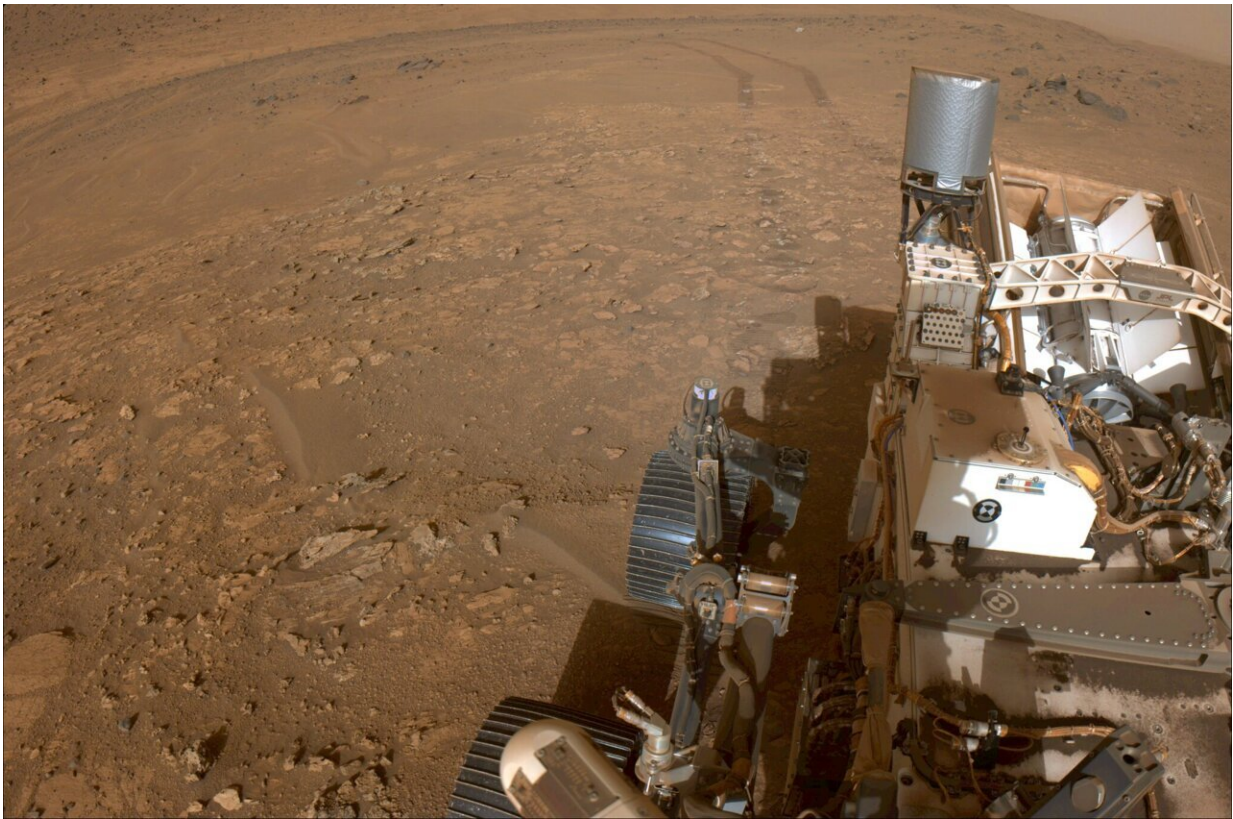


# NASA's Perseverance rover to begin long climb up Martian crater rim

August 14 2024

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One of the navigation cameras aboard NASA's Perseverance Mars rover captured this view looking back at the "Bright Angel" area on July 30, the 1,224th Martian day, or sol, of the mission. Credit: NASA/JPL-Caltech

After 2½ years exploring Jezero Crater's floor and river delta, the rover will ascend to an area where it will search for more discoveries that

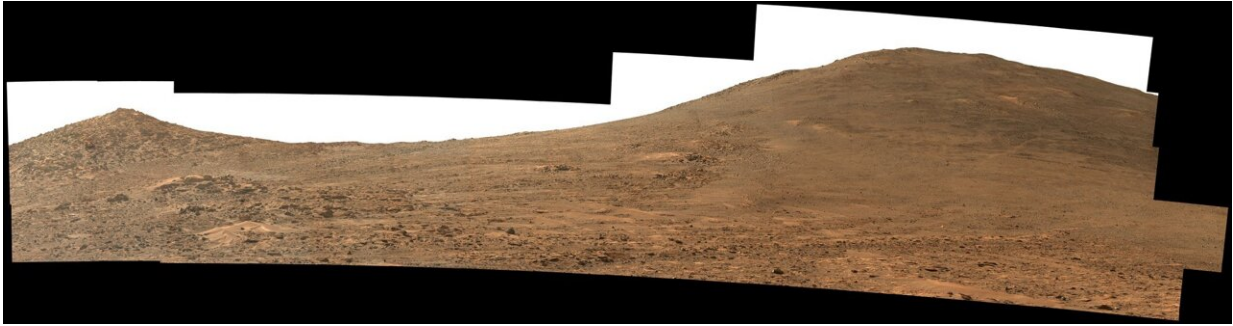
could rewrite Mars' history.

NASA's Perseverance Mars [rover](#) will soon begin a months long ascent up the western rim of Jezero Crater that is likely to include some of the steepest and most challenging terrain the rover has encountered to date. Scheduled to start the week of Aug. 19, the climb will mark the kickoff of the mission's new science campaign—its fifth since the rover landed in the [crater](#) on Feb. 18, 2021.

"Perseverance has completed four science campaigns, collected 22 rock cores, and traveled over 18 unpaved miles," said Perseverance project manager Art Thompson of NASA's Jet Propulsion Laboratory in Southern California. "As we start the Crater Rim Campaign, our rover is in excellent condition, and the team is raring to see what's on the roof of this place."

Two of the priority regions the science team wants to study at the top of the crater are nicknamed "Pico Turquino" and "Witch Hazel Hill." Imagery from NASA's Mars orbiters indicates that Pico Turquino contains ancient fractures that may have been caused by hydrothermal activity in the distant past.

Orbital views of Witch Hazel show layered materials that likely date from a time when Mars had a very different climate than today. Those views have revealed light-toned bedrock similar to what was found at "Bright Angel," the area where Perseverance recently discovered and sampled the "Cheyava Falls" rock, which exhibits chemical signatures and structures that could possibly have been formed by life billions of years ago when the area contained running water.



This panorama shows the area NASA's Perseverance Mars rover will climb in coming months to crest Jezero Crater's rim. It is made up of 59 images taken by the rover's Mastcam-Z on Aug. 4. Credit: NASA/JPL-Caltech/ASU/MSSS

## It's sedimentary

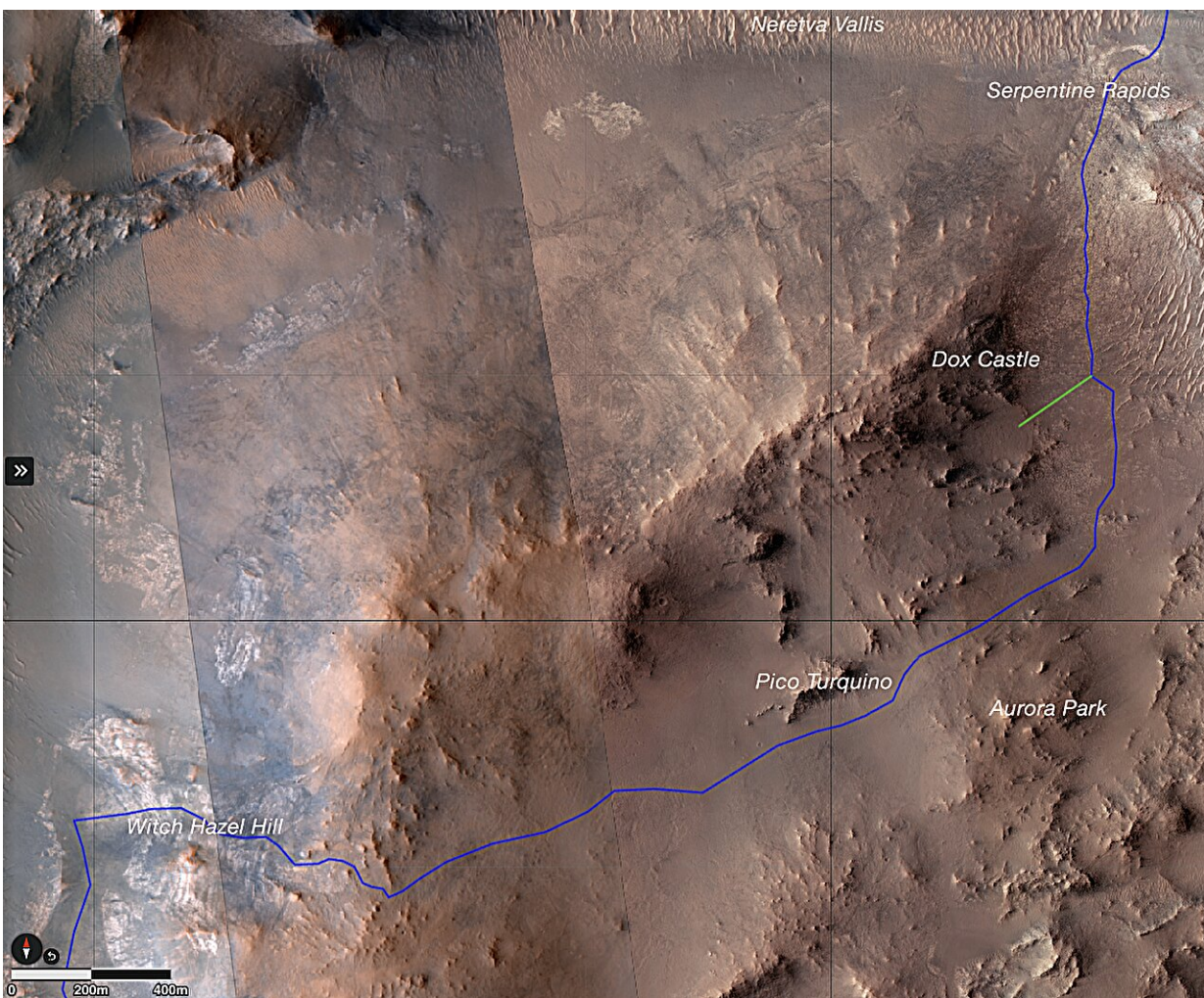
During the [river delta](#) exploration phase of the mission, the rover collected the only sedimentary rock ever sampled from a planet other than Earth. Sedimentary rocks are important because they form when particles of various sizes are transported by water and deposited into a standing body of water; on Earth, [liquid water](#) is one of the most important requirements for life as we know it.

A study [published Wednesday](#), Aug. 14, in *AGU Advances* chronicles the 10 rock cores gathered from [sedimentary rocks](#) in an ancient Martian delta, a fan-shaped collection of rocks and sediment that formed billions of years ago at the convergence of a river and a [crater lake](#).

The [core samples](#) collected at the fan front are the oldest, whereas the rocks cored at the fan top are likely the youngest, produced when flowing water deposited sediment in the western fan.

"Among these rock cores are likely the oldest materials sampled from

any known environment that was potentially habitable," said Tanja Bosak, a geobiologist at the Massachusetts Institute of Technology in Cambridge and member of Perseverance's science team. "When we bring them back to Earth, they can tell us so much about when, why, and for how long Mars contained liquid water and whether some organic, prebiotic, and potentially even biological evolution may have taken place on that planet."



This map shows the route NASA's Perseverance Mars rover will take (in blue) as it climbs the western rim of Jezero Crater, first reaching "Dox Castle," then investigating the "Pico Turquino" area before approaching "Witch Hazel Hill."

Credit: NASA/JPL-Caltech/University of Arizona

## **Onward to the crater rim**

As scientifically intriguing as the samples have been so far, the mission expects many more discoveries to come.

"Our samples are already an incredibly scientifically compelling collection, but the crater rim promises to provide even more samples that will have significant implications for our understanding of Martian geologic history," said Eleni Ravanis, a University of Hawai'i at Mānoa scientist on Perseverance's Mastcam-Z instrument team and one of the Crater Rim Campaign science leads.

"This is because we expect to investigate rocks from the most ancient crust of Mars. These rocks formed from a wealth of different processes, and some represent potentially habitable ancient environments that have never been examined up close before."

Reaching the top of the crater won't be easy. To get there, Perseverance will rely on its auto-navigation capabilities as it follows a route that rover planners designed to minimize hazards while still giving the science team plenty to investigate. Encountering slopes of up to 23 degrees on the journey (rover drivers avoid terrain that would tilt Perseverance more than 30 degrees), the rover will have gained about 1,000 feet (300 meters) in elevation by the time it summits the crater's rim at a location the science team has dubbed "Aurora Park."

Then, perched hundreds of meters above a crater floor stretching 28 miles (45 kilometers) across, Perseverance can begin the next leg of its adventure.

Provided by NASA

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