

Ice offers possible explanation for Death Valley's mysterious 'self-moving' rocks

February 17 2011, By Phillip F. Schewe



View of Racetrack Playa, a dry lakebed in Death Valley, Calif. Credit: Ralph Lorenz

Death Valley National Park contains many mysteries, including one of nature's strangest phenomena: Rocks that seem to move around all on their own.

In the remote, almost totally dry lakebed called Racetrack Playa, some of the rocks move themselves across the desert floor when people aren't watching.

Scientists know the rocks move because they leave narrow tracks trailing behind them, but they haven't actually seen it happen. And although one

can't entirely rule out the possibility of some prank being played, at least some of the rocks appear to be moving under natural circumstances.

It doesn't rain often in Racetrack Playa, and when it does the lakebed can flood. The rocks don't float exactly, but the main explanation for their movement is that moisture can make the mud on which the rocks sit more slick, making it easier for high winds to push the rocks along. Another explanation offered is that the temporary deposit of water, chilled to form extensive sheets of ice, might help to reflect and focus the winds, making it easier for the rocks to move.

The winds required to move rocks in this way would seem to be at the level of 100 mph or more. That's why the rocks are sometimes referred to as "sailing stones." They are rare but they have been noticed in Racetrack Playa and a few other arid places around the world subject to occasional floods

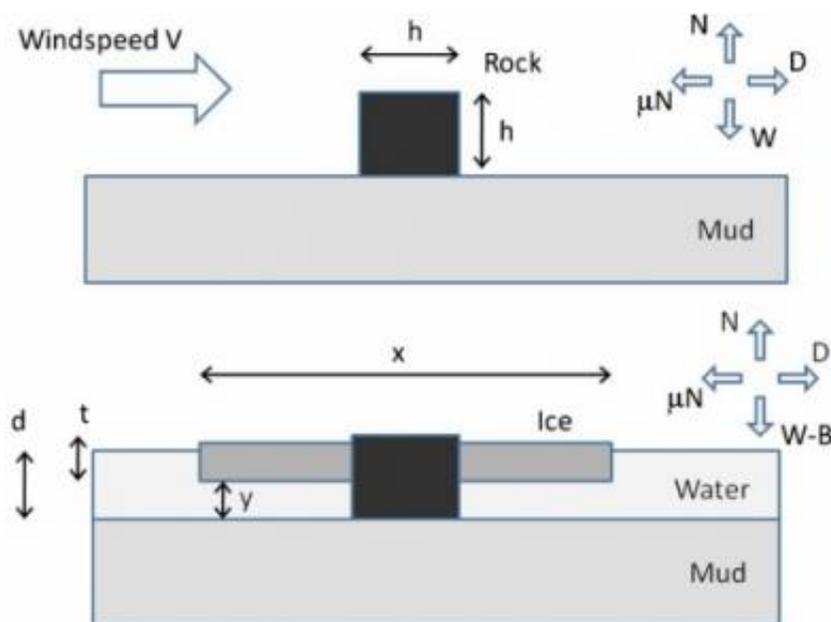


The track left from a "self-moving" rock. Credit: Courtesy of Ralph Lorenz

Ralph Lorenz, a scientist at Johns Hopkins University, offers a new explanation. The rocks are actually lifted up by the ice, or at least made more buoyant by the ice, making it easier for the rocks to migrate. If the rocks are moving about on ice rafts, the ground below cannot offer as much [resistance](#) against their motion and the winds needed for movement wouldn't have to be as great, he argued.

So why hasn't the motion been observed?

"Movement happens for only tens of seconds, at intervals spaced typically by several years," said Lorenz. "This would demand exceptional patience as well as luck."



Schematic of the forces and dimensions of a solitary rock and a rock frozen into an ice raft. (Courtesy Ralph Lorenza)

So, the rocks are probably traveling on the coldest and windiest days that

occur over a period of several years. The most likely time would be in the very early dawn. Little wonder no one is around to witness the event.

Lorenz and his colleagues would like to install inexpensive time-lapse monitoring of the Playa area, using digital cameras. The lakebed is about 2.5 miles long and 1.25 miles wide. They have also performed some laboratory tests by blowing on ice-assisted rocks. These simple tests support the ice-raft hypothesis. The results appear in the January 2011 issue of the *American Journal of Physics*.

An additional reason for studying the rocks of Racetrack Playa is that its qualities resemble those at a drying-up lake on Saturn's moon Titan. Pictures taken by the Cassini-Huygens mission reveal what look like river channels, cobblestones, and lake beds or mud flats. Only at Titan's "Ontario Lacus," as one interesting site is called, the runoff consists of liquid hydrocarbons, not water. Some pictures even seem to be showing a "bathtub ring" left by what is probably a drying lake.

One of Lorenz's colleagues, Brian K. Jackson, who works at NASA's Goddard Space Flight Center, also likes the idea that their research at Racetrack Playa has a dual purpose.

"It's been exciting trying to solve a mystery that has resisted solution for sixty years," Jackson said. "Scientific accounts of the Racetrack Playa rocks go back to at least 1948, and there were certainly stories about the playa long before that."

And Jackson also believes discoveries in Death Valley, here on Earth, will help us to better understand similar real estate on Titan or Mars.

More information: Ice rafts not sails: Floating the rocks at Racetrack Playa: [ajp.aapt.org/resource/1/ajpias ... 7_s1?isAuthorized=no](http://ajp.aapt.org/resource/1/ajpias...7_s1?isAuthorized=no)

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