

Offered Title: Titan: Strange Brew

Not beer, but perhaps an oil company's dream world.

As Saturn's largest satellite, Titan has been the target of investigation since discovery in 1655 by Christiaan Huygens. Hey, it's Saturn, the darling of our solar system, with spectacular rings that grab you every time you see them. Everything about Saturn is cool, and Titan is one of the coolest, OK, maybe strangest is a better term.

Titan is the second largest moon in our solar system, just behind Jupiter's Ganymede, and larger than the planet Mercury, so it's a big rock. That's not strange. Titan is the only other solar system body (beside Earth) that has a thick atmosphere, and lakes, rivers, and seas. Not necessarily strange but interesting. You want strange? Those lakes, rivers, and seas are filled with liquid methane! *Ligeia Mare*, Titan's second largest lake has enough liquid methane to fill three *Lake Michigan*'s. There's even some ethane and propane mixed in. It rains on Titan too...methane rain! That'll make an oil executive salivate. Just need big, refrigerated "space tankers", or maybe a pipeline! That's around 900 million miles of pipe.

Methane waterways are strange enough, but the brew is made by combining UV from the Sun, nitrogen, and methane. No yeast needed. One of the results is a permanent haze, reminiscent of 1970's Los Angeles and "smog". While Titan's atmosphere is mainly nitrogen (97%) it has about 2.7% gaseous methane. In the upper atmosphere the Sun's UV breaks methane molecules. Subsequent recombination's and even reactions with nitrogen produce trace amounts of propane, acetylene, cyanoacetylene, diacetylene, methylacetylene, and hydrogen cyanide. This witch's brew forms Titan's haze. Think I would rather be in Los Angeles, thank you.

All of this is going on at -290 degrees Fahrenheit. Think I'll stay here where 32 degrees Fahrenheit seems cold.

Titan's crust is composed of rocks and water ice, but at -290 F, the ice is hard as rock. How hard are rocks at minus 290 F? Still hard as rocks. From studies made with the Cassini spacecraft Titan seems to be organized in layers, not unusual for a large solar system body. Beneath its crust lies a layer of water ice and below the water ice is a softer layer, possibly liquid/slushy, very salty water. Another layer of ice, this time ice VI (tetragonal crystals) is suspected below the liquid layer and finally a core of hydrous silicates. There is even evidence of cryovolcanism, eruptions of liquid water/ammonia "magma".

Then there are tholins, organic polymer-like chemicals. Precursors to amino acids. They seem to be common in our solar system. Titan's got them too. Any discussion of amino acids leads to discussion of life, no matter how remote the possibility.

Strange brew indeed.

What's in the Sky?

April 14 & 15; around 10 pm; south - high: A waxing gibbous Moon shares the sky with Leo's brightest star Regulus, alpha Leonis. Leo's head looks like a backward question mark.