New mystery on Mars' forgotten plains

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THEMIS daytime infrared image mosaic (courtesy of ASU/NASA/JPL) of Mars with north is at the top. Image is centered at 116.3°E and 25.0°S

(PhysOrg.com) -- One of the supposedly best understood and least interesting landscapes on Mars is hiding something that could rewrite the planet's history. Or not. In fact, about all that is certain is that decades of assumptions regarding the wide, flat Hesperia Planum are not holding up very well under renewed scrutiny with higher-resolution, more recent spacecraft data.

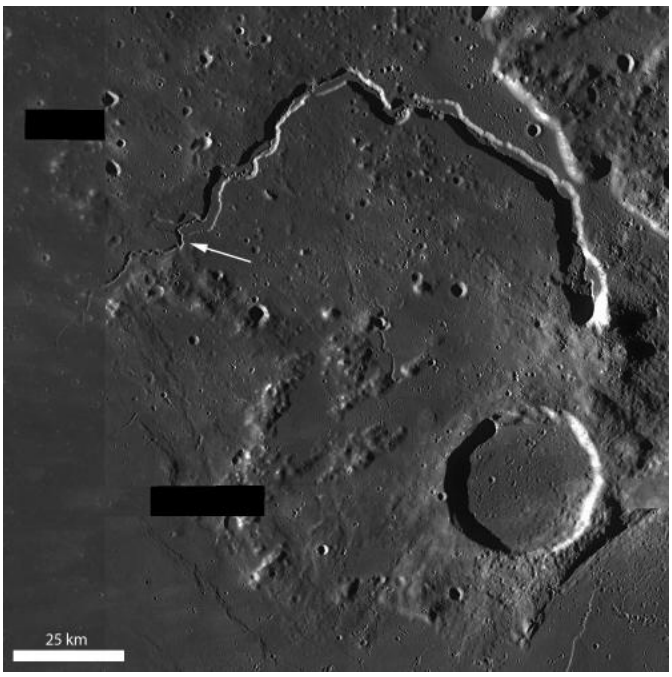
"Most scientists don't want to work on the flat things," noted geologist Tracy Gregg of University at Buffalo, State University of New York. So after early Mars scientists decided Hesperia Planum looked like a lava-filled plain, no one really revisited the matter and the place was used to exemplify something rather important: The base of a major transitional period in the geologic time scale of Mars. The period is aptly called the Hesperian and it is thought to have run from 3.7 to 3.1 billion years ago.

But when Gregg and her student Carolyn Roberts started looking at this classic Martian lava plain with modern data sets, they ran into trouble.

"There's a volcano in Hesperia Planum that not many people pay attention to because it's very small," Gregg said. "As I started looking closer at the broader region -- I can't find any other volcanic vents, any flows. I just kept looking for evidence of lava flows. It's kind of frustrating. There is nothing like that in the Hesperia Planum."

"A likely cause of this trouble is the thick dust that blankets Hesperia Planum," she said. "It covers everywhere like a snowfall."

So she turned her attention to what could be discerned on Hesperia Planum: about a dozen narrow, sinuous channels, called rilles, just a few hundred meters wide and up to hundreds of kilometers long. These rilles have no obvious sources or destinations and it is not at all clear they are volcanic.



NASA/GSFC/Arizona State University Lunar

Reconnaissance Orbiter image "Secrets of Schröteri" Vallis Schröteri is a sinuous rille on the moon; its inner rille diverges from the primary rille near arrow.

gsa.confex.com/gsa/2011AM/fina … /abstract_196462.htm

Provided by Geological Society of America

"The question I have is what made the channels," said Gregg. Was it water, lava, or something else? "There are some lavas that can be really, really runny. And both are liquids that run downhill." So either is a possibility.

To begin to sort the matter out, Gregg and Roberts are now looking for help on the Moon. Their preliminary findings will be presented Wednesday, 12 October at the Annual Meeting of The Geological Society of America in Minneapolis.

"On the Moon we see these same kinds of features and we know that water couldn't have formed them there," Gregg said. So they are in the process of comparing channels on the Moon and Mars, using similar data sets from different spacecraft, to see if that sheds any light on the matter. She hopes to find evidence that will rule out water or lava on Hesperia Planum.

"Everybody assumed these were huge lava flows," said Gregg. "But if it turns out to be a lake deposit, it's a very different picture of what Mars was doing at that time." It would also make Hesperia Planum a good place to look for life, because water plus volcanic heat and minerals is widely believed to be a winning combination for getting life started.

"The 'volcanic' part is an interpretation that's beginning to fall apart," said Gregg. "What is holding up is that the Hesperian marks a transition between the Noachian (a time of liquid water on the surface and the formation of lots of impact craters) and the Amazonian (a drier, colder Mars)."

She has found that other scientists are interested in her work because of its possible implications on the Mars geological time scale. Gregg is not worried that Mars history will need to be rewritten, but she does suspect that Hesperia Planum is a lot more complicated than people has long thought.

More information: