



This is the print version of the [Skeptical Science](http://sks.to/planets) article '[Other planets are warming](http://sks.to/planets)', which can be found at <http://sks.to/planets>.

What climate change is happening to other planets in the solar system?

What The Science Says:

Mars and Jupiter are not warming, and anyway the sun has recently been cooling slightly.

Climate Myth: Other planets are warming

"[E]vidence that CO₂ is not the principle driver of warming on this planet is provided by the simultaneous warming of other planets and moons in our solar system, despite the fact that they obviously have no anthropogenic emissions of greenhouse gases.

Mars, Triton, Pluto and Jupiter all show global warming, pointing to the Sun as the dominating influence in determining climate throughout the solar system." ([Ian McClintock - PDF, page 8](#))

At a glance

Experienced students of climate science denial will be familiar with many of the arguments that contrarians use. But every now and then you come across a document so crammed with such talking points that they're like raisins in a Christmas pudding. So it is with the 8-page offering containing the above quote, dating from June 2009.

But 2009 is a long time ago now. So much so that one of the big statements in that document:

"With the Sun now entering a 'quiet' phase, it is anticipated that this cooling trend is likely to continue until Sun activity increases."

is self-evidently a complete fail, given that according to NOAA, all of the ten warmest years in a data record stretching back to the late 19th century have been since 2010.

That the document is a complete fail, as evidenced by the above quote, is one thing. But how about the claim that the other planets are warming? This is a weird one, given the impossible expectations demanded of those tasked with recording temperatures here on Earth. Accusations of badly-sited weather stations, data manipulation and similar conspiracy-theories abound out there in various dimly-lit corners of cyberspace. But then you get a document from the same stable that claims Pluto is warming up. What's that based on?

Pluto takes 248 years to complete a single orbit around the Sun. Since the body was discovered in 1930, a simple calculation shows we've had the chance to point our telescopes at it for 37.5% of a Plutonian year, so if the place had four seasons then we've not yet seen half of them.

Apart from remote observations made in 1988 and 2002, we did send the New Horizons NASA spacecraft out there in 2006, to make a flyby of the dwarf planet in 2015. It collected lots of useful data in the process, but three sets of observations over 27 years means just what?

Twenty-seven years is just one ninth of a single year on Pluto. On Earth that would be 40 days. What could you say about the climate from that? Wild and unsubstantiated claims, based on very little data, might fool some people but the advantage these days is that they can be fact-checked and quickly. Nonsensical statements thereby reveal themselves to be just that.

Finally, in the 2009 document, all talking-points converge on a single hypothesis - that the Sun is responsible for the current global warming. Only one problem with that, but it's a huge one. Solar energy output is expressed as 'total Solar irradiance' (TSI) and is easily measured by satellites. Since 1980, TSI and global

temperatures have diverged. TSI has decreased by a measurable amount, while the global temperature has continued on its erratic but upwards pathway.

It's not the Sun - it's our cranking out of greenhouse gases in their tens of billions of tonnes every year, on and on and on.

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Further details

This argument is part of a greater one that other planets are warming. If this is happening throughout the solar system, so the argument goes, it must be the sun causing the rise in temperatures – including here on Earth.

This easily dismissed hypothesis depends so much on sparse information – what we know about the climates on other planets and their history – mostly gleaned in the past few decades. Yet its proponents resolutely ignore the most compelling evidence against the notion, specifically that over the last fifty years the sun's output has decreased slightly: it is radiating less heat. We can measure that heat energy coming from the Sun with good accuracy, both from Earth or from orbit above it. The discrepancy between the facts and the sceptical argument that the sun is causing the rise in temperatures is therefore rather hard to ignore (fig. 1).

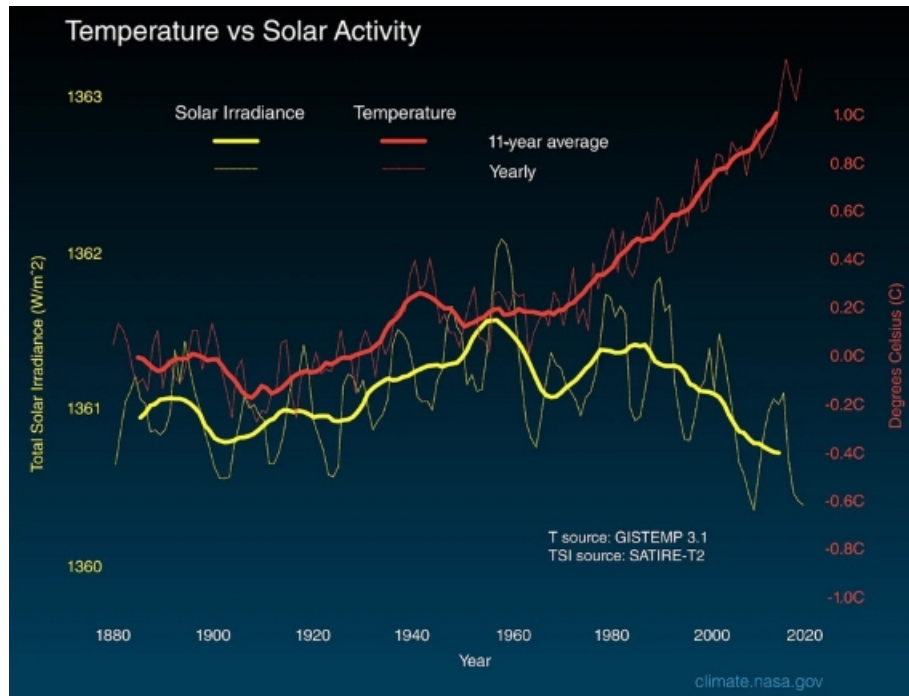


Fig 1: Another 'divergence problem'! Global temperatures plotted against total Solar irradiance, 1880-2020. Graphic: [NASA-JPL/Caltech](#).

But if the sun's output has diminished a bit, then what is causing other planets to warm up? Or perhaps the better question is: are they warming at all?

The planets and moons that are claimed to be warming constitute eight out of dozens of large bodies in the solar system. Some, like Uranus, may be cooling. All the outer planets have vastly longer orbital periods than Earth, so any climate change on them may be seasonal. Saturn and its moons take 30 Earth years to orbit the Sun, so three decades of observations equates to only 1 Saturnian year. Uranus has an 84-year orbit and 98° axial tilt, so its seasons are extreme. Neptune has not yet completed a single orbit since its discovery in 1846 and neither has Pluto.

This is a round-up of the planets said by sceptics to be experiencing climate change:

- Mars: the notion that Mars is warming came from an unfortunate conflation of weather and climate. Based on two pictures taken 22 years apart, assumptions were made that have not proved to be reliable. There is currently no evidence to support claims that Mars is warming at all. We have covered Mars in more detail [here at Skeptical Science](#).
- Jupiter: the notion that Jupiter is warming is actually based on predictions, since no warming has actually been observed. Climate models predict temperature increases along the equator and cooling at the poles. It is believed these changes will be catalysed by storms that merge into one super-storm, inhibiting the planet's ability to mix heat. Sceptical arguments have ignored the fact this is not a phenomenon we have observed, and that the modelled forcing is storm and dust movements, not changes in solar radiation.
- Neptune: observations of changes in luminosity on the surface of both Neptune and its largest moon, Triton, have been taken to indicate warming caused by increased solar activity. In fact, the brightening is due to the planet's seasons changing, but very slowly. Summer is coming to Neptune's southern hemisphere, bringing more sunlight, as it does every 164 years.
- Pluto: the seasons on this dwarf planet are the least understood of all: its existence has only been known for a third of its 248-year orbit, and it has only been visited by a space probe once, in the 2015 New Horizons flyby. The 'evidence' for climate change that this myth is based upon, however, is older: it consists of just two observations made in 1988 and 2002. That's equivalent to observing the Earth's weather for just three weeks out of the year. Various speculative hypotheses suggest its highly elliptical orbit may play a part in Pluto's climate, as could the large angle of its rotational axis. One thing we do know now is that sunlight at Pluto is 900 times weaker than it is at the Earth. It's a very cold place indeed.

Claims that solar system bodies are heating up due to increased solar activity are clearly wrong. The sun's output has declined in recent decades. Only Pluto and Neptune are exhibiting increased brightness, the cause of which remains to be understood, given that we've yet to see a single orbital year with either body. Heating attributed to other Solar System bodies remains undemonstrated. It's the stuff of fantasy.

For lots of useful information about Pluto and the other dwarf planets, NASA has a [useful resource](#) on its website. There are also informative pages about the gas-giants [Jupiter](#), [Saturn](#), [Uranus](#) and [Neptune](#). For specific details about Pluto, see NASA's [Pluto: Facts](#).



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