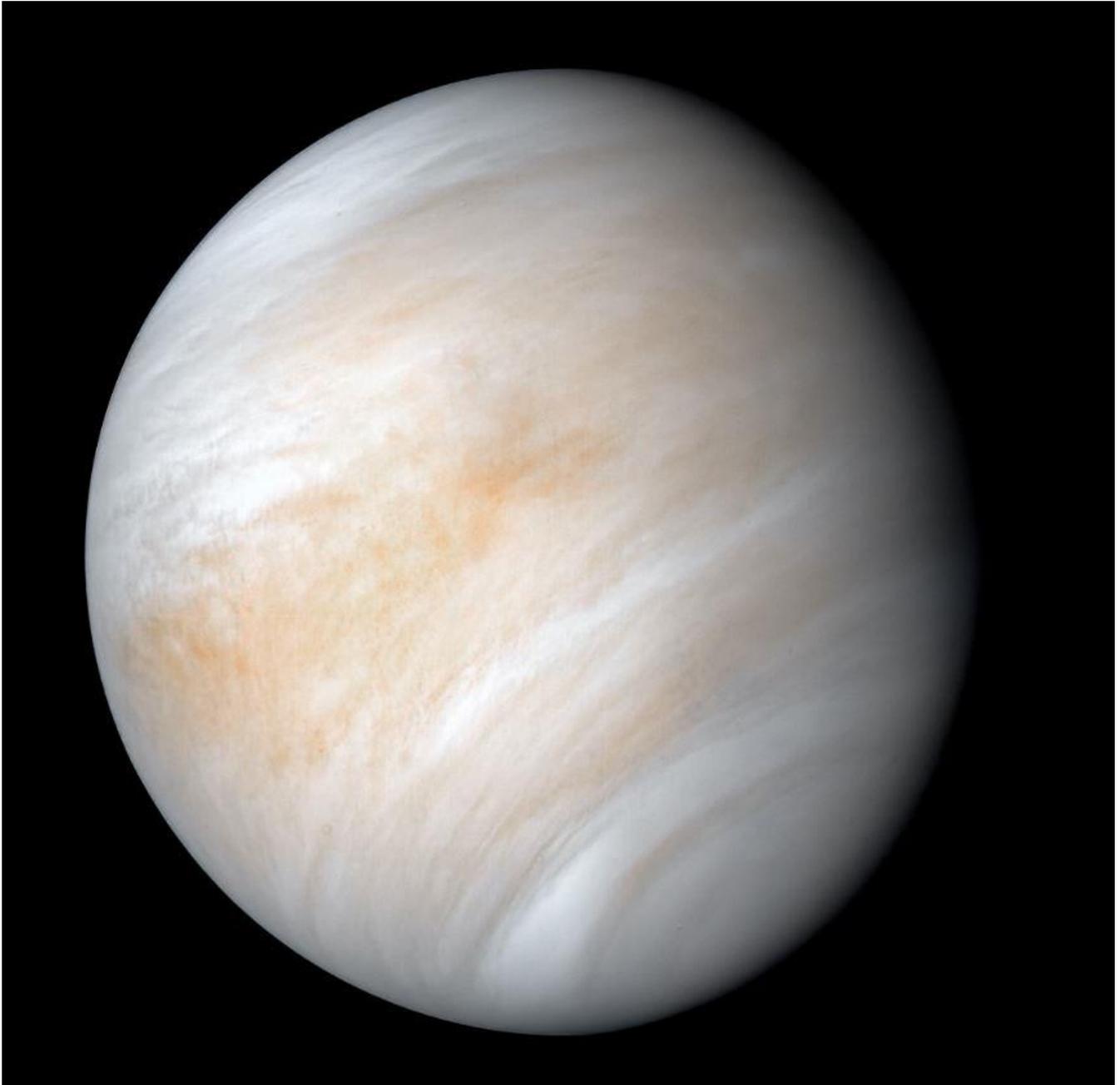


Chippewa Valley Astronomy Update November 2021

Figure caption. Venus appears so bright to us because it is close to the sun, close to the Earth, and is covered in thick white clouds that reflect the sunlight. This month you get a good view of it in the south-East after sunset, a bright “Evening Star”. **Photo Credit:** NASA



“Volcanoes on the Evening Star”

By Lauren Likkel

The Evening Star is not really a star. It is the planet Venus, which you may have seen shining intensely in the evening sky just after dark this month (November 2021). “The Morning Star” is another nickname -- Venus gets two nicknames because it is spectacular, brighter than any other planets or stars.

Under the thick clouds that hide the surface of Venus from sight, there is evidence of very old volcanic activity, like circular features from subsurface magma, lava cones and old volcanic outflows. I have been fascinated by

the speculation of active volcanoes on Venus, suggested in 1978 by changes in atmospheric sulfur dioxide. And just a year ago, the discovery of phosphine in the atmosphere of Venus was construed as evidence of active volcanoes.

A few years ago, the Venus Express spacecraft of the European Space Agency (ESA) found evidence for volcanic activity that occurred 2-3 million years ago, and possibly activity “only” a quarter million years ago. It detected olivine, a volcanic rock, and it also found four hotspots that could be actual CURRENT activity. Plus, exciting research almost 2 years ago in the on-line “Science Advances” journal concludes that Venus has active volcanoes. They claim that the olivine spectra detected by Venus Express must be from volcanic outflows that occurred within the last year. Their research found that the atmosphere of Venus within months to years would coat volcanic olivine with hematite so it would not produce the spectra observed by Venus Express.

Wow, the air of Venus could degrade volcanic rocks in a few months? Well, at the surface of Venus the air is 90 times as dense as Earth’s air, and is hot enough to melt lead. Venus has not been a popular place to land spacecraft because the electronics tend to quickly stop working.

A future NASA Venus mission named VERITAS is planned (about 7 years from now) to orbit the planet and map the surface. The clouds completely block our view of the surface so wavelengths that penetrate the clouds like radio waves are needed to “see” the surface. VERITAS will try to confirm active volcanoes by finding water vapor from volcanic eruptions. It will also be looking for hot spots (yes, hotter than Venus is already!) of surface lava flows and pools. ESA is planning a Venus mission called EnVision at about the same time, and there is a lot of collaboration between NASA and ESA. The results of these missions may well confirm that active volcanoes exist on Venus.

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