



This is the print version of the [Skeptical Science](http://sks.to/cycle) article '[It's a natural cycle](http://sks.to/cycle)', which can be found at <http://sks.to/cycle>.

What The Science Says:

A natural cycle requires a forcing, and no known forcing exists that fits the fingerprints of observed warming - except anthropogenic greenhouse gases.

Climate Myth: It's a natural cycle

"Global warming (i.e. the warming since 1977) is over. The minute increase of anthropogenic CO₂ in the atmosphere (0.008%) was not the cause of the warming—it was a continuation of natural cycles that occurred over the past 500 years." ([Don Easterbrook](#))

"What if global warming is just a natural cycle?" This argument is, perhaps, one of the most common raised by the average person, rather than someone who makes a career out of denying climate change. Cyclical variations in climate are well-known to the public; we all studied the ice ages in school. However, climate isn't inherently cyclical.

A common misunderstanding of the climate system characterizes it like a pendulum. The planet will warm up to "cancel out" a previous period of cooling, spurred by some internal equilibrium. This view of the climate is incorrect. Internal variability will move energy between the ocean and the atmosphere, causing short-term warming and cooling of the surface in events such as El Niño and La Niña, and longer-term changes when similar cycles operate on decadal scales. However, internal forces do not cause climate change. Appreciable changes in climate are the result of changes in the energy balance of the Earth, which requires "external" forcings, such as changes in solar output, albedo, and atmospheric greenhouse gases. These forcings can be cyclical, as they are in the ice ages, but they can come in different shapes entirely.

For this reason, "it's just a natural cycle" is a bit of a cop-out argument. The Earth doesn't warm up because it feels like it. It warms up because something forces it to. Scientists keep track of natural forcings, but the observed warming of the planet over the second half of the 20th century can only be explained by adding in anthropogenic radiative forcings, namely increases in greenhouse gases such as carbon dioxide.

Of course, it's always possible that some natural cycle exists, unknown to scientists and their instruments, that is currently causing the planet to warm. There's always a chance that we could be totally wrong. This omnipresent fact of science is called irreducible uncertainty, because it can never be entirely eliminated. However, it's very unlikely that such a cycle exists.

Firstly, the hypothetical natural cycle would have to explain [the observed "fingerprints" of greenhouse gas-induced warming](#). Even if, for the sake of argument, we were to discount the [direct measurements showing an increased greenhouse effect](#), other lines of evidence point to anthropogenic causes. For example, the troposphere (the lowest part of the atmosphere) is warming, [but the levels above, from the stratosphere up, are cooling](#), as less radiation is escaping out to space. This rules out cycles related to the Sun, as solar influences would warm the entire atmosphere in a uniform fashion. The only explanation that makes sense is greenhouse gases.

What about an internal cycle, perhaps from [volcanoes](#) or the [ocean](#), that releases massive amounts of greenhouse gases? This wouldn't make sense either, not only because scientists keep track of volcanic and oceanic emissions of CO₂ and know that they are small compared to anthropogenic emissions, but also because CO₂ from fossil fuels has its own fingerprints. Its isotopic signature is depleted in the carbon-13 isotope, which explains why the atmospheric ratio of carbon-12 to carbon-13 has been going up as anthropogenic carbon dioxide goes up. Additionally, atmospheric oxygen (O₂) is decreasing at the same rate that CO₂ is increasing, because oxygen is consumed when fossil fuels combust.

A natural cycle that fits all these fingerprints is nearly unfathomable. However, that's not all the cycle would have to explain. It would also have to tell us why anthropogenic greenhouse gases are *not* having an effect. Either a century of basic physics and chemistry studying the radiative properties of greenhouse gases would have to be proven wrong, or the natural cycle would have to be unbelievably complex to prevent such dramatic anthropogenic emissions from warming the planet.

It is indeed possible that [multidecadal climate variability, especially cycles originating in the Atlantic](#), could be contributing to recent warming, particularly in the Arctic. However, the amplitude of the cycles simply can't explain the observed temperature change. Internal variability has always been superimposed on top of global surface temperature trends, but the magnitude - as well as the fingerprints - of current warming clearly indicates that anthropogenic greenhouse gases are the dominant factor.

Despite all these lines of evidence, many known climatic cycles are often trumpeted to be the real cause, on the Internet and in the media. Many of these cycles have been debunked on Skeptical Science, and all of them either aren't in the warming phases, don't fit the fingerprints, or both.

For example, we are warming far too fast to be coming out of the last ice age, and the Milankovitch cycles that drive glaciation show that we should be, in fact, very slowly going *into* a new ice age (but anthropogenic warming is virtually certain to offset that influence).

The "[1500-year cycle](#)" that S. Fred Singer attributes warming to is, in fact, a change in *distribution* of thermal energy between the poles, not a net *increase* in global temperature, which is what we observe now.

The [Little Ice Age](#) following the Medieval Warm Period ended due to a slight increase in solar output (changes in both thermohaline circulation and volcanic activity also contributed), but that increase has since reversed, and global temperature and solar activity are [now going in opposite directions](#). This also explains why the [11-year solar cycle](#) could not be causing global warming.

[ENSO \(El Nino Southern Oscillation\)](#) and [PDO \(Pacific Decadal Oscillation\)](#) help to explain short-term variations, but have no long-term trend, warming or otherwise. Additionally, these cycles simply move thermal energy between the ocean and the atmosphere, and do not change the energy balance of the Earth.

As we can see, "it's just a natural cycle" isn't just a cop-out argument - it's something that scientists have considered, studied, and ruled out long before you and I even knew what global warming was.

Intermediate rebuttal written by climatesight

Update July 2015:

Here is a related lecture-video from [Denial101x - Making Sense of Climate Science Denial](#)



Skeptical Science explains the science of global warming and examines climate misinformation through the lens of peer-reviewed research. The website won the Australian Museum 2011 Eureka Prize for the Advancement of Climate Change Knowledge. Members of the Skeptical Science team have authored peer-reviewed papers, a [college textbook on climate change](#) and the book [Climate Change Denial: Heads in the Sand](#). Skeptical Science content has been used in university courses, textbooks, government reports on climate change, television documentaries and numerous books.



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