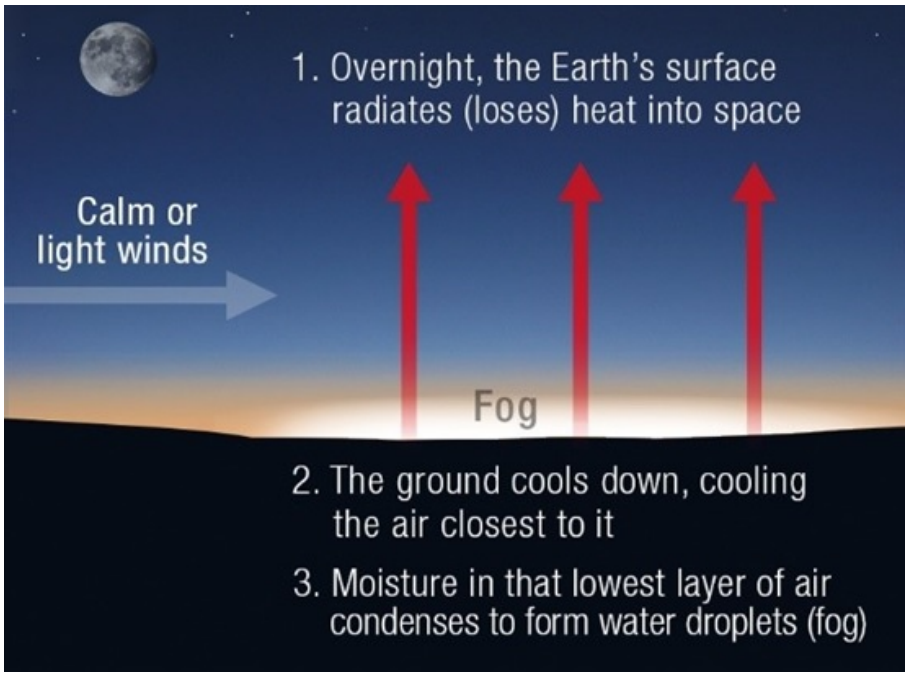
Dense Fog in North India

Why in News?

Dense fog covered the better part of north India during the last days of December and the 1st couple of days of 2024.

What is fog?

- **A fog** – It is a ***collection of small droplets of water*** produced when evaporated water has cooled down and condensed.
- It is nothing but a thick cloud, but very close to the earth's surface.



- **Conditions for a thick fog**
  - Lower temperatures
  - Abundant moisture near the surface
  - Higher humidity
  - The process by which it cools
- Fog materialises whenever there is a *temperature disparity between the ground and the air*.

	Fog	Mist
Meaning	A thick low lying cloud at surface level and composed of tiny dew drops in the air.	A cloud formed out of small droplets held over in atmosphere at ground level due to temperature inversion of humidity variation.
Density	Very high	Relatively low

Visibility	Lower, upto 1 km	Relatively higher, more than 1 km
Longevity	Longer period	Shorter time

What are the different types of fog?

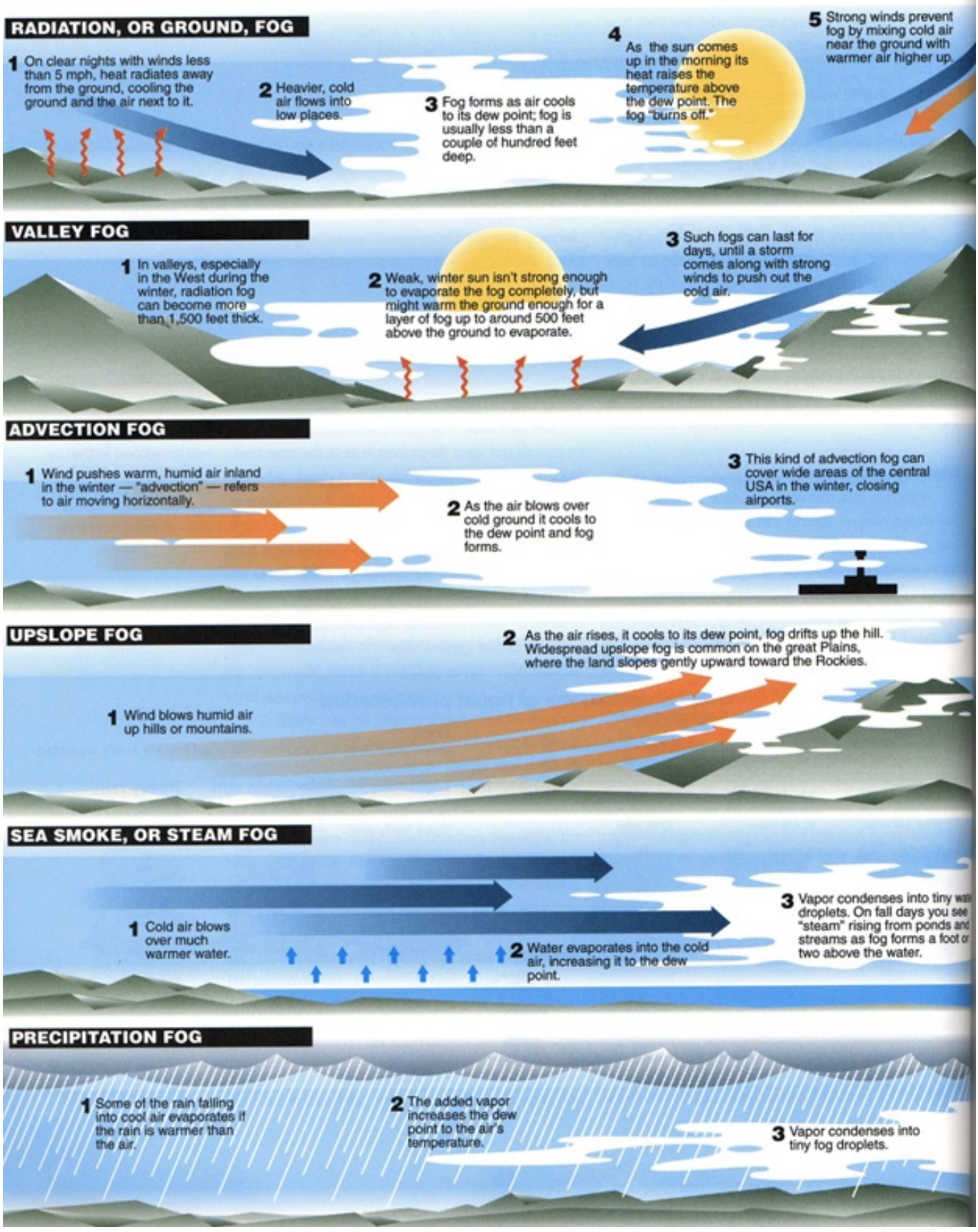
- **Radiation Fog** – It forms *when all solar energy exits the earth* and allows the temperature to meet up with the dew point and the best condition is *when it had rained the previous night*.
- **Precipitation Fog** – It forms *when rain is falling through cold air* which is common with a warm fronts but it can occur with cold fronts as well only if it's not moving too fast.
- Cold air, dry at the surface while rain is falling through it evaporates and causes the dew point to rise and this saturation forms fog.
- **Advection Fog** – It forms f*rom surface contact of horizontal winds* and can occur with windy conditions.
- When cool moisture on the ground comes in contact with the warm, moist winds, it cause the air blowing in to become cool and then dew point rises and creates high humidity and forms fog.
- **Steam Fog** – It forms during the fall season on any lake *due to the difference in rate of cooling and interactions* between the upper cold air and relatively warmer lake.
- **Upslope Fog** – It *forms adiabatically*, as moist winds blow toward a mountain, it up glides and this causes the air to rise and cool.
- The cooling of the air from rising causes to meet up with the dew point temperature and so fog forms *on top of the mountains*.
- **Valley Fog** – It forms in the valley *when the soil is moist from previous rainfall*.
- As the skies clear solar energy exits earth and allow the temperature to cool near or at the dew point.

*Valley fog is so dense that sometimes it is called as **tule fog.***

- **Freezing Fog** – It occurs when the *temperature falls at 32°F (0°C) or below,* it produces drizzle and these tiny droplets freeze when they come into contact with an object.
- **Ice Fog** – It is ***only*** *seen in the polar and artic* regions.
- Temperatures at 14 F (-10°C) is too cold for the air to contain super-cooled water droplets so it forms small tiny ice crystals.

How fog forms

Fog is a cloud on the ground. The most common kinds of fog form when humid air is cooled to its dew point, causing water vapor to begin condensing into tiny drops. Sometimes fog forms when extra water evaporates into the air, increasing the dew point enough to match the temperature.



What is the situation of fogging in northern India?

- During Indian winters, the fog is created when the temperature drops at night and in the early morning, condenses on aerosols present in the atmosphere.
- **Vulnerable regions** – The **entire Indo-Gangetic plains**
- **Favourable conditions** – It is due to presence of
    - Low temperatures
    - Low wind speed
    - Moisture availability
    - Plenty of aerosols
- **Moisture incursion** – It can happen once a ***Western Disturbance,*** a precipational pattern that brings rain to north India during winter months moves across northern parts.
- Sometimes, it can happen from the Arabian Sea also.
- **Effect of fogging** – Fog disrupting the lives of people in North India with the condition of poor visibility.
- It impacts air travel and land transportation
- It also increases the pollution.
    - Recently, Delhi experienced an increase in pollution levels, with an AQI rating of "severe."

References

1. The Hindu| Dense fog in North India
2. Weather.Gov| Types of Fog