

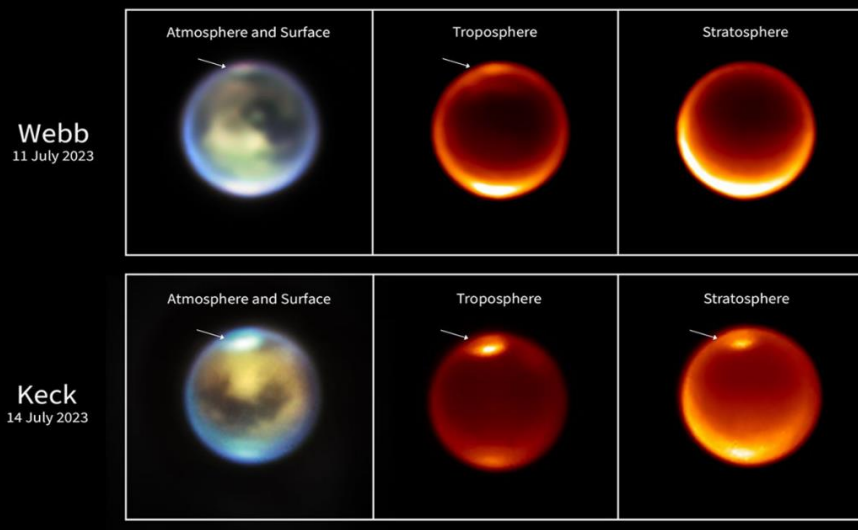
Webb's Titan Forecast: Partly Cloudy With Occasional Methane Showers

NASA's James Webb Space Telescope, supplemented with images from the Keck II telescope, has for the first time found evidence for cloud convection in Titan's northern hemisphere, over a region of lakes and seas. Webb also has detected a key carbon-containing molecule that gives insight into the chemical processes in Titan's complex atmosphere.

The Goddard-led team observed Titan in November 2022 and July 2023 using both Webb and one of W.M. Keck Observatories telescopes, revealing clouds in the mid and high northern latitudes on Titan – the hemisphere where it is currently summer – and also showed those clouds rising to higher altitudes over time.

This is significant because most of Titan's lakes and seas are located in its northern hemisphere and evaporation from lakes is a major potential methane source. Their total area is similar to that of the Great Lakes in North America.

On Titan, methane plays a similar role to water on Earth when it comes to weather. It evaporates from the surface and rises into the atmosphere, where it condenses to form methane clouds. Occasionally it falls as a chilly, oily rain onto a solid surface where water ice is hard as rocks.



Top left: Images of Titan taken by NASA's James Webb Space Telescope and the ground-based W.M. Keck Observatories, showing methane clouds (white arrows) at different altitudes in Titan's northern hemisphere that eventually rain down to form hydrocarbon lakes of methane and ethane (bottom right). Credit: NASA, ESA, CSA, STScI, and W.M. Keck Observatories, and Elizabeth Wheatley (STScI).