



## Presence of Water on Mars

[Source: TOI](#)

### Why in News?

Recently, scientists have found **frost atop Mars' tallest volcano, Olympus Mons**, indicating the presence of a sparse but active [water cycle](#) on the [Red Planet](#) for the first time.

- In another development, a study suggested the existence of immense reserves of liquid water deep within Mars' rocky outer crust, marking the first discovery of liquid water on the planet.

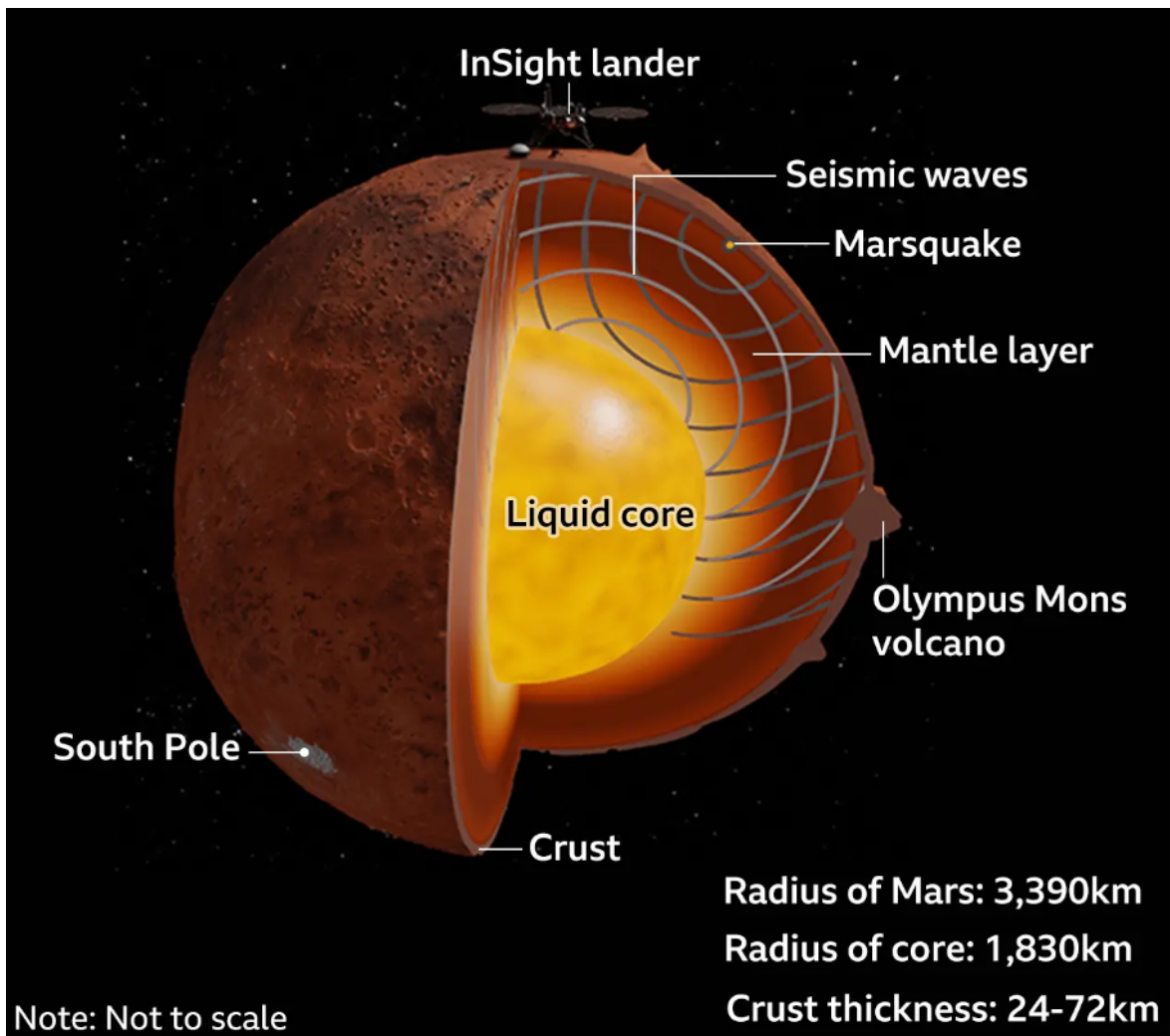
### What are the Recent Findings Related to Water on Mars?

- **Water on Mars' Volcano:** For a few hours each morning during Mars' winter seasons, frost forms in the ancient [calderas](#) of the [Tharsis volcanic region](#), which includes Olympus Mons. The patches of frost **evaporate** as sunlight shines down on the equator of Mars.
  - The [European Space Agency \(ESA\)'s](#) Trace Gas Orbiter and Mars Express Orbiter discovered frost, which forms due to unique [microclimates](#) created by air circulation around mountain summits and through calderas.

### Note:

- **Olympus Mons** is the **tallest volcano** on Mars with a height of **29.9 kilometres** (around 2.5 times the height of [Mount Everest](#)). It is located close to the **Martian equator**, in Mars's **western hemisphere**.
- A **caldera** is formed when a volcano erupts and collapses inward, resulting in a **depression** on the surface.
- The **Tharsis area** is the largest volcanic region on Mars which hosts 12 large volcanoes.
- **Water in Mars' Crust:**
  - The study, titled '**Liquid Water in the Martian Mid-Crust**' used the data from NASA's [Mars InSight Lander](#) which was equipped with a seismometer which recorded seismic waves of Mars for four years.
    - Mars InSight Lander was the **first mission** to study in depth the inner parts of Mars i.e., its **crust, mantle, and core**.
  - The data collected by **InSight Lander** can be best explained if, deep below the surface of Mars, there lies a layer of fractured [igneous rock](#), such as **granite**, whose cracks are filled with liquid water.
  - The water likely infiltrated from the surface **billions of years ago** when Mars had rivers, lakes, and potentially oceans, indicating a **warmer upper crust** at the time.
  - While the discovery does not confirm the existence of life on Mars, it suggests the possibility of a **habitable environment**, as water is essential for life.

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## Key Facts About Mars

- Mars is the **fourth planet** out from the Sun. It is also the second smallest planet in the Solar System after **Mercury**.
- It is called the "**Red Planet**" because iron **minerals oxidise** in the Martian atmosphere causing the surface to look red.
- Mars has two small moons, **Phobos and Deimos**.

Important Missions to Mars		
Mission Name (Year)	Space Agency/Country	Objective
Mariner 4 (1964)	NASA	First spacecraft to fly by Mars, and the first to provide images of the Red Planet.
Viking 1 and Viking 2 (both 1975)	NASA	First spacecraft to successfully land on Mars
Curiosity Rover (2011)	NASA	Studied Martian climate and geology; found evidence of past water on Mars.
Mangalyaan (Mars Orbiter Mission) (2013)	ISRO	First Indian mission to Mars; studied Martian surface features, morphology, atmosphere, and mineralogy.

InSight (2018)	NASA	Studied the interior of Mars, including its crust, mantle, and core, to understand the planet's geological activity
Tianwen 1 (2020)	CNSA (China)	To study Martian topography and geology and look for water-ice content.
Perseverance Rover (2020)	NASA	First mission to demonstrate gathering samples from Martian rocks and soil.
Hope Mars Mission (2020)	United Arab Emirates	Creating mankind's first integrated model of the Mars' atmosphere.

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### UPSC Civil Services Examination, Previous Year Question (PYQ)

*Prelims:*

**Q.Consider the following statements: (2016)**

The Mangalyaan launched by ISRO

1. is also called the Mars Orbiter Mission
2. made India the second country to have a spacecraft orbit the Mars after USA
3. made India the only country to be successful in making its spacecraft orbit the Mars in its very first attempt.

**Which of the statements given above is/are correct?**

- (a) 1 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

**Ans: (c)**

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**CEA Launched PROMPT, DRIPS and JALVIDYUT-DPR Portals**

[Source: PIB](#)

Recently, the Union Minister of Power has launched **3 online platforms - PROMPT, DRIPS and JALVIDYUT DPR** to enhance the **efficiency, transparency, and effectiveness of the power sector**. The [Central Electricity Authority \(CEA\)](#) assisted by [NTPC](#) has developed these online portals.

- **Portal for Online Monitoring of Projects-Thermal (PROMPT):**
  - It will enable **real-time online tracking and analysis of thermal power projects** under construction in India.
  - This platform is designed to swiftly **identify and address issues** that cause delays in the construction of thermal power plants
- **Disaster Resilient Infrastructure for Power Sector (DRIPS):**
  - This online portal has been developed to swiftly **identify power disruptions** across the country **caused by natural disasters** such as [cyclones](#), [earthquakes](#), and [floods](#).
  - It will **connect designated nodal officers** across the power sector to ensure **rapid restoration** in affected areas.
- **JAL VIDYUT DPR:**
  - The **JAL VIDYUT DPR (Monitoring Survey and Investigation Activities of Hydroelectric Projects and Pumped Storage Projects)** platform will offer real-time updates on the **status of hydroelectric pumped storage projects** under construction across the country.
  - This platform aims to **enhance management and coordination** in the construction of these plants.
- The **Central Electricity Authority (CEA)** was established in **1951** under the **Electricity (Supply) Act of 1948** and later replaced by the **Electricity Act of 2003**.
  - It operates under the Ministry of Power and prepares the **National Electricity Plan**. It also **approves new hydroelectric power plants**, and carries out various other functions.
  - It is composed of a Chairman and 6 full-time members by the Central Government.
  - It is headquartered at **New Delhi**.

## INDIA'S POWER MIX

Power source	Share in power generation		Capacity utilisation	
	FY20	FY24	FY20	FY24
Coal-fired	71%	75%	53%	68%
Solar	4%	7%	17%	16%
Wind	5%	5%	20%	21%
Hydro	12%	8%	39%	33%
Others	8%	5%	-	-

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## RBI Intensifies Scrutiny on P2P Lending Platforms

[Source: BS](#)

The [Reserve Bank of India \(RBI\)](#) has intensified its regulatory scrutiny on [Non-Banking Financial Company–Peer to Peer Lending Platform \(P2P\) lending platforms](#) following the discovery of multiple **regulatory violations**, including high levels of [non-performing assets \(NPAs\)](#).

- RBI identified violations, including unauthorised deposit acceptance and **unusually high balances in escrow accounts** raised concerns during RBI's review.
- Some P2P platforms **allowed lenders to recall funds prematurely**, replacing them with new lenders who were **unaware of the loans they were taking over**, mimicking **Ponzi schemes**.
  - A Ponzi scheme is an investment fraud that pays existing investors with funds collected from new investors.
    - The Ponzi scheme is named after **Charles Ponzi**, who in 1919 in Boston, United States ran a fraudulent investment scheme promising to double investment in 90 days.
- P2P lending platforms **enable individuals to lend directly to borrowers** via RBI-regulated NBFCs, facilitating quick loan disbursements for short-term needs.
- RBI's guidelines state that NBFC-P2P entities should only act as **intermediaries without assuming any credit risk**, a norm that was found to be violated.
  - P2P platforms cannot promote peer-to-peer lending as an investment product with features like assured minimum returns or liquidity options.

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## RBI Governor Secures

[Source: HT](#)

Prime Minister of India recently congratulated [Reserve Bank of India \(RBI\)](#) Governor Shaktikanta Das for receiving an **'A+' rating in the Global Finance Central Banker Report Cards 2024**, marking his second consecutive achievement of this high honour.

- Shaktikanta Das is **one of only three central bankers globally** to receive an "A+" rating, alongside **Denmark's Christian Kettel Thomsen and Switzerland's Thomas Jordan**.
- The rating, assessed by **Global Finance magazine**, evaluates **central bank governors** of almost 100 important nations based on their performance in key areas such as [inflation control](#), [economic growth](#), [currency stability](#), and [interest rate management](#), with grades ranging from "A+" to "F."
- Global Finance's Central Banker Report Cards, initiated in 1994, serve as a key indicator of a **central bank's effectiveness in managing economic challenges**.
- The recognition underscores the RBI's success in balancing inflation control with economic growth, especially in a volatile global economic environment.

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# Californium

[Source: IE](#)

Recently, police in **Bihar's Gopalganj** seized **50 grams** of the **highly radioactive metal Californium**, estimated to be worth **Rs 850 crore**.

- **Californium** is a **silvery-white metal** that tarnishes gradually when exposed to air at room temperature.
- It is so **soft and malleable** that it can be sliced with a razor blade and its **spectral lines** have been detected in [supernova](#).
- **Chemical symbol** of Californium is **Cf** and the **atomic number** is **98**.
- Created in 1950 at Berkeley, it is a **powerful neutron emitter**.
- It is utilized in **portable metal detectors** to identify gold and silver ores, **locate water and oil layers in wells**, and **detect metal fatigue and stress** in airplanes.
- Neutrons from **Californium (Cf-252)** are utilised to serve the **treatment of brain and cervical cancers** when radiation therapy proves futile.
- Highly radioactive and extremely costly, Californium is priced at approximately **Rs 17 crore per gram** in the international market (one of the most expensive substances in the world).

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