

Titan satellite

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In news– A new study published recently puts forth a theory to explain physiological differences and similarities between Saturn's moon Titan and the Earth.

Key findings of the study-

- As per the study, **Saturn's moon Titan holds liquid lakes, rivers and fields of sand dunes, much like Earth**, but the ingredients that make up the landscapes of the two worlds are different.
- For instance, **Titan's sand dunes, rounded piles of sand deposited by the wind, contain hydrocarbons, unlike sand on Earth.**
- The hydrocarbon grains that make up Titan's landscape are soft and brittle and are expected to break down into dust. Instead, they remain grain-sized, Mathieu Lapôtre.
- In this study, the researchers have proposed a hypothesis to identify the forces that might have created Titan's landscape, which is thought to host dunes at the equator, rocks in the mid-latitude and labyrinth terrains eroded plateau areas in the higher latitudes.
- The moon is dry around the equator while its poles are wet due to an abundance of methane lakes.
- At the equator, sand transport occurs primarily by winds, indicating the presence of fine sand grains – an ingredient of sand dunes.
- In the labyrinth terrains of the higher latitudes, rivers might be providing coarse grains thought to make up the landscape.
- Scientists observed that as for mid-latitudes, the frequency of sediment transport is likely lower than at low and high latitudes.
- This means sediment grains experience less breakdown and

more sintering, where grains accumulate to become larger over time, probably forming “rocks” in the process.

About Titan-

- **Titan is the largest moon of Saturn and it is the only moon known to have a dense atmosphere, and is the only known object in space other than Earth on which clear evidence of stable bodies of surface liquid has been found.**
- Titan is one of the 82 moons orbiting Saturn.
- **Dutch astronomer Christiaan Huygens discovered it** on March 25, 1655.
- It is **one of seven gravitationally rounded moons in orbit around Saturn**, and the second most distant from Saturn of those seven.
- **It is the second-largest moon in the Solar System after Jupiter’s moon Ganymede**, and is larger than the planet Mercury, but only 40% as massive.
- Frequently described as a planet-like moon, **Titan is 50% larger (in diameter) than Earth’s Moon and 80% more massive.**
- It is **primarily composed of ice and rocky material**, which is likely differentiated into a rocky core surrounded by various layers of ice, including a crust of ice and a subsurface layer of ammonia-rich liquid water.
- **NASA’S Huygens probe detached from Cassini and parachuted through Titan’s atmosphere**, landing on the surface on Jan. 14, 2005, the first landing of a probe in the outer solar system.
- **The atmosphere of Titan is largely nitrogen;** minor components lead to the formation of methane and ethane clouds and heavy organonitrogen haze.
- The climate including wind and rain creates surface features similar to those of Earth, such as dunes, rivers, lakes, seas (probably of liquid methane and

ethane), and deltas, and is dominated by seasonal weather patterns as on Earth.

- **With its liquids (both surface and subsurface) and robust nitrogen atmosphere, Titan's methane cycle bears a striking similarity to Earth's water cycle**, albeit at the much lower temperature of about 94 K (-179 °C; -290 °F).