

Transient Lunar Phenomena (TLPs)

Prelims: Current events of national and international importance | Science

Why in news?

For centuries, sky-gazers have reported seeing peculiar events on the moon's surface called transient lunar phenomena (TLPs).

- TLPs These are *short-lived, unusual visual events* on the moon's surface, such as flashes, glows, or changes in color.
- **Visibility** They last from a *few seconds to several hours* before fading, and can grow from less than a few to a hundred kilometers in size.
- Appearance The most common sightings include bright, star-like points
 of light, *reddish or coloured glows*, and some sort of mists obscuring
 the view.
- Active areas- Includes the Aristarchus & Plato craters.
- **Possible causes/theories for origin -** Reported for over 1,000 years, their precise causes are **not correctly known**.
 - Meteoroid impacts -Frequent on the moon because it lacks a protective atmosphere, these high-velocity collisions can generate a flash of light.
 - Release of gases The outgassing of gasses like radon and argon from beneath the moon's surface can disturb lunar dust, making it glow or reflect sunlight.
 - **Electrostatic phenomena** Lunar dust can become electrically charged by solar radiation, this charged dust may levitate or move, producing light scattering or glows.
 - Optical Effects / Human Perception Earth's atmospheric turbulence or telescope aberrations can sometimes mimic brief flashes or color changes.
 - Solar Illumination Geometry- Low Sun angles can make certain features appear to brighten or dim abruptly as shadows shift.
- Atmospheric effects on earth Sometimes, disturbances or distortions in Earth's atmosphere may create the illusion of TLPs and distort our view

of the moon.

- Scientific implication The scientists suggest that the moon may be more *geologically dynamic* than previously assumed.
- Modern Investigations
 - NASA's Lunar Reconnaissance Orbiter (LRO) monitors for surface changes to identify possible recent impact or gas release activity.
 - Automated telescopic networks on Earth (and even amateur astronomers with high-speed cameras) now confirm that many "flashes" correspond to meteoroid impacts.
- **Significance** Provides useful insight into the Moon's geology, surface activity, and internal processes, assisting scientists in gaining a better understanding of moon.

References

- 1. The Hindu | Transient Lunar Phenomena (TLPs)
- 2. Times of India | Transient Lunar Phenomena (TLPs)

