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Water on Moon: NASA probe atop Chandrayaan-1 discovers water

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By Syed Akbar

NASA scientists have discovered water molecules in the polar regions of the moon. Instruments aboard three separate spacecraft revealed water molecules in amounts that are greater than predicted, but still relatively small. Hydroxyl, a molecule consisting of one oxygen atom and one hydrogen atom, also was found in the lunar soil. The findings were published in Thursday's edition of the journal Science.

NASA's Moon Mineralogy Mapper, or M3, instrument reported the observations. M3 was carried into space on Oct. 22, 2008, aboard the Indian Space Research Organization's Chandrayaan-1 spacecraft. Data from the Visual and Infrared Mapping Spectrometer, or VIMS, on NASA's Cassini spacecraft, and the High-Resolution Infrared Imaging Spectrometer on NASA's Epoxi spacecraft contributed to confirmation of the finding. The spacecraft Imaging spectrometers made it possible to map lunar water more effectively than ever before.

The confirmation of elevated water molecules and hydroxyl at these concentrations in the moon's polar regions raises new questions about its origin and effect on the mineralogy of the moon. Answers to these questions will be studied and debated for years to come.

"Water ice on the moon has been something of a holy grail for lunar scientists for a very long time," said Jim Green, director of the Planetary Science Division at NASA Headquarters in Washington. "This surprising finding has come about through the ingenuity, perseverance and international cooperation between NASA and the India Space Research Organization."

From its perch in lunar orbit, M3's state-of-the-art spectrometer measured light reflecting off the moon's surface at infrared wavelengths, splitting the spectral

colors of the lunar surface into small enough bits to reveal a new level of detail in surface composition. When the M3 science team analyzed data from the instrument, they found the wavelengths of light being absorbed were consistent with the absorption patterns for water molecules and hydroxyl.

"For silicate bodies, such features are typically attributed to water and hydroxyl-bearing materials," said Carle Pieters, M3's principal investigator from Brown University, Providence, R.I. "When we say 'water on the moon,' we are not talking about lakes, oceans or even puddles. Water on the moon means molecules of water and hydroxyl that interact with molecules of rock and dust specifically in the top millimeters of the moon's surface.

The M3 team found water molecules and hydroxyl at diverse areas of the sunlit region of the moon's surface, but the water signature appeared stronger at the moon's higher latitudes. Water molecules and hydroxyl previously were suspected in data from a Cassini flyby of the moon in 1999, but the findings were not published until now.

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