Cassini may have spotted waves in Titan's seas

March 19 2014, by Jason Major

Cassini VIMS image showing specular reflections in one of Titan’s many lakes during the T85 flyby on July 24, 2012. Credit: NASA/JPL-Caltech/SSI/Jason W. Barnes et al.

It's no surprise that Titan's north polar region is covered with vast lakes and seas of liquid methane—these have been imaged many times by Cassini during its ten years in orbit around Saturn. What is surprising though is just how incredibly smooth the surfaces of these lakes have been found to be.

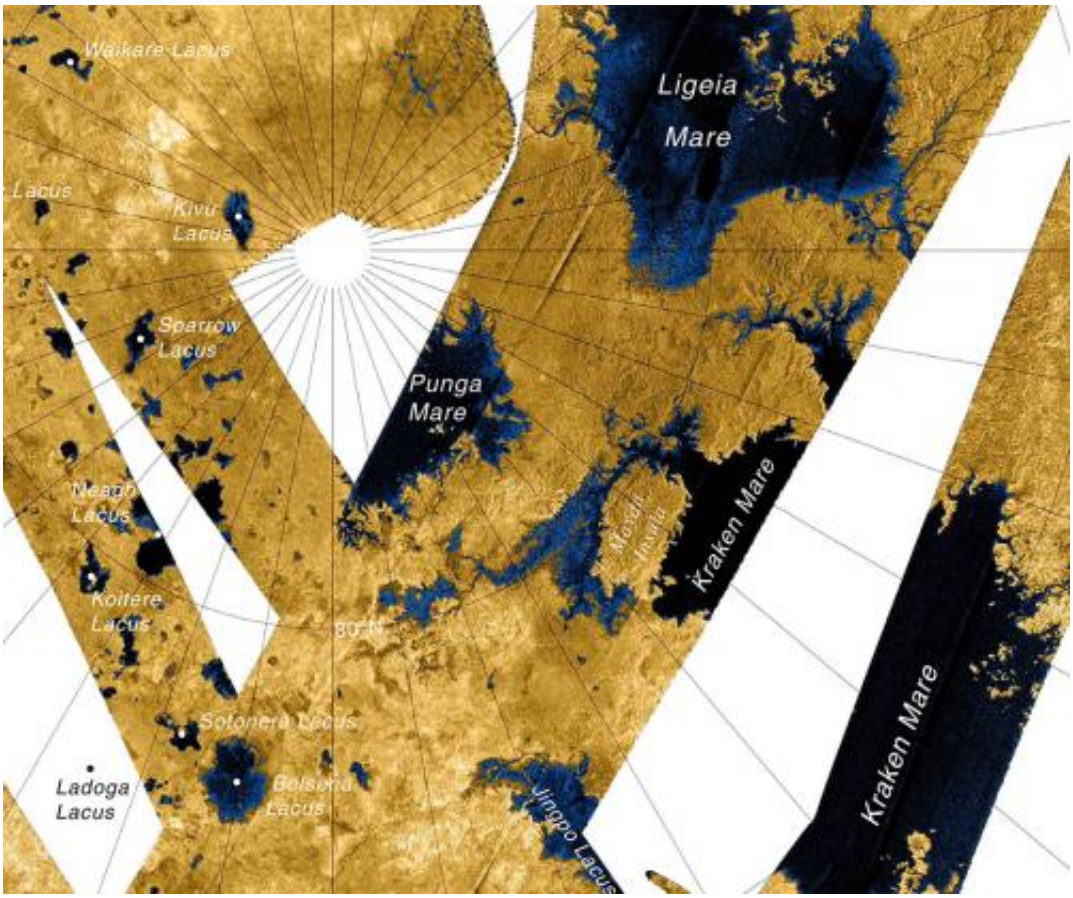
One would think that such large expanses of surface liquid—some of Titan's seas are as big the Great Lakes—would exhibit at least a little surface action on a world with an atmosphere as dense as Titan's. But repeated radar imaging has shown their surfaces to be "as smooth as the paint on a car." Over the past several years scientists have puzzled over this anomaly but now they may have truly seen the light—that is, reflected light from what could actually be waves on Titan!

Using data acquired during flybys of Titan in 2012 and 2013, planetary scientist Jason Barnes from the University of Idaho and a team of researchers from several other institutions including JPL, Cornell, and MIT, have identified what might be waves in the surface of Punga Mare, one of Titan's biggest lakes.

For a sense of scale, Lake Victoria, the largest lake in Africa, could fit lengthwise across Titan's 380-km (236-mile) -wide Punga Mare.

Variations in specular highlights in four pixels observed in the surface of Punga Mare by Cassini's VIMS (Visible and Infrared Mapping Spectrometer) have been interpreted by the team as being the result of waves—or, perhaps more accurately, ripples, seeing as that they are estimated to be a mere 2 centimeters in height.

Still, based on what's been observed thus far on Titan, that's downright choppy.



Map of Titan's northern "Land o' Lakes" made from Cassini high-resolution radar imaging. Credit: NASA/JPL/USGS

If the Cassini observations interpreted by Barnes et al. are indicative of waves in Punga Mare, they could also explain previous specular variations seen in other bodies of liquid, like the smaller Kivu Lacus.

Then again, wave action isn't the only possible answer. Similar varied specular highlights could also be caused by a wet surface—like a methane mud flat. Further observations will be needed to rule out other possibilities and obtain a more accurate "surf forecast" for Titan.

More information: The findings were presented by Jason Barnes at

the 45th Lunar and Planetary Science Conference in Houston on March 17, 2014. Read the team's abstract here: www.hou.usra.edu/meetings/lpsc2014/pdf/1947.pdf

Provided by Universe Today