

CASSINI-HUYGENS

Titan's methane lakes

Sunglints, or specular reflections, are often seen on Earth when sunlight reflects off of the smooth surfaces of lakes and rivers. On 8 July 2009, the Visual and Infrared Mapping Spectrometer (VIMS) on Cassini captured the first sunglint from an extraterrestrial body of liquid, confirming the presence of lakes and seas near Titan's north pole. Titan's thick nitrogen (N_2) and methane (CH_4) atmosphere and photochemically generated haze layer prevent most visible light from reaching the surface, so this image was taken in the infrared at $5\ \mu\text{m}$. The sunlight reflected off of a lake, now called Jingpo Lacus, which is intermediate in size between Lake Ontario and Lake Superior ($\sim 8,000$ square miles or $20,800$ square kilometres).

Titan is the only other body in the Solar System besides Earth that currently has stable liquid on its surface. However, with a surface temperature of $94\ \text{K}$ and pressure of $1.5\ \text{bar}$, water is solid and the surface conditions are close to the triple point of methane. Titan's lakes and seas are composed primarily of liquid methane and ethane (C_2H_6); ethane is one of the most abundant products of Titan's complex atmospheric chemistry, which produces numerous complex organic molecules. Titan's proximity to the triple point of methane allows for an active hydrological cycle and Cassini–Huygens observed extensive stream and river systems, large outbursts of clouds from convective methane storms, and evidence of rainfall. Titan's surface has

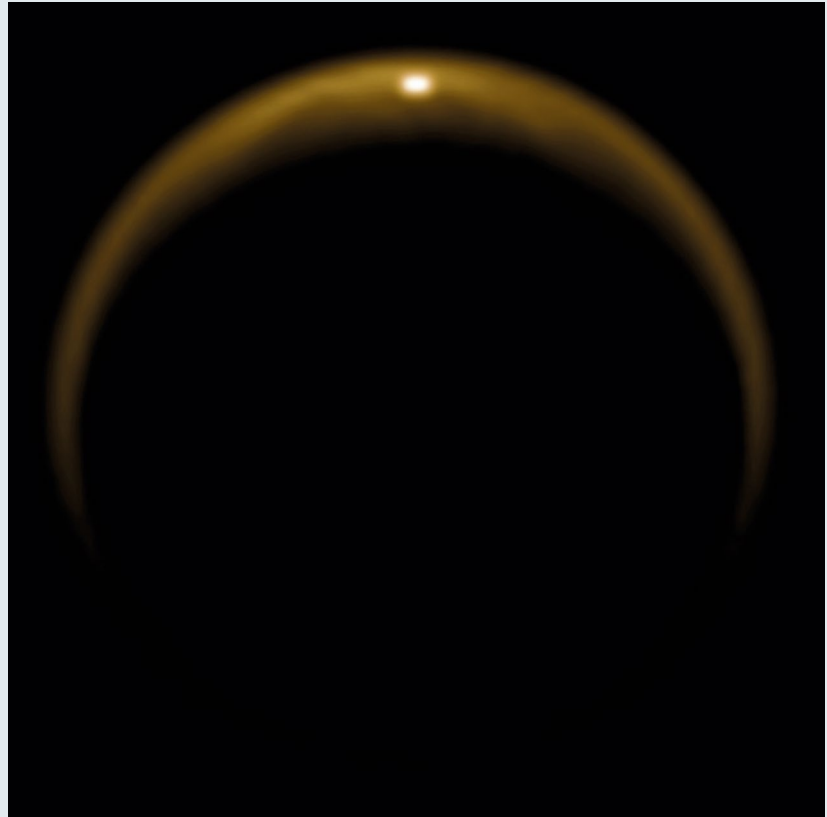


Image credit: NASA/JPL/University of Arizona/DLR

been carved into a landscape that is irresistibly reminiscent of home. We now know that there is another world in the Solar System that has abundant liquids and organics and therefore harbours the potential for life. The sunglint captured by Cassini VIMS serves as a beacon for future explorers.

Sarah M. Hörst

*Department of Earth and Planetary Sciences,
Johns Hopkins University, 3400 N. Charles Street,
Baltimore, MD 21218, USA.
e-mail: sarah.horst@jhu.edu*

Published online: 5 September 2017
DOI: 10.1038/s41550-017-0244-8