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Press Release

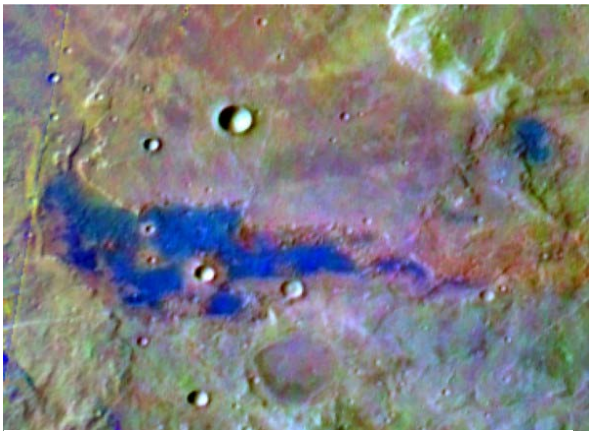
# SALTY SPOTS ON MARS SUGGEST WHERE TO LOOK FOR LIFE'S ANCIENT TRACES

Honolulu, HI - Scientists using a camera on NASA's Mars Odyssey orbiter have found the first evidence for deposits of chloride salts in numerous places on Mars. The salt deposits point to places where water was once abundant and where evidence of former Martian life may exist, say the researchers.

A team led by graduate student Mikki Osterloo, of the University of Hawaii, found about 200 places within the southern highlands of Mars that show spectral characteristics consistent with chloride minerals.

The sites range from about one square kilometer (0.4 square mile) to 25 times that area. "They could come from groundwater reaching the surface in low spots," Osterloo said. "The water would evaporate and leave mineral deposits, which build up over years." The sites are disconnected, so they are unlikely to be the remnants of a global ocean, she said.

The team used Odyssey's Thermal Emission Imaging System (THEMIS), a camera designed and operated by Arizona State University, Tempe, to take images in a range of visible-light and infrared wavelengths.

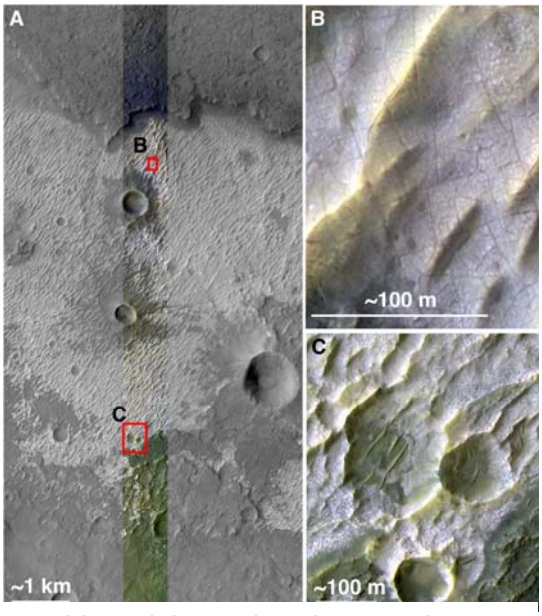


THEMIS infrared radiance false color image showing putative chloride materials in blue. (Image credit Mikki Osterloo / THEMIS operated by NASA/JPL/Arizona State University)

Thermal infrared wavelengths are useful for identifying different mineral and rock types on the Martian surface. Osterloo found the sites by looking through thousands of images processed to reveal, in false colors, compositional differences on the Martian surface. "I started noting these sites because they showed up bright blue in one set of images, green in a second set, and yellow-orange in a third," she said.

Osterloo and seven co-authors report the findings in this week's issue of the journal Science. Plotted on a Mars map, the chloride sites appear only in southern highlands, the most ancient rocks on Mars. Co-author Philip Christensen of Arizona State University, principal investigator for the Thermal Emission Imaging System, said, "Many of the deposits lie in basins with channels leading into them," he says. "This is the kind of feature, like salt-pan deposits on Earth, that's consistent with water flowing in over a long time."

The scientists think the salt deposits formed about 3.5 to 3.9 billion years ago. Several lines of evidence suggest Mars then had intermittent periods with substantially wetter and warmer conditions than today's dry, frigid climate. “The discovery of these deposits throughout the southern hemisphere of Mars is opening a new a chapter in our understanding of how Mars evolved," says Scott Anderson, a co-author on the paper and Osterloo’s advisor.




High Resolution Imaging Science Experiment (HiRISE) image that shows the location of color data; locations of color inset images are indicated by red boxes. B) Polygonal fractures. C) Chloride-bearing material appears to post-date small, degraded craters. (Image credit Mikki Osterloo / HiRISE operated by NASA/ JPL/ University of Arizona)

Up to now, scientists looking for evidence of past life on Mars have focused mainly on a handful of places that show evidence of clay or sulfate minerals. The reasoning is that clays indicate weathering by water and sulfates may form by water evaporation. The new research, however, suggests an alternative mineral target to explore for biological remains. Christensen said, "By their nature, salt deposits point to a lot of water, which could potentially remain standing in pools as it evaporates." That's crucial, he said. "For life, it's all about a habitat that endures for some time."

Jeffrey Plaut, Odyssey project scientist at NASA's Jet Propulsion Laboratory, Pasadena, Calif., said, "This discovery demonstrates the continuing value of the Odyssey science mission, now entering its seventh year. The more we look at Mars, the more fascinating a place it becomes."

Whether or not the Red Planet ever had life is the biggest scientific question driving Mars research. On Earth, salt is good at preserving organic material. For example, bacteria have been revived in the laboratory after being preserved in salt deposits for millions of years.

For researchers at the University of Hawaii, this study helps to support ongoing projects that focus on the Red Planet. "It is particularly pleasing to see that one of our graduate students can lead cutting-edge research such as this", says Peter Mouginis-Mark, the Interim Director of the Hawaii Institute of Geophysics and Planetology. "Mikki's work builds on the strong emphasis in Mars research within HIGP and SOEST, and adds a significant new piece of information to the puzzle of climate conditions early in the history of Mars."

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JPL, a division of the California Institute of Technology, Pasadena, manages Odyssey for the NASA Science Mission Directorate.
For additional information about Odyssey, visit: http://www.nasa.gov/mission_pages/odyssey
For additional information about the camera and the new findings, visit: http://themis.asu.edu

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