



Jupiter's Moon Europa

For Prelims: Jupiter and its Moons, NASA

For Mains: Space Technology, Implications of Recent findings related to Jupiter's moon Europa

Why in News?

A team of researchers from Stanford University have found the possibility of **water on one of Jupiter's moons Europa**, a prime candidate for life in the solar system.

- Earlier, [NASA's\(National Aeronautics and Space Administration\) Dawn spacecraft](#), [dwarf planet Ceres](#) reportedly found **salty water underground**.
- **Earlier, Scientists also found signatures of water vapor in the atmosphere of K2-18b.**

What is Europa?

- Europa is **slightly smaller than Earth's moon** and its diameter is about one-quarter that of the Earth.
- Even though Europa has a **very thin oxygen atmosphere, it is considered one of the most promising places in the solar system** to find present-day environments that are suitable for life beyond the Earth.
- It is also believed that underneath **Europa's icy surface the amount of water is twice that on Earth.**
- Scientists believe **Europa's ice shell is 15-25 km thick and is floating on an ocean, which is estimated to be between 60-150 km deep.**
- Interestingly, while its diameter is less than the Earth's, **Europa probably contains twice the amount of the water in all of the Earth's oceans.**
- [NASA](#) is expected to launch its **Europa Clipper in 2024.**
 - The module will **orbit Jupiter and conduct multiple close flybys to Europa to gather data on the moon's atmosphere, surface and its interior.**

What are the Findings?

- Europa's surface is mostly solid water ice and **contains water beneath it.**
- The double ridges - the **formations which are most common on Europa's surface and are like those seen on Earth's Greenland ice sheet.**
- Double Ridges of the moon **are formed over shallow pockets of water.**

What are the Implications of the recent findings?

- The double ridges of Europa **increase the potential habitability of the moon.**
- The ice shell, which is potentially miles thick, has been a difficult prospect for scientists to sample. But according to the new evidence gathered by the Stanford team, **the ice shell is believed to be less of a barrier and more of a dynamic system.**

- This means that the **ice shell does not behave like an inert block of ice, but rather undergoes a variety of geological and hydrological processes.**
- There is a **possibility that life has a shot if there are pockets of water in the shell.**
- If the mechanism seen in Greenland is how these things happen on Europa, **it suggests there's water everywhere.**

What is Jupiter?

- Fifth in line from the Sun, Jupiter is, by far, the **largest planet in the solar system** - more than twice as massive as all the other planets combined.
 - Jupiter, Saturn, Uranus and Neptune are called **Jovian or Gas Giant Planets.** These have thick atmosphere, **mostly of helium and hydrogen.**
- Jupiter's iconic **Great Red Spot** is a giant storm bigger than Earth that has raged for hundreds of years.
- Jupiter **rotates once about every 10 hours** (a Jovian day), but takes about **12 Earth years** to complete **one orbit of the Sun** (a Jovian year).
- Jupiter has **more than 75 moons.**
 - The planet Jupiter's **four largest moons are called the Galilean satellites** after Italian astronomer Galileo Galilei, who first observed them in 1610.
 - These large moons, named **Io, Europa, Ganymede, and Callisto,** are each distinctive world.
- In 1979, the **Voyager mission** discovered Jupiter's faint **ring system.**
- **Nine spacecraft** have visited Jupiter. Seven flew by and two have orbited the gas giant. **Juno,** the most recent, arrived at Jupiter in 2016.

[Source: IE](#)

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