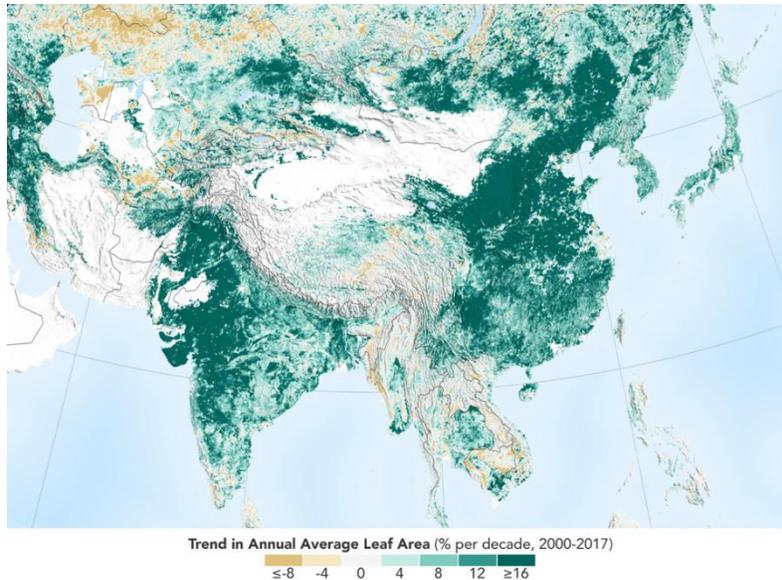


Fig 6. Temperature and Sea Level Pressure

## *CO2 AND GLOBAL WARMING*

The global warming theory is that CO<sub>2</sub> and water vapor trap heat and is the cause of rising temperatures. CO<sub>2</sub> has increased constantly, and water vapor increased substantially beginning in the mid-1990s. If the global warming CO<sub>2</sub> theory is correct, OLR should have decreased with constant solar input, but it did not; it increased. See Fig 3.

One possible explanation for increasing OLR is that a reduction of snow and ice cover would lower the albedo of the earth, resulting in more absorption of short-wave radiation and higher OLR. Another factor is the greening of China and India.



Rather than try to estimate the effects of various factors changing the albedo, consider this quote from NASA Earth Observatory concerning the albedo of the planet;

***In the early 2000s, after the first few years of Terra-CERES measurements, it appeared that Earth's albedo was declining, a phenomenon that was widely reported in scientific journals and on [NASA Earth Observatory](#). But as more years of data accumulated, and as scientists began to better understand the data, they found that albedo was neither increasing nor declining over time. It was fluctuating a lot by year, though.***

***“What the results show is that even at global scales, Earth's albedo fluctuates markedly over short time periods due to natural variations in the climate system,” said Norman Loeb, CERES principal investigator at NASA's Langley Research Center. Ice cover, cloud cover, and the amount of airborne particles—*aerosols from pollution, volcanoes, and dust storms*—can change reflectivity on scales from days to years. “We should not get fooled by short-term fluctuations in the data, as a longer record may reverse any short-term trend.”***

So there you have it. The rise in OLR has nothing to do with changes in snow and ice cover, and it is time to think the unthinkable; “When you have eliminated the impossible, whatever remains, however improbable, must be the truth,” and what remains is that the sun is responsible for the rise in OLR and temperature, and directly or indirectly, all other changes in the earth's climate. CO2 has little or nothing to do with climate change.

Scientists need to challenge the global warming theory of CO2 trapping heat. The word “trap” is a deliberate attempt to mislead the public. To “trap,” according to the dictionary, is to allow entry, but no exit. CO2 does absorb certain wavelengths of radiation, but it immediately reradiates or loses the excess heat through

conduction until it is the same temperature as its surroundings, just like all other material in the universe, except for a black hole.

Initially, the CO<sub>2</sub> theory of heating the atmosphere included the upper atmosphere, but alas, the data showed that was not the case, and the Warmers immediately claimed the upper air data was bad. After proof that the data was good, the Warmers dropped that idea. CO<sub>2</sub> does not heat above about 30,000 feet because there is no water vapor, and the longwave radiation is free to escape to space.

The fact that Mars, with 21 times as much CO<sub>2</sub> as the earth, loses heat rapidly when the sun goes down is proof that CO<sub>2</sub> has little to do with warming, but the Warmers reject this idea. One internet poster said the reason for Mars rapidly losing heat is because there is little atmosphere; no, the reason for the rapid cooling is the lack of greenhouse gas such as water vapor. In fact, during dust storms on Mars, the dust acts as a greenhouse gas and moderates the loss of heat.

Something similar happens in the Sahara Desert, where the humidity is very low, and the temperature can drop from over a hundred degrees to below freezing during the night. If there were 90% humidity, like in Houston, Texas, the temperature would only drop 10 degrees or so.