

Evidence of mantle plume beneath the surface of the red planet

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In news— A new study shows evidence of what could be an active mantle plume beneath the surface of the red planet.

Key findings-

- Scientists have often considered Mars to be a dead planet due to the lack of the geological activity that rocks Earth and Venus.
- The study presents multiple lines of evidence that reveal the presence of a giant active mantle plume on present-day Mars.
- According to the evidence found by the scientists, the **mantle plume is situated underneath a low-lying area called Elysium Planitia that lies north to the equator.**
- Though an otherwise indistinctive area, **scientists found unexpected evidence of geological activities in Elysium in the recent past.**
- **Mantle plumes are large blobs of molten rock that rise towards the surface from the interiors of a planet.**
- They push through the intermediate or mantle layers and accumulate at the base of the crust.
- **This geological phenomenon can be witnessed on Earth in Hawaii** where the warm materials from the plume ooze out of fissures to create great volcanic plains.
- **The researchers have noted that the predominant view is that Mars is essentially dead today as most of its geological activity, which created some of the tallest volcanoes in the solar system, happened three to four billion years ago.**
- Though there is little activity in the form of quakes

(marsquakes) or volcanic eruptions now, these have mostly been attributed to the passive processes on a cooling planet.

- **As compared to the otherwise silent planet, Elysium Planitia has experienced large eruptions in the last 200 million years. It holds evidence of the youngest volcanic eruption on Mars.**
- It created a small explosion of volcanic ash around 53,000 years ago.
- Studying the data from NASA's InSight lander, scientists found that the **volcanic eruptions at Elysium Planitia originate from a set of fissures called Cerberus Fossae** that stretch for more than 1278 kilometres (800 miles) across the planet's surface.
- They also found that most marsquakes emanate from this region.
- **According to the data from Elysium Planitia, the force of the mantle plume is thought to have raised the surface by more than a mile, making it one of the highest points in the lowlands of Mars' northern hemisphere.**
- They also applied a tectonic model to the region and discovered that the creation of the Cerberus Fossae could only be explained by the existence of a massive mantle plume that was 4,023 km (2,500 miles) wide.
- The floor of impact craters being tilted in the direction of the plume also supported the hypothesis that something pushed the craters to the surface well after their formation.