

Saturn's moon Enceladus

July 9, 2021

In news- NASA's **Cassini spacecraft** has detected an unusually high concentration of methane, along with carbon dioxide and dihydrogen, in the moons of Saturn.

Key updates-

- The spacecraft has found that **Titan has methane in its atmosphere and Enceladus has a liquid ocean with erupting plumes of gas and water.**
- An international research team has used new statistical methods to understand if methanogenesis or methane production by microbes could explain the molecular hydrogen and methane.
- The team gave a set of conditions, including dihydrogen concentration and different temperatures to understand if microbes would grow.
- It has opined that **methane could be formed by the chemical breakdown of organic matter present in Enceladus' core.**
- On Earth, hydrothermal vents on seafloors are known to release methane, but this happens at a very slow rate.
- However, this hypothesis is plausible but only if Enceladus was formed through the accretion of organic-rich material from comets.
- The results have suggested that **methane production from hydrothermal vents is not sufficient to explain the high methane concentration detected by Cassini.**

About Enceladus-

- Enceladus is the sixth-largest moon of Saturn.
- It is mostly covered by fresh, clean ice, making it one of the most reflective bodies of the Solar System.
- It has a wide range of surface features, ranging from old, heavily cratered regions to young, tectonically

deformed terrains.

- It was **discovered on August 28, 1789, by William Herschel,**
- The two Voyager spacecraft, **Voyager 1 and Voyager 2,** passed nearby in 1980 and 1981.
- In 2005, the **Cassini spacecraft** started multiple close flybys of Enceladus, revealing its surface and environment in greater detail.
- In particular, Cassini discovered water-rich plumes venting from the south polar region.
- According to NASA scientists, the plumes are similar in composition to comets.
- In 2014, NASA reported that Cassini found evidence for a **large south polar subsurface ocean of liquid water** with a thickness of around 10 km.
- On June 7, 2021, astronomers reported detecting substantial amounts of methane, a possible sign of microbial life, on Enceladus.

About Titan moon-

- Titan is larger than the planet Mercury and is the **second largest moon in our solar system.**
- It is the **only one moon in the solar system with a substantial atmosphere.**
- Titan's atmosphere is made mostly of nitrogen, like Earth's, but with a surface pressure 50 percent higher than Earth's.
- It is the only place besides Earth known to have liquids in the form of rivers, lakes and seas on its surface.
- The largest seas are hundreds of feet deep and hundreds of miles wide.
- Beneath Titan's thick crust of water ice is more liquid, an ocean primarily of water rather than methane.
- Titan **has no known moon**, but it's possible for a moon to have moons.
- Titan **has no rings**, while some of Saturn's moons create

rings around the planet.

- Three other spacecraft – **Pioneer 11, and Voyagers 1 and 2**, studied Titan while flying by Saturn.

Titan's air is dense enough that **one could walk around without a spacesuit** but an oxygen mask is needed.