

2. How Aerosol Formation Helps Brighten Clouds, Balance Climate

Prelims: Environment

Mains: GS-III Conservation of Environment

Why in News?

- ▶▶ Small aerosol particles help in “brightening” of clouds, enabling them to alter Earth’s radiative balance and ultimately its climate, according to a study.

Aerosol:

- ▶▶ An aerosol is a suspension of fine solid particles or liquid droplets, in air or another gas.
- ▶▶ Aerosols can be natural or anthropogenic. Examples of natural aerosols are fog, dust, forest exudates and geyser steam.
- ▶▶ Examples of anthropogenic aerosols are haze, particulate air pollutants and smoke.
- ▶▶ Formation in atmosphere:
 - ▶▶ When deep, convective clouds in the tropics carry gases high into the atmosphere, they form small aerosol particles in a process called gas-to-particle conversion.
 - ▶▶ As they condense, they grow big enough to brighten lower-level cloud in the lower troposphere.
 - ▶▶ This gas-to-particle conversion brightens clouds in the tropics over both the Pacific and Atlantic Oceans.

Significance:

- ▶▶ These brighter clouds reflect more energy from the sun back to space.
- ▶▶ Further, this formation of new particle covers about 40 per cent of the Earth’s surface, which means some of the current climate models underestimate the cooling impact of some clouds.
- ▶▶ Understanding how these particles form and contribute to cloud properties in the tropics will help us better represent clouds in climate models and improve those models.
- ▶▶ The study showed that in remote places with cleaner air, the effect of aerosol particle formation on clouds was found to be much larger.