

"Deadly White Teeth"

Dentists don't want you to know THIS teeth whitening secret. American-Derma-Society.org

NO-SALT Water Softener

Premium Hard Water Conditioner & Descaler. Free Ship. Now \$179. www.equinox-products.com

\$79/Hr Job - 236 Openings

Make \$79/hr Working From Home. As Seen On CNN,NBC,& Fox News www.OurDailyReviews.com/localnews

Powered by Bing

MSN Home | Mail | More | Sign In

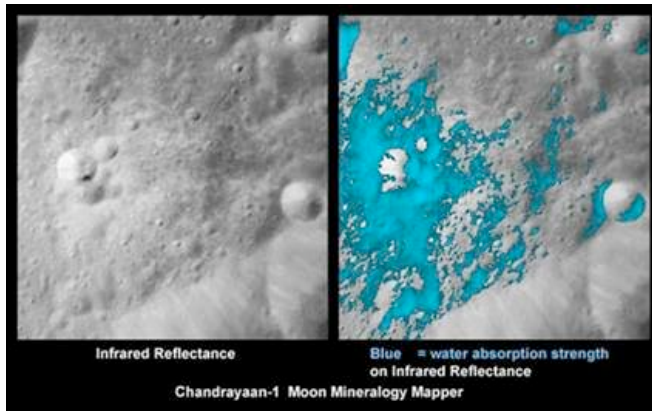
featuring TODAY | Nightly News | Dateline | Meet the Press | msnbc tv | NBC Sports

Technology & science Space

Categories

- U.S. news
World news
Politics
Business
Sports
Entertainment
Health
Tech & science
Space
Science
Tech and gadgets
Games
Wireless
Innovation
Security
Travel
Local news
Weather
Browse
Video
Photos
Disable Fly-out

New idea surfaces on origin of moon's water
Some experts believe there is water deep inside the moon



On the left is an image of the moon showing brightness at shorter infrared wavelengths. On the right, the distribution of water-rich minerals (light blue) is shown around a small crater. Both water- and hydroxyl-rich materials were found to be associated with material ejected from the crater.

View related photos

ISRO/NASA

By Clara Moskowitz
SPACE

updated 5:34 p.m. MT, Tues., Oct . 6, 2009

Many experts were shocked by the recent discovery of water on the moon, which was long thought to be bone-dry.

But not everyone was surprised.

Astrophysicist Arlin Crotts of Columbia University has been working for years on research that he says predicted this finding. In a paper he submitted recently to the Astrophysical Journal with his graduate student Cameron Hummels, Crotts hypothesizes the existence of widespread water on the lunar surface, and offers an idea for how it got there.

Story continues below ↓

advertisement | your ad here

Space.com

Video - Water on the Moon

NASA, Disney Celebrate Buzz Lightyear's Return From Space

Video - Acrobat Space Tourist on Flight Training

Gravitational Corridors Act Like Space Lanes

Video - MIT Student Photos of Earth From Near-Space



Most popular

Most viewed | Top rated | Most e-mailed

- Taliban hoists flag after deadly battle with GIs
'Robin Hood' banker jailed over \$340,000 theft
Poll: Public split on health overhaul legislation
13 celeb-inspired wedding hairstyles

Sponsored Links

\$79/Hr Job - 236 Openings
Make \$79/hr Working From Home. As Seen On CNN,NBC,& Fox News www.OurDailyReviews.com/loc

Top Portable Filters
Radical new portable purifier: Unparalleled 99.99999% purity! pleasanthillgrain.com

Office Water Solutions
We Make Water Better. Coolers Bottle-less, RO, and more www.taylormadewater.com

Kinetico Water Systems
Give your Family the BEST Water Get Safe, Healthy H2O CALL:602-814-024 KineticoAZ.com

DIY Water Test Kit
Test for 13 Common Water Contaminants - Free Water Test Kit w/ Order h2okits.com/water_test_kit

Resource guide



Our rates vs. the others



Scottrade: \$7 online trades



Shop Halloween Costumes



Movies delivered - Try free

[Abused then denied care: 8 states allow practice](#)[Most viewed on msnbc.com](#)**The UPS Store**

Locations near you!

Shop for Laptops

- Laptops
- Laptop Memory
- Flash Memory



"I am predicting something that just happened, that nobody else was predicting," Crofts said. "I hope people recognize that this is a true prediction of the spatial distribution of water around the moon."

Until recently, many scientists thought the lunar surface was almost completely dry, and that shadowed craters near the poles offered the only chance for small stores of water. But new data from the NASA-built Moon Mineralogy Mapper (M3) on India's Chandrayaan-1 satellite, NASA's Cassini spacecraft and [NASA's Deep Impact probe](#) uncovered tantalizing evidence of water molecules all over the moon's surface. These findings were detailed in three papers in the Sept. 25 issue of the journal Science.

Some more details, especially about the possible water at the poles, are likely to come when NASA's LCROSS impactor slams into a crater on the moon's south pole Friday morning in search of signs of water.

Where did it come from?

[The experts](#) behind the new findings said they don't yet know the source of this water. According to one hypothesis, charged hydrogen ions carried from the sun to the moon by the solar wind could combine with oxygen on the moon to form water molecules. Another idea is that the water is left over from comets that have impacted the moon.

"There are many models out there," said Roger Clark of the U.S. Geological Survey in Denver, who is a team member for the Cassini spacecraft and a co-investigator for Chandrayaan-1. "Probably to some degree they all are in play. It's too early to tell."

But Crofts has a different idea in mind.

Previous research has uncovered some water trapped in minerals deep inside the moon, Crofts said. According to his model, this water is likely to travel up through fissures to the lunar surface along with other gases that are escaping the pressure of the moon's dense interior.

"We now know that there's water in the interior," Crofts told SPACE.com. "There's no particular reason to think that it doesn't get out."

Buried water

One piece of evidence for interior water — a 2008 Nature study by Brown University's Alberto Saal and colleagues — identified water (between 260 and 745 parts per million, or ppm) in pebbles of hardened moon lava brought back by Apollo astronauts. Other work on similar samples by Francis McCubbin of the Carnegie Institution for Science in Washington D.C. also indicates the moon could harbor

water beneath its surface.

While Crofts thinks those amounts are enough to produce the observed surface water, other experts are skeptical.

"I feel that it is highly unlikely that there are significant amounts of water remaining in the moon's interior at this time," said Darby Dyar of Mount Holyoke College in Massachusetts, who was a co-author on the recent Science papers announcing the surface water discovery. "The amounts of water found are at the parts per million level, and as such constitute only a very small amount of water as a resource."

Other scientists echo this thinking.

"The moon interior is believed to be very dry, with less water than what we observed on the surface," Olivier Groussin, a scientist at the Laboratoire d'Astrophysique de Marseille in France and another co-author on the Science papers, wrote in an [e-mail](#). "Apollo samples indicate less than 50 ppm of water in the interior, while we detected about 1000 ppm on the surface."

Wet moon

However, Denton Ebel, curator of meteorites at the American Museum of Natural History in New York, said the trace amounts of interior moon water so far identified could be enough to produce the signature found at the surface.

"I think the amounts of water that are inferred for the lunar interior from the work of Alberto Saal and the work of Francis McCubbin, coupled with what we know about the lunar core, implies that degassing is a viable cause of the hydrogen signal that's observed," Ebel said in a [phone](#) interview.

"I think that [Crofts'] scenario of seepage — slow degassing — is consistent with the findings," Ebel said. "And I think it's more encouraging than the idea of hydrogen implantation by the solar wind. The bottom line is, he could turn out to be right."

Crofts' paper outlining his hypothesis has been submitted to an academic journal, and is in the process of being peer-reviewed before possible publication. Some scientists are waiting to reserve judgment until then.

"I am delighted that scientists have been thinking along these lines, but we must wait to see if it holds up to the test of peer review," said Jim Green, director of the Planetary Science Division of the Science Mission Directorate at NASA Headquarters in Washington, D.C., another co-author on the Science papers.

[CLICK FOR RELATED CONTENT](#)

[How to watch NASA's mighty moon crash](#)
[What House to throw star party Wednesday](#)
[Circus billionaire: Space trip worth every penny](#)

To get to the bottom of the issue, more data will be needed, scientists say.

INTERACTIVE



[Launch](#)

Top 10 images of the world at night

The night sky is the forgotten half of our environment, says Mike Simmons, the president and founder of Astronomers Without Borders.

In fact, the signature of water seen on the surface could easily result from a combination of multiple processes, Crofts said, adding that his explanation might only account for some of the water on the surface.

To find out for sure, more lunar expeditions will be required, Crofts said.

"We've got to have another polar orbiter mission, and it's got to have some instruments on it that study this question," he said.

© 2009 Space.com. All rights reserved. [More from Space.com.](#)

Discuss Story
On Newsvine

Rate Story: Low  High
View popular 4.5 after 23 ratings

Email

Instant Message

Print

MORE FROM SPACE

Next →

[White House to throw star party Wednesday](#)

[Cosmic Log: Xombie rocket goes the distance](#)

[Eight great crashes and smashes from outer space](#)

[NASA downgrades threat of asteroid impact](#)

[Observatories gear up for Friday lunar crash](#)

[How to watch NASA's mighty moon crash](#)

[Far-reaching ring detected around Saturn](#)

[New idea surfaces on origin of moon's water](#)

[White House to throw star party Wednesday](#)

[Circus billionaire: Space trip worth every penny](#)

[A clown, a crisis and the future of space travel](#)

[Space Section Front](#)

Add Space headlines to your news reader:



[More RSS feeds from MSNBC.com](#)

Top msnbc.com stories

[Poll: Public split on health overhaul](#)

[Obama weighs options in Afghan war](#)

[Taliban hoists flag after battle](#)

[Opinion: Yankees will rule MLB world](#)

[Profit pressure may stall stock rally](#)

NBC News highlights

[The mind of a Ponzi schemer](#)

[New pet craze: 'Teacup pigs'](#)

[Video: She survives raccoon attack](#)

[Video: Remembering hero Marine](#)

[Video: Beware these risky foods](#)

SPONSORED LINKS

[Get listed here](#)

Tempe - Mom Lost 47lbs Following 1 Rule

I Cut Down 47 lbs of Stomach Fat In A Month By Obeying This 1 Old Rule
[RachelRayBlogs.com](#)

Working Mom EXPOSED (Official Report)

We investigate a jobless mom who now makes over \$5K/month at home.
[www.News3.tv/work](#)

WARNING - Acai Side Effects -

Who Can You Trust? Read this Warning Now
[www.TheGlobeReport.com](#)

Do NOT Pay For White Teeth

Mom's Whitening Method Exposed. The Results WILL Shock You.
www.consumertipsweekly.net

Acai Berry EXPOSED (News 6 Reports)

We Investigate Acai Berry. Is Acai a Miracle Diet or Internet Scam?
www.HealthNews6.com

- Featuring [TODAY](#) [Nightly News](#) [Dateline](#) [Meet the Press](#) [msnbc tv](#) [Newsweek](#)
- Categories [Top stories](#) [Local news](#) [U.S.](#) [World](#) [Politics](#) [Business](#) [Sports](#)
[Entertainment](#) [Health](#) [Tech & science](#) [Travel](#) [Weather](#)
- About [About us](#) [Contact](#) [Site map](#) [Jobs](#) [Stock data](#) [Terms & conditions](#)

[News alerts](#)

[E-mail highlights](#)

[RSS & feeds](#)

[Mobile headlines](#)

[Podcasts](#)

[Widgets](#)