



# Marsquake

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## Why in News?

- Recently, scientists have revealed the causes of the **largest recorded marsquake**. This finding holds scientific importance and carries **implications for forthcoming Mars exploration** by providing fresh insights into the **geology and seismic events of the Red Planet**.

## What are the Recent Findings Related to Marsquake?

- A **Marsquake, or Martian earthquake**, is a seismic event **occurring on Mars**. In 2022, a significant marsquake with a magnitude of **4.7** was recorded.
  - Initial suspicion was a **meteoroid impact** due to **similar seismic signals from past meteoroid-caused quakes**.
- Space agencies like **Indian Space Research Organisation (ISRO), European Space Agency, China National Space Administration, and the UAE Space Agency** collaborated on a groundbreaking project to search for a crater on Mars.
  - The **search found no impact crater**, leading to the conclusion that the **marsquake resulted from internal tectonic forces**, indicating increased seismic activity.
  - The cause was attributed to the **accumulated stresses within Mars' crust**, evolving over billions of years due to differential cooling and shrinking rates in different regions.
- This discovery has implications for future Mars exploration, aiding in the identification of **safe landing sites** and areas to avoid for astronauts.

## What are the Major Facts Related to Mars?

- Mars, the **fourth planet from the Sun**, takes its name from the Roman God of war. It is often referred to as the "**Red Planet**" due to its **distinctive reddish appearance**. This reddish coloration is primarily attributed to the **presence of a significant amount of iron oxide, commonly known as rust**, in its surface rocks and soil.
- Mars, being the second smallest planet in our solar system after Mercury, boasts a **diameter of approximately 6,791 kilometers**, making it about **half the size of Earth**.
  - It possesses **two moons**, known as **Phobos and Deimos**.
- The planet **experiences extreme cold**, with **equatorial temperatures reaching 20°C** and **polar regions plunging as low as -140°C** due to its greater distance from the sun.
- Mars is home to **Olympus Mons**, the **tallest volcano in our solar system**, roughly three times the height of Mount Everest.
- A Martian day is **24 hours and 37 minutes**, slightly longer than an Earth day, but a **Martian year lasts nearly twice as long**, spanning **687 Earth days** due to its extended orbit around the Sun.
- Mars' axis of rotation is **tilted 25 degrees** with respect to the plane of its orbit around the Sun. This is similar to Earth, **which has an axial tilt of 23.4 degrees**.
  - **Mars has distinct seasons**, but they last longer than seasons here on Earth.

## What Missions Have Been Sent to Mars?

- [India's Mars Orbiter Mission \(MOM\) or Mangalyaan \(2013\)](#)
- [ExoMars rover \(2021\) \(European Space Agency\)](#)
- [Tianwen-1: China's Mars Mission \(2021\)](#)
- [UAE's Hope Mars Mission \(UAE's first-ever interplanetary mission\) \(2021\)](#)
- [Mars 2 and Mars 3 \(1971\) \(Soviet Union\)](#)

## UPSC Civil Services Examination Previous Year Questions (PYQs)

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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