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Rocket Smash Could Find Moon's Water Ice, Expert Says

ScienceDaily (Oct. 6, 2009) — Crashing a rocket into the Moon will create "one more dimple" on the lunar surface and could find water ice on Earth's nearest neighbour, according to a Durham University expert.

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Dr Vincent Eke's research has helped inform NASA's decision about where to crash its probes into the Moon's surface in search of water.

The Lunar CRater Observation and Sensing Satellite (LCROSS) and its Centaur rocket will smash into a crater in the Cabeus region of the Moon's South Pole next week. Impact has been timed for approximately 12.30 pm BST (4.30 am PDT) on Friday, October 9.

Approximately 350 tonnes of material will be propelled into the sunlight so scientists can study its composition using ground-based telescopes.

Cabeus was identified in a previous study led by Dr Eke as a site with high concentrations of hydrogen – a key element in water.

According to the findings, water in the form of ice could be found in the frozen confines of the Moon's polar craters where temperatures are colder than minus 170 degrees Celsius.

Sept. 2009 data from three spacecraft, including India's Chandrayaan-1 probe, showed that small amounts of H₂O coated particles that make up the Moon's soil.

Dr Eke, in the Institute for Computational Cosmology, at Durham University, said: "Water ice could be stable for billions of years on the Moon provided that it is cold enough.

"If ice is present in the permanently shaded lunar craters of the Moon then it could potentially provide a water source for the eventual establishment of a manned base on the Moon.

"Such a base could be used as a platform for exploration into the further reaches of our solar system."

Dr Eke said people should not worry about the effect the collision could have on the Moon.

He added: "The rocket has roughly the mass of a Transit van and it will hit the Moon at about 5,600 miles per hour. The energy of the collision is roughly equivalent to two tonnes of TNT.

"While this sounds dramatic, the impact of this will simply create one more dimple on the moonscape.

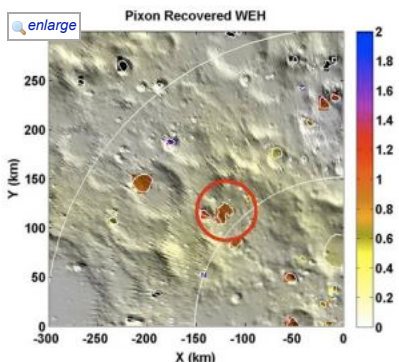
"The cratered surface of the Moon shows it has a history of violent collisions with asteroids and comets.

"Such collisions frequently occur, but the difference is that this time we know precisely where and when to look."

Dr Eke's previous study analysed data from NASA's 1998 Lunar Prospector mission, which showed that hydrogen was concentrated in the permanently shaded craters of the Moon's polar regions.

If hydrogen is present as water ice, then the data would imply that the top metre of the surface in these craters holds about 200,000 million litres of water in total.

Dr Eke's research, published in the International Journal of Solar System Studies, Icarus, was carried out in collaboration with Dr Richard Elphic and Dr Luis Teodoro, who work in the Planetary Systems Branch at NASA Ames Research Center



A map showing the south polar region of the moon and the target crater Cabeus. The coloured pixels represent permanently shaded regions and their equivalent water concentrations. (Credit: Dr Vincent Eke, Durham University/NASA)

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in the USA.

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Adapted from materials provided by Durham University, via AlphaGalileo.

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