

How can Mars sometimes be warmer than Earth?

February 10 2015, by Matt Williams



Curiosity's recent shot of the Martian landscape. Doesn't look too warm, does it?
Credit: NASA/JPL

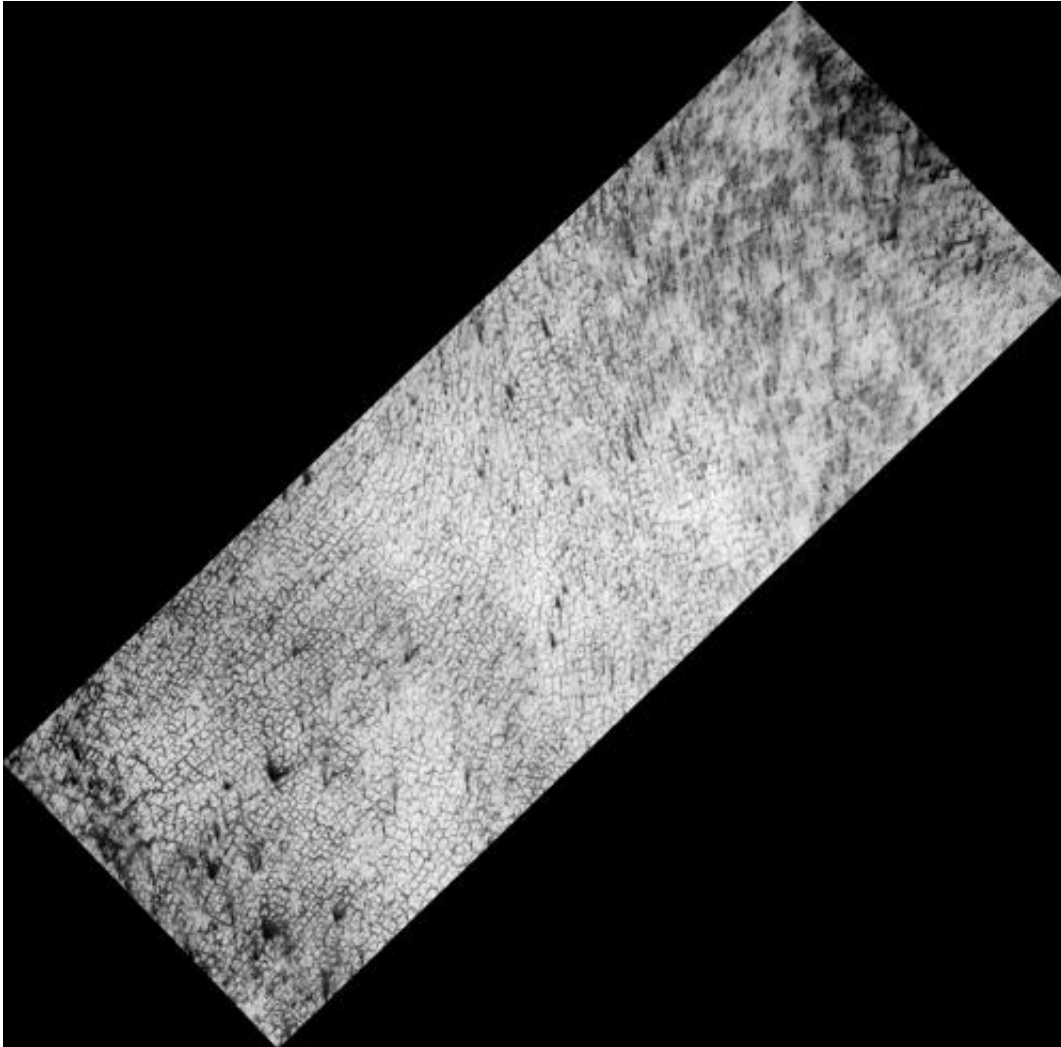
Remember a few weeks ago when the weather on Mars was making the news? At the time, parts of the Red Planet was experiencing temperatures that were actually warmer than parts of the US. Naturally, there were quite a few skeptics. How could a planet with barely any atmosphere which is farther from the Sun actually be warmer than

Earth?

Well, according to recent data obtained by the Curiosity rover, temperatures in the Gale Crater reached a daytime high of $-8\text{ }^{\circ}\text{C}$ ($17.6\text{ }^{\circ}\text{F}$) while cities like Chicago and Buffalo were experiencing lows of -16 to $-20\text{ }^{\circ}\text{C}$ (2 to $-4\text{ }^{\circ}\text{F}$). As it turns out, this is due to a number of interesting quirks that allow for significant temperature variability on Mars, which at times allow some regions to get warmer than places here on Earth.

It's no secret that this past winter, we here in North America have been experiencing a bit of a record-breaking cold front. This was due to surges of cold air pushing in from Siberia and the North Pole into Canada, the Northern Plains and the Midwest. This resulted in many cities experiencing January-like weather conditions in November, and several cities hitting record-lows not seen in decades or longer.

For instance, the morning of November 18th, 2014, was the coldest since 1976, with a national average temperature of $-7\text{ }^{\circ}\text{C}$ ($19.4\text{ }^{\circ}\text{F}$). That same day, Detroit tied a record it had set in 1880, with a record low of $-12\text{ }^{\circ}\text{C}$ ($11\text{ }^{\circ}\text{F}$).



Carbon dioxide ice on Mars, which experiences sublimation from solar warming to create polygonal structures. Credit: NASA/JPL/University of Arizona

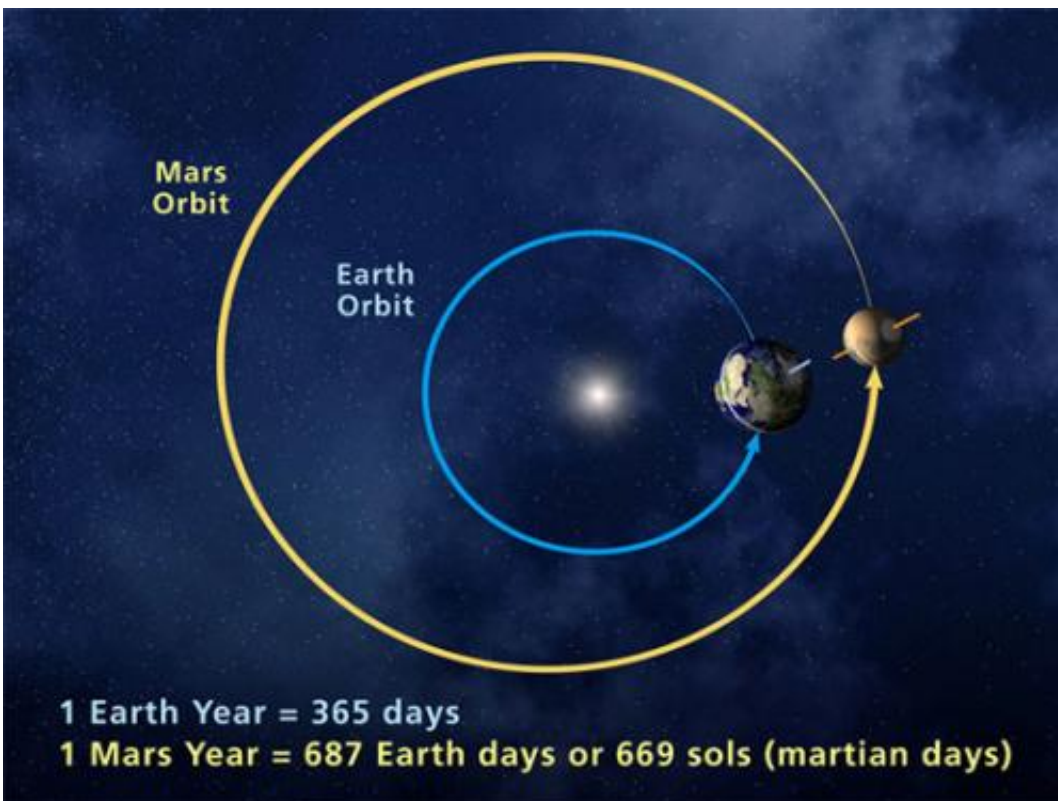
Five days earlier, the city of Denver, Colorado experienced temperatures as cold as -26°C (-14°F) while the city of Casper, Wyoming, hit a record low of -33°C (-27°F). And then on November 20th, the town of Jacksonville, Florida broke a previous record (which it set in 1873) with an uncharacteristic low of -4°C (25°F).

Hard to believe isn't it? Were it not for the constant need for bottled

oxygen, more people might consider volunteering for Mars One's colonizing mission – which, btw, is still scheduled to depart in 2023, so there's still plenty of time register! However, these comparative figures manage to conceal a few interesting facts about Mars.

For starters, Mars experiences an average surface temperature of about $-55\text{ }^{\circ}\text{C}$ ($-67\text{ }^{\circ}\text{F}$), with temperatures at the pole reaching as low as a frigid $-153\text{ }^{\circ}\text{C}$ ($-243.4\text{ }^{\circ}\text{F}$). Meanwhile, here on Earth the average surface temperature is $7.2\text{ }^{\circ}\text{C}$ ($45\text{ }^{\circ}\text{F}$), which is also due to a great deal of seasonal and geographic variability.

In the desert regions near the equator, temperature can get as high as $57.7\text{ }^{\circ}\text{C}$, with the hottest temperature ever recorded being $70.7\text{ }^{\circ}\text{C}$ ($158.36\text{ }^{\circ}\text{F}$) in the summertime in the desert region of Iran. At the south pole in Antarctica temperatures can reach as low as $-89.2\text{ }^{\circ}\text{C}$ ($-128.6\text{ }^{\circ}\text{F}$). Pretty darn cold, but still balmy compared to Mars' polar ice caps!



The eccentricity in Mars' orbit around the Sun means that it is 42.5 million km closer during certain times of the year. Credit: NASA

Also, since its arrival in 2012, the Curiosity Rover has been rolling around inside Gale Crater – which is located near the planet's equator. Here, the planet's [temperature](#) experiences the most variability, and can reach as high as 20 °C (68 °F) during midday.

And last, but not least, Mars has a greater eccentricity than all other planet's in the Solar System – save for Mercury. This means that when the planet is at perihelion (closest to the Sun) it is roughly 0.28 AUs (42.5 million km) closer than when it is at aphelion (farthest from the Sun). Having just passed perihelion recently, the average surface temperatures on Mars can vary by up to an additional 20 °C.

In short, Mars is still, and by far, the colder of the two planets. Not that it's a competition or anything...

Source: [Universe Today](#)

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