PRESS RELEASE

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PERSEVERANCE ROVER: FIRST RESULTS

Evidence of liquid water on Mars

Boulder, Co, **August 31, 2022**

Two papers recently released in the scholarly journal Science by Farley et al. (https://www.science.org/doi/10.1126/science.abo2196) and Liu et al. (https://www.science.org/doi/10.1126/science.abo2756), which describe recent major results from NASA's Mars 2020 mission provide new insight into the history of water on Mars.

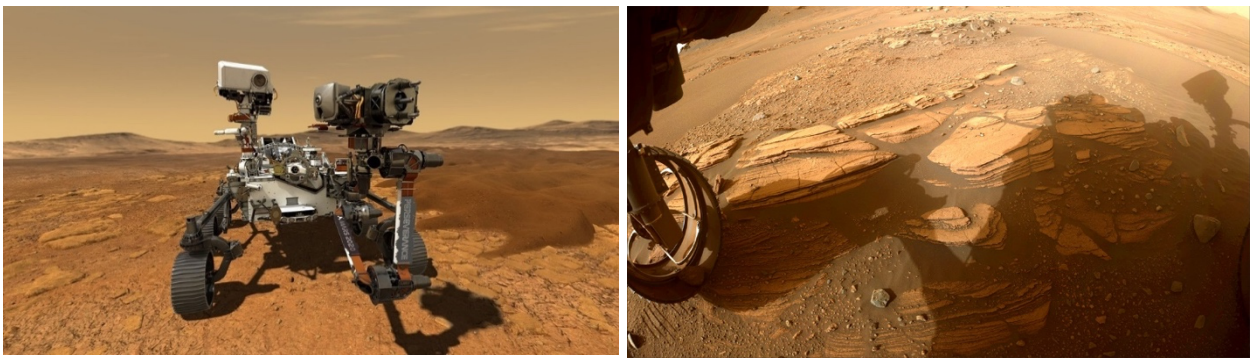
The first samples analyzed by NASA's Perseverance Rover, in the former crater lake named Jezero, are an intriguing mix of igneous minerals (e.g., from lava) and salt patches in voids and crevices between the mineral grains. In the first sampling attempt by the coring drill, that core broke apart and slipped out of the drill, presumably because it was weakened by its high salt content. Later drilling attempts were fully successful.

The salts include sulfates, similar to Epsom salts, which are common on Mars. Most importantly, high levels of chlorine-containing salts are also present, such as chlorides ("table salt") and perchlorates. These highly soluble salts reveal that the rocks were soaked in brines, and hence contain clear evidence of liquid water. This strongly confirms that Jezero Crater once provided a habitable environment for life. Some igneous minerals were transformed into carbonates, which can occur when carbon dioxide from the atmosphere dissolves in water.

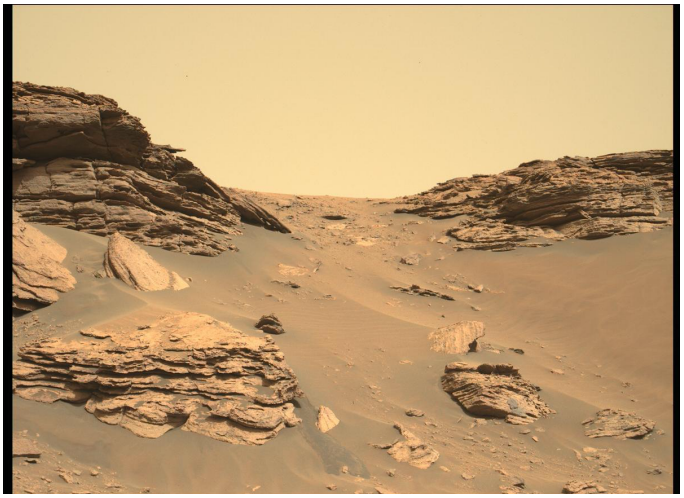
Dr. Benton Clark, senior research scientist at Space Science Institute in Boulder, CO and coauthor on the Perseverance team papers, said, "These samples are especially valuable because they include *both* igneous minerals *and* salts." This can enable scientists to determine when the crater was formed and also provide evidence of the conditions under which the water was present. The salts can also preserve organic compounds that could indicate the past existence of living organisms. Thus, in each single core sample, scientists will have an opportunity to study the record of many different processes and events that have occurred on this part of Mars. The collection of igneous rock samples, once they are returned to Earth, will provide a critical marker for the time at which the volcanism occurred and will help in defining the Martian geological time scale.

Dr. Bill Farrand, senior research scientist and Center for Mars Science lead at Space Science Institute in Boulder, CO, said, "The work by [Dr. Clark] and other members of the Perseverance rover science team is helping to further our understanding of both the geological history of Mars and how rocks have interacted with water over time. Since water is such a critical requirement for life, it also provides constraints on our understanding of whether Mars could have once hosted life."

The Perseverance Rover is now heading back to the "Enchanted Lake" feature it drove by previously.



Left: Perseverance Rover exploring Mars. Right: "Enchanted Lake" feature on Mars. Credit: NASA/JPL.



Sediments on Mars (as of 1st week July 2022). Credit: NASA/JPL.

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