



Mains Practice Question

Q. What do you understand by the phenomenon of the inversion of temperature? Examine how does it impact the atmosphere and the weather.(150 words)

28 Sep, 2020 GS Paper 1 Geography

Approach

- In the introduction, define the term temperature inversion.
- Explain the favourable conditions that lead to temperature inversion.
- Discuss the impact of temperature inversion on the atmosphere and the weather.
- Conclude by summarising your answer.

Introduction

- Temperature inversion is a reversal of the normal behavior of temperature in the troposphere. Under this meteorological phenomenon a layer of warm air lies over the cold air layer.
- It is caused in stac atmospheric conditions while some times, it occurs due to horizontal or vertical movement of air.
- Temperature inversion is usually of short duration but quite common nonetheless

Body

Favourable conditions for temperature inversion

- **Long winter nights:** Loss of heat by terrestrial radiation from the ground surface during night may exceed the amount of incoming solar radiation.
- **Cloudless and clear sky:** Loss of heat through terrestrial radiation proceeds more rapidly without any obstruction.
- **Dry air near the ground surface:** It limits the absorption of the radiated heat from the Earth's surface.
- **Slow movement of air:** It results in no transfer or mixing of heat in the lower layers of the atmosphere.
- **Snow covered ground surface:** It results in maximum loss of heat through reflection of incoming solar radiation.

Effects on atmosphere and weather

- Temperature inversion determines the precipitation, forms of clouds, and also causes frost due to condensation of warm air due to its cooling.
- **Dust particles hanging in the air:** Due to inversion of temperature, air pollutants such as dust particles and smoke do not disperse on the surface.
- **Stops the movement of air:** It causes the stability of the atmosphere that stops the downward and upward movement of air.
- **Less rainfall:** Convection clouds can not move high upwards so there is less rainfall and no showers. So, it causes a problem for agricultural productivity.
- **Lower visibility:** Fog is formed due to the situation of warm air above and cold air below, and

hence visibility is reduced which causes disturbance in transportation.

- **Thunderstorms and tornadoes:** Intense thunderstorms and tornadoes are also associated with inversion of temperature because of the intense energy that is released after an inversion blocks an area's normal convection patterns.
- Diurnal variations in temperature tend to be very small.

Conclusion

To conclude, temperature inversion might be a desirable phenomena when it comes to cooler air temperatures, and comfort after an extremely hot and oppressive day, the after-effects on air quality are certainly not desirable.

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