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Japanese images find no proof of water at lunar south pole

The search for water on moon is a recent quest. It brought back during early lunar explorations suggests its surface was completely dry

Seema Singh

Bangalore: Barely two days after *Chandrayaan-1* left for its 21-day journey to the moon looking for water among several other things, images from the Japanese lunar probe suggest there is no water-ice, at least on the surface of lunar south pole, a region believed to hold water deposits.

In Friday's issue of *Science*, scientists report that there is a lack of pure water-ice on the Shackleton Crater, a permanently shadowed area, or PSA, which is largely unexposed to sunlight and hence a likely place for water-ice deposits.

Based on images taken by a stereo camera onboard the Japanese lunar satellite Selene, or Kaguya, researchers built a terrain model of the crater.



Earth rising: The earth as seen from the horizon of the moon. From left to right, it took about 40 seconds for the earth to rise fully; the pictures were taken by a tele-camera aboard Selene, the Japanese lunar probe. Japan Aerospace Exploration Agency

Laboratory, Ahmedabad.

Even the Indian mission has a terrain camera and will attempt a similar exercise, but the Japanese images are the first pictures of the crater, which, at about 4.2km deep, is deeper than other craters.

They found the temperature to be less than 90 Kelvin scale—183 degrees Celsius—cold enough to hold ice, but the images reveal no conspicuous brightness that would indicate water-ice.

"They (Japanese) have done a fantastic job; we can call it remote sensing in star light," said J.N. Goswami, principal scientist of Chandrayaan and director of Physical Research

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Since a camera cannot detect anything but reflection, the search for water needs deeper investigation, which Chandrayaan is better placed to do with its mini synthetic aperture radar, MiniSar.

"We will do active remote sensing; penetrate 1.5m in radio wavelength on the crater," said Goswami.

So, did the preliminary findings disappoint? "No, I don't think so," said Junichi Haruyama of Japan Aerospace Exploration Agency and co-author of the *Science* paper.

The X-ray spectrometer on board Chandrayaan will also explore the moon's polar region for water

The water-ice may be buried by the thin layer of lunar soil or mixed with lunar soils, he said.

But the Japanese findings leave an important question unanswered. "...It remains a struggle to resolve the question: What makes the hydrogen concentration on the lunar poles?" said Haruyama. He thinks it could be the result of "solar wind implantation".

As for water, there are other PSAs in both polar regions that we are investigating, said Haruyama, who is looking forward to MiniSar and high-resolution camera data from Chandrayaan, which when combined with Selene data can provide new insight.

The search for water on moon is a recent quest. Samples brought back during early lunar explorations suggested its surface was completely dry.

However, in July, Brown University researchers for the first time found evidence of water on the moon by analysing its volcanic glass.

Now, besides MiniSar, the high energy X-ray spectrometer on board Chandrayaan will also explore the moon's polar region for water. The US Lunar Reconnaissance Orbiter to be launched in April 2009, too, will look for water in

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the south pole. Meanwhile, Selene scientists are waiting for the next observation window, in early November, to further their research on water.



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chandan Said:

India's chandrayaan is definitely gonna do challenging work , for its use of minisar will make better intepretations ::: definatly the remote sensing technology is improving and this is the proper occasion that INDIA will test its potential.

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