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LCROSS Finds Water On Moon

by Dr. Tony Phillips
Science@NASA
Huntsville AL (SPX) Nov 16, 2009

The argument that the [Moon](#) is a dry, desolate place no longer holds water. Researchers have revealed preliminary data from [NASA's](#) Lunar Crater Observation and Sensing Satellite, or LCROSS, indicating that water exists in a permanently shadowed lunar crater. The discovery opens a new chapter in our understanding of the [Moon](#).

"We are ecstatic," said Anthony Colaprete, LCROSS project scientist and principal investigator at NASA's Ames Research Center in Moffett Field, Calif.

The LCROSS [spacecraft](#) and a companion rocket stage made twin impacts in crater Cabeus near the Moon's south pole on Oct. 9th. A plume of debris traveled at a high angle beyond the rim of Cabeus and into sunlight, while an additional curtain of debris was ejected more laterally.

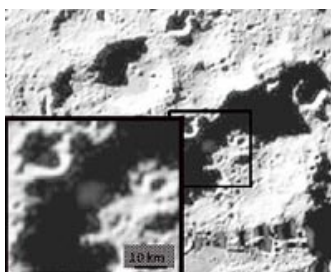
"Multiple lines of evidence show water was present in both the high angle vapor plume and the ejecta curtain created by the LCROSS Centaur impact," says Colaprete.

"The concentration and distribution of water and other substances requires further analysis, but it is safe to say Cabeus holds water."

Since the impacts, the LCROSS [science](#) team has been analyzing the huge amount of data the spacecraft collected. The team concentrated on data from the satellite's spectrometers, which provide the most definitive information about the presence of water. A spectrometer helps identify the composition of materials by examining light they emit or absorb.

The team took the known near-infrared spectral signatures of water and other materials and compared them to the impact spectra the LCROSS near infrared spectrometer collected.

"We were able to match the spectra from LCROSS data only when we



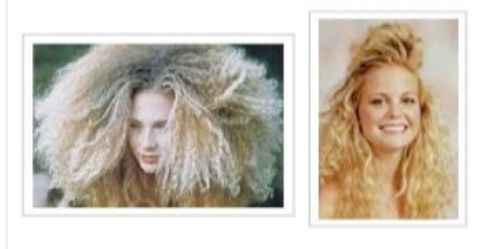
Visible camera images showing the ejecta plume at about 20 seconds after impact. Credit: LCROSS/NASA. For more images from the Preliminary Impact Results please go [here](#).

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inserted the spectra for water," Colaprete said. "No other reasonable combination of other compounds that we tried matched the observations. The possibility of contamination from the Centaur also was ruled out."

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Additional confirmation came from an emission in the ultraviolet spectrum that was attributed to hydroxyl (OH), one product from the break-up of water by sunlight.



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Data from the other LCROSS instruments are being analyzed for additional clues about the state and distribution of the material at the impact site.

The LCROSS science team and colleagues are poring over the data to understand the entire impact event, from flash to crater. The goal is to understand the distribution of all materials within the soil at the impact site.

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"The full understanding of the LCROSS data may take some time. The data is that rich," Colaprete said. "Along with the water in Cabeus, there are hints of other intriguing substances. The permanently shadowed regions of the Moon are truly cold traps, collecting and preserving material over billions of years."

Stay tuned for updates.

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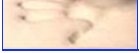
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Radiation: The Moon's Greatest Menace

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