

Unusual Ozone Layer Above North Bay of Bengal

Prelims: Current events of national and international importance | Geography

Why in News?

Scientists detected an unusually thick ozone layer over the North Bay of Bengal during a nationwide observation campaign.

- The finding shows how ozone-rich air can be transported downward and redistributed across the Indian subtropical region.
- The unusual ozone enhancement was found at an altitude of around 21-23 kilometres, in the lower stratosphere.

Major Findings

- The concentration was significantly higher than normally observed over eastern India, with the unusual layer persisting for more than a day.
- The enhanced ozone layer was detected during both day and night, suggesting that sunlight-driven chemical reactions were unlikely to be the main reason for its formation.
- Researchers instead examined atmospheric convection, wind shear, horizontal transport and vertical air movements.
- Their analysis showed persistent downward air motion in the lower stratosphere above the region.
- The scientists concluded that the unusual ozone enhancement was primarily caused by the transport of ozone-rich air, followed by downward movement and compression of the air mass.
- The ozone layer normally reaches its highest concentration around 25-30 kilometres above Earth and plays a crucial role in shielding life from harmful ultraviolet radiation.
- The findings provide new quantitative evidence of how atmospheric circulation can redistribute stratospheric ozone over the Indian subtropical region.

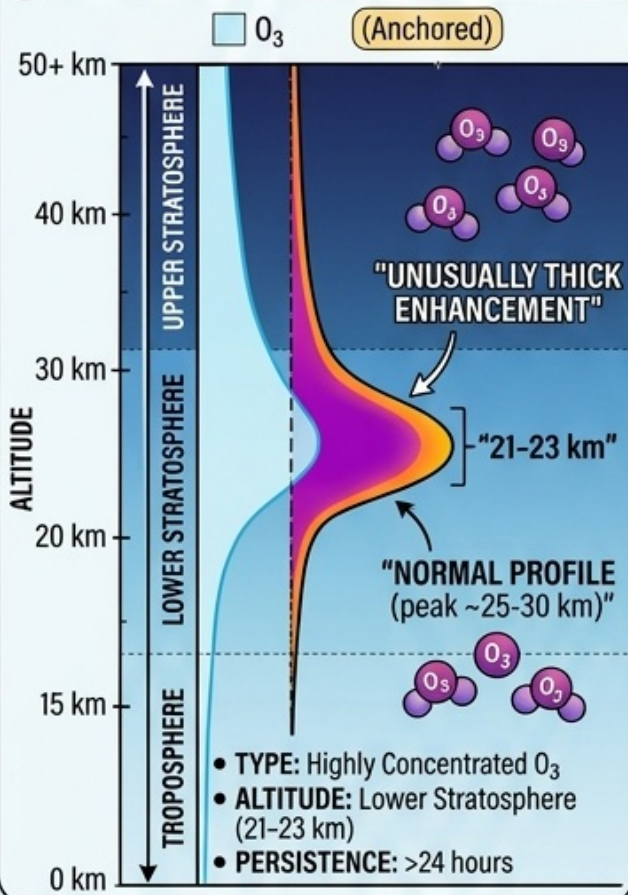
Methodology

- The discovery was made as part of the Phase-I NetRAD-ASMA campaign, a coordinated effort involving atmospheric research institutions across India.
- Scientists used an extensive network of instruments, including atmospheric radars, weather balloons, satellites and advanced atmospheric models.
- A key role was played by the Aryabhata Research Institute of Observational Sciences (ARIES).
- Scientists further used observations from the Aura MLS and INSAT-3DR satellites, allowing them to track the unusual ozone structure from space and compare it with ground-based measurements.
- During the campaign, ARIES' indigenously developed 206.5 MHz Stratosphere-Troposphere (ST) Radar at Nainital collected observations alongside similar radars at Haringhata, Gadanki and Kochi.

- Weather balloons equipped with instruments were also launched to measure atmospheric conditions and ozone concentrations.

UNUSUAL OZONE ENHANCEMENT DETECTED

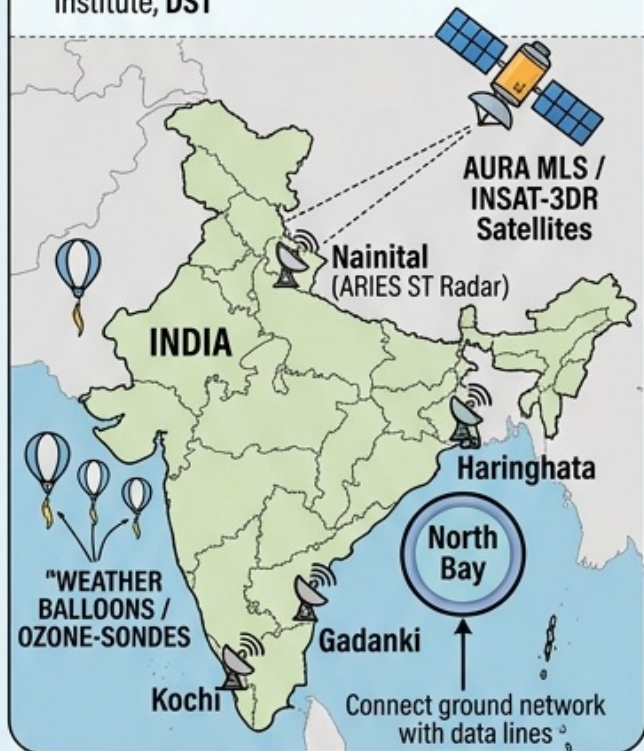
1 DISCOVERY: ANOMALOUS OZONE LAYER



2 LOCATION & OBSERVATION CAMPAIGN

NORTH BAY OF BENGAL: REGIONAL FINDING.

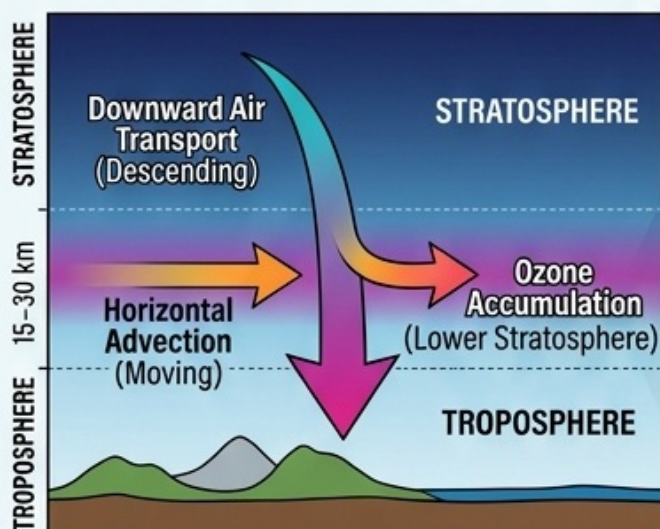
- "Nationwide Phase-I NetRAD-ASMA programme"
- Led by: ARIES (Nainital), an autonomous institute, DST"



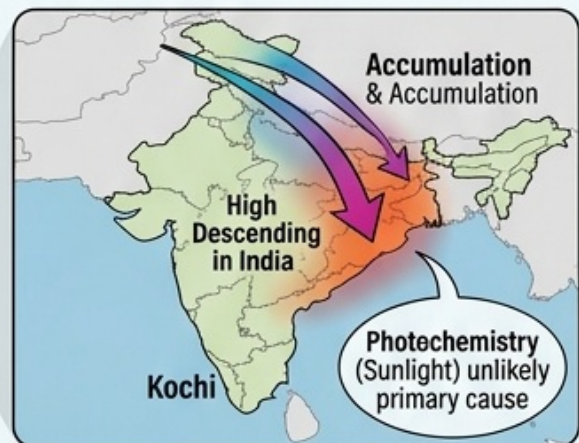
3 MECHANISM: DOWNWARD TRANSPORT & REDISTRIBUTION

HOW IT FORMED: AIR CURRENTS IN MOTION.

- VERTICAL MOTION: Persistent downward air transport



- HORIZONTAL TRANSPORT (ADVECTION): Ozone-rich air moved from elsewhere
- COMPRESSION & ACCUMULATION: Layer forms and persists



- The ozone layer is a region of Earth's stratosphere, roughly 15-35 km above the surface, containing relatively high concentrations of ozone (O₃).
- It acts as Earth's natural shield, absorbing most of the Sun's harmful ultraviolet (UV) radiation, protecting humans, animals, plants and marine ecosystems from radiation damage.

Reference

[DST | Scientists discover unusual ozone layer above North Bay of Bengal](#)

