

ASTRONOMY

Climate changes on Mars, Venus should serve as lesson

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This month, my colleague Ken Hicks wrote about the possibility of water on Mars. Two spacecraft orbiting the planet are providing tentative evidence that water could exist, maybe temporarily, in subsurface pockets.

But the greatest weight of evidence indicates that if Mars was ever a wet planet, it was billions of years ago. Today, conditions on Mars are about what you would find if you took a ride in a high-altitude spy plane and stepped outside: cold, dry and deadly.

But why? Mars receives about half the solar heat that Earth does. Based on that, you'd expect it to be only about 80 degrees colder. That's cold, but not unbearable.

The answer is that Mars lacks the insulating layer of water vapor and carbon dioxide that Earth has. Sometime in the distant past, Mars' greenhouse effect failed, plunging it into a deep freeze.

At the same time, on the planet Venus, a runaway greenhouse effect has made the surface unsurvivalably hot.

All this was figured out by atmospheric and planetary scientists more than 30 years ago. Since then, the basic theories have been refined and verified many times over by spacecraft observations and experiments.

Understanding the basic workings of the greenhouse effect is nothing new, nor is the realization that Earth is in a delicate balance.

Mars and Venus, planets that might have been near-twins of Earth, have toppled so far to either side of this balance that exposure on the surface would be deadly to any Earth life.

It's easy to score political points these days by saying that "global warming," or human-caused climate change, is a hoax. It's easy to obscure the evidence by overplaying "controversies."

But the consequences of the failed and runaway greenhouse effects on Mars and Venus have been staring us in the face for decades.

The evidence tells us that even a planet, if it is pushed too far, can't save itself. It's up to us to decide how hard we want to push Earth.

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