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NASA Reports That Methane Drizzles on Saturn's Moon, Titan

Liquid methane drizzles on the surface of Titan, a moon of Saturn, according to a paper by NASA and university scientists that appears in today's issue of the journal, *Nature*.

Data from the European Space Agency's Huygens probe indicates there is a lower, barely visible, liquid methane-nitrogen cloud that drops rain to the surface of Titan, reported a team of scientists from universities, an observatory and NASA. The probe collected the data on January 14, 2005, when it approached and landed on Titan.

"The rain on Titan is just a slight drizzle, but it rains all the time, day in, day out. It makes the ground wet and muddy with liquid methane. This is why the Huygens probe landed with a splat. It landed in methane mud," said Christopher McKay, a scientist at NASA Ames Research Center in California's Silicon Valley and second author of the study. The principal author is Tetsuya Tokano from the University of Cologne, Germany.

On Titan, the clouds and rain are formed of liquid methane. On Earth, methane is a flammable gas, but Titan has no oxygen in its atmosphere that could support combustion. Also, the temperatures on Titan are so cold -- minus 300 degrees Fahrenheit (minus 149 degrees Celsius) -- that the methane can form liquid. Titan's landscape includes fluvial, river-like features that may well be formed by methane rain, scientists noted.

A gap separates the liquid methane cloud -- the source of the rain -- from a higher, upper methane ice cloud, according to the scientific study. Scientists say the downward flow of methane due to the rain is balanced by upward transport of methane gas by large-scale atmospheric circulation.

According to scientists, the rain comes from thin clouds of methane. The upper clouds are methane ice, and the lower clouds are liquid and composed of a combination of methane and nitrogen. Computer models indicate these thin liquid methane clouds cover about half of Titan, even though methane abundance on the moon decreases with latitude, the team reported.

"We determined that the rain on Titan is equal to about two inches (about 5 centimeters) a year," McKay said. "This is about as much rain as Death Valley (receives). The difference is (that) on Titan, this rain is spread out evenly over the entire year."

The scientists reported that erosion potential from the very light methane drizzle may be quite limited, but at least would be sufficient to wet the surface material, and may explain its generally wet character.

In addition to McKay the other co-authors of the scientific paper include Fritz Neubauer, of the University of Cologne; Sushil Atreya, University of Michigan, Ann Arbor; Francesca Ferri, University of Padova, Italy; Marcello Fulchignoni, of both the Paris Observatory and the University of Denis Diderot, Paris; and Hasso Niemann, NASA Goddard Space Flight Center, Greenbelt, Md.

More information about the Huygens mission to Titan can be found at on the Internet at:

<http://saturn.jpl.nasa.gov/operations/huygens-mission.cfm>

More information about scientist Christopher McKay can be found at:

<http://www.nasa.gov/centers/ames/research/2006/mckay.html>

More information about NASA can be found at:

<http://www.nasa.gov>

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