

Mercury's Contraction

Prelims: Current events of national and international importance | Geography

Why in News?

A new study published in Geophysical Research Letters suggests that Mercury may have contracted by up to 23 km in diameter, around 30% more than previous estimates.

- Researchers conducted a comparison of the following elements:
 - Maps depicting **contraction-related faults and associated geological features**
 - Maps illustrating variations in **surface roughness**



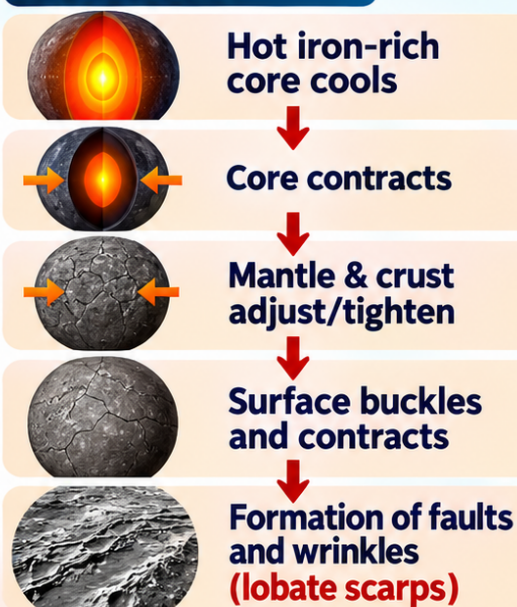
MERCURY SHRINKING

Mercury formed about **4.5 billion years ago** and has been gradually cooling.



A smaller Mercury over time

PROCESS



Key concept:

Mercury's contraction is primarily linked to the cooling and contraction of its large iron core.

NEW ESTIMATE

Parameter	Key Fact
↔ Possible total contraction	Up to 23 km in diameter
📊 Earlier estimate	~30% lower
🌐 Mercury's diameter	~4,900 km
📅 Age	~4.5 billion years
⚙️ Main cause	Cooling & contraction of interior
🔍 Evidence	Faults, geological features and surface roughness

LOBATE SCARPS



These ridges and scarps are evidence of Mercury's shrinking.

- The analysis revealed that certain regions characterized by **higher surface roughness** exhibited fewer observable contraction features.
- The findings could help scientists understand Mercury's long-term thermal and geological evolution.
- Fresh observations from **BepiColombo** may provide further evidence.

BepiColombo Mission

- **BepiColombo** is a collaborative mission between the **European Space Agency (ESA)** and the **Japan Aerospace Exploration Agency (JAXA)** aimed at exploring Mercury.
- The mission includes two spacecraft.
 - **Mercury Planetary Orbiter (MPO)**, developed by **ESA**.
 - **Mercury Magnetospheric Orbiter (Mio)**, developed by **JAXA**.
- The spacecraft will study Mercury's surface, interior, magnetosphere, magnetic field, and geological evolution.
- BepiColombo's **laser instrument** is expected to provide data to help determine the

extent of Mercury's contraction as its interior cools.

Earlier Mercury Missions		
Mariner 10	NASA	First spacecraft to visit Mercury; 1970s
MESSENGER	NASA	Studied Mercury extensively; 2010s
BepiColombo	ESA + JAXA	Detailed investigation of Mercury; ongoing

Mercury

- Mercury is the **smallest planet** in the Solar System.
- It is the **closest planet to the Sun**.
- Mercury possesses a disproportionately **large iron core** relative to its overall size.
- The planet has been undergoing **gradual contraction** as its interior cools.
- Mercury's surface is heavily affected by **impact cratering**.
- This contraction produces geological features such as faults and scarps.
- **Mercury does not have any natural satellites.**
- Despite being a small rocky planet, Mercury possesses a global magnetic field.

Reference

[India Today | Mercury's Contraction](#)