

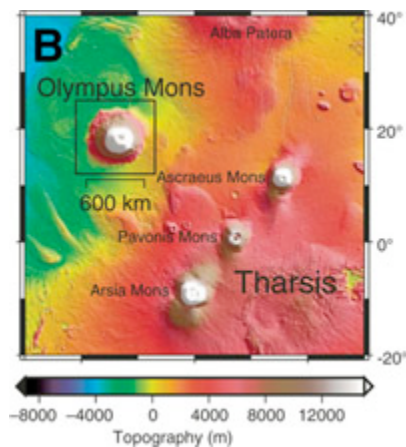
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# Martian mountain may answer big question

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Courtesy Rice University  
and World Science staff

The Martian volcano Olympus Mons is about three times Mount Everest's height. But it's the small details that geologists Patrick McGovern and Julia Morgan are looking at in thinking about whether the Red Planet ever had – or still supports – life.

In simulating the mountain's formation by computer, McGovern and Morgan reached the conclusion that ancient water may still be trapped underneath. Their findings are published in February's issue of the research journal *Geology*.



Color indicates height in meters. (courtesy Rice U.)

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The researchers, at Rice University in Texas, found that only the presence of ancient clay sediments, implying water, could account for the volcano's asymmetric shape.

Olympus stands almost 15 miles (24 km) high but has a very shallow slope. That slope hints at what lies beneath, said the researchers. They suspect if they were able to stand on the northwest side and start digging, they'd eventually find clay sediment deposited there billions of years ago, before the mountain was even a molehill.

The European Space Agency's Mars Express spacecraft has in recent years found abundant evidence of clay on Mars. This dovetails with a previous theory that where Olympus Mons now stands, a layer of sediment once rested that may have been hundreds of meters (yards) thick.

Morgan and McGovern found in their computer models that volcanic material was able to spread to Olympus-sized proportions because of the clay's friction-reducing effect, a phenomenon also seen at volcanoes in Hawaii.

What may be trapped underneath is of great interest, said the researchers. Fluids embedded in an impermeable, pressurized clay sediment would allow the kind of slipping motion that would account for Olympus Mons' spread-out northeast flank – and they may still be there. Scientists already know Mars has water thanks to NASA's Phoenix lander, which scratched through the surface to find ice underneath the red dust last year.

The deep reservoir under Olympus Mons "would be a favored environment" for heat-

loving organisms, as a protected area heated partly by nearby volcanic activity, Morgan and McGovern wrote. Finding the source of heat will be a challenge, they admitted, although a series of seismic stations on Mars might help by picking up on ground movements.

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