

# Probing Question: Is the moon shrinking?

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Earth and moon

While everything else changes, it's comforting to think that some things in the universe will always stay the same. The sun always rises and sets, the tides ebb and flow, and the moon hangs in the night sky, just as it has since time began.

Or does it?

Recent research suggests that the moon we gaze up at may be slightly smaller than the one our ancestors saw, said Darren Williams, associate professor of astronomy at Penn State Erie, The Behrend College. In August, NASA published new high-resolution images that show cliffs, called lobate scarps, all over the surface of the moon -- evidence that the moon is getting gradually smaller, researchers say.

"Over the past billion years, the moon has been slowly cooling, and as the surface cools, it shrinks, just like a lump of metal or plastic does in the winter. This causes cracks to form," much like the cracks that appear across a cake as it cools, or in a pavement during the winter, explained Williams.

"If one region cools slightly faster than another, possibly because of differences in surface composition or heating from the interior, then surfaces can sink below one another, creating sharp ridges or scarps," he said.

Scientists think the moon formed when boulders in a ring of debris around the young Earth smashed together and coalesced. This "violently energetic" beginning gave the moon a molten crust for millions of years, before it began to slowly cool and solidify, Williams said.

Other planets and moons that formed and cooled in a similar way also display this shrinkage. "Mercury has scarps too," noted Williams. "Its interior, like the moon's, is relatively cool due to its small size." By contrast, he added, "The Earth's interior is warmed by radioactive decay of elements such as Uranium, which prevents the surface from cooling off and shrinking -- and so scarps are not formed."

The NASA images aren't the first scarp sightings. Since the Apollo missions of the 1970s, scientists have studied several scarps observed near the moon's equator, prompting theories of moon shrinkage. But the new images, obtained by NASA's Lunar Reconnaissance Orbiter, provide the first evidence that the scarps occur uniformly over the entire surface of the moon, and support the idea that the moon has shrunk evenly all the way around, explained Williams. "It's a great example of direct observation of a theoretical idea," he added.

Moon gazers don't need to worry: the moon won't disappear completely,

and in fact most people probably won't detect any difference in the night sky. "The most the [moon](#) has probably shrunk is just a few kilometers in a billion years," Williams said -- a change that would be hardly noticeable from Earth.

Provided by Pennsylvania State University

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