



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

Global warming on Mars, ice caps melting

What The Science Says:
Mars is not warming globally.

Climate Myth: Mars is warming

"Some people think that our planet is suffering from a fever. Now scientists are telling us that Mars is experiencing its own planetary warming: Martian warming. It seems scientists have noticed recently that quite a few planets in our solar system seem to be heating up a bit, including Pluto.

NASA says the Martian South Pole's "ice cap" has been shrinking for three summers in a row. Maybe Mars got its fever from earth. If so, I guess Jupiter's caught the same cold, because it's warming up too, like Pluto." ([Fred Thompson](#)).

It is hard to understand how anyone could claim global warming is happening on Mars when we can't even agree what's happening on the planet we live on. Yet they do, and the alleged reasoning is this; if other planets are warming up, then there is some solar system-wide phenomena at work - and therefore that it isn't human activity causing climate change here on Earth.

The broadest counter argument depends on a simple premise: we know so little about Mars that it's impossible to say what trends in climate the planet is experiencing, or why changes occur. We do have information from various orbiting missions and the few lander explorations to date, yet even this small amount of data has been misunderstood, in terms of causal complexity and significance.

There are a few basic points about the climate on Mars that are worth reviewing:

- Planets do not orbit the sun in perfect circles, sometimes they are slightly closer to the sun, sometimes further away. This is called orbital eccentricity and it contributes far greater changes to Martian climate than to that of the Earth because variations in Mars' orbit are five times greater than the Earth.
- Mars has no oceans and only a very thin atmosphere, which means there is very little thermal inertia - the climate is much more susceptible to change caused by external influences.
- The whole planet is subject to massive dust storms, and these have many causal effects on the planet's climate, very little of which we understand yet.
- We have virtually no historical data about the climate of Mars prior to the 1970s, except for drawings (and latterly, photographs) that reveal changes in gross surface features (i.e. features that can be seen from Earth through telescopes). It is not possible to tell if current observations reveal frequent or infrequent events, trends or outliers.

A picture is worth a thousand words, but only if you understand what it is saying

The global warming argument was strongly influenced by a paper written by a team led by NASA scientist Lori Fenton, who observed that changes in albedo - the property of light surfaces to reflect sunlight e.g. ice and snow - were shown when comparing 1977 pictures of the Martian surface taken by the Viking spacecraft, to a 1999 image compiled by the Mars Global Surveyor. The pictures revealed that in 1977 the surface was brighter than in 1999, and from this Fenton used a general circulation model to suggest that between 1977 and 1999 the planet had experienced a warming trend of 0.65 degrees C. Fenton attributed the warming to surface dust causing a change in the planet's albedo.

Unfortunately, Fenton's conclusions were undermined by the failure to distinguish between climate (trends) and weather (single events). Taking two end points – pictures from 1977 and 1999 – did not reveal any kind of trend, merely the weather on two specific Martian days. Without the intervening data – which was not available – it is impossible to say whether there was a *trend* in albedo reduction, or what part the prodigious dust storms played in the intervening period between the first and second photographs. Indeed, when you look at all the available data – sparse though it is – there is no discernable long term trend in albedo.

At this time, there is little empirical evidence that Mars is warming. Mars' climate is primarily driven by dust and albedo, not solar variations, and we know the sun is not heating up all the planets in our solar system because we can accurately measure the sun's output here on Earth.

Basic rebuttal written by [GPWayne](#)



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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