Geography Class 24

A BRIEF REVIEW OF THE PREVIOUS CLASS (09:15 AM)

- Humidity

CONDENSATION (09:23 AM)

- The process of conversion of water vapour into liquid water is called condensation.
- It is the reversal of evaporation.
- The temperature at which condensation takes place is called the dew point.
- If the condensation happens below zero degrees Celsius, it is called a Frost point.
- **Forms of condensation**
- **Dew**
- It is the moisture deposited in the form of liquid water droplets on the land surface.
- **Conditions favourable for the formation of dew-**
- Long winter nights.
- Calm air.
- Clear sky.
- **Frost**
- It is a thin layer of ice on a solid surface.
- It is formed when the temperature of the surface is below freezing point and the water droplets fall on such a cold surface.
- **Rime**
- It is the deposition of needle-like white opaque icy crystals on the surfaces with a temp below 0 degrees C.
- **Mist**
- It consists of small water droplets suspended in the air.
- The humidity is above 75% and visibility is between 1 to 2 km.
- **Haze**
- It is caused by smoke and dust particles with humidity less than 75%.
- The visibility is up to 2 km.

- **Fog**
- It is produced near the surface when the temp of air drops suddenly.
- The visibility is less than 1 km.
- The conditions required for the formation of fog are the same as the conditions of temperature inversion.
- **Types of fog-**
- Radiation fog due to radiation inversion
- Valley fog due to air drainage type of inversion
- Frontal fog due to frontal inversion
- Advection fog due to advection inversion

STABILITY AND INSTABILITY (10:11 AM)

- **Stability**
- It is a condition where air resists vertical movement and remains in its original position.
- Stability is when the air is cooled at its base (near polar regions) or when air subsides along high-pressure belts (subtropics).
- Precipitation is unlikely in this condition.
- **Instability**
- It is a condition where air does not resist vertical movement and leads to cloud formation and precipitation.
- It occurs along the regions of high temperature and low pressure.
- **Types of clouds**
- **Cirrus-** Thin, feather-like, white in colour, fibrous in nature, high altitude and indicates fair weather.
- **Cirrocumulus**- Patches of globular masses at high altitudes. Also called **Mackerel** Sky.
- **Cirrostratus-** Layered and high altitude with a milky appearance.
- **Altocumulus-** Globular masses of clouds with a cotton wool-like appearance at middle altitude.
- **Altostratus** - Layer of clouds in sheets along middle altitude.
- **Stratus** - Low uniform layer of cloud near the ground. It produces light drizzle.
- **Cumulus cloud-** Thick cloud of cotton wool appearance with a dome shape or cauliflower top.
- **Stratocumulus-** Cotton wool-like appearance with clouds regularly arranged at low altitudes.
- **Cumulonimbus -** Overgrown cumulus cloud, very dark, heavy and dense with an anvil top. It causes heavy showers with thunder and lightning.

PRECIPITATION (11:12 AM)

- **Conditions required for precipitation-**
- i) Mechanism of upliftment causing the moist air to rise upwards.
- ii) Saturation and cooling of air below the dew point.
- iii) Presence of hygroscopic nuclei such as dust particles around which water droplets accumulate and form clouds.
- **Types of Precipitation**
- **i) Convectional rainfall**
- It occurs in the regions of intense heating near the ground surface causing air to expand and rise.
- Often it is accompanied by thunderstorms and lightning due to the formation of cumulonimbus clouds.
- They are experienced throughout the year in equatorial regions and in summers in Tropical regions.
- **ii) Orographic rainfall**
- When warm and moist air is forced to rise along the mountain slopes, it cools down causing precipitation along the windward side.
- However, along the leeward side, the descending air will not cause precipitation resulting in the formation of a rain shadow region.
- E.g. Western Ghats, Himalayas and Ladakh
- **iii) Frontal Rainfall**
- It occurs along frontal zones due to the convergence of different types of air masses.
- The warm airmass rises above the cold airmass causing precipitation.

- **Distribution**
- Along the equatorial zone, the highest rainfall (above 200 cm per annum) is experienced due to convectional rainfall.
- Along the subtropical regions, the lowest rainfall of less than 25 cm per annum is due to the sub-tropical high-pressure belt, offshore trade winds and cold ocean currents.
- Along mid-latitude regions and along the tropical regions of monsoon, the precipitation is above average i.e. between 100 to 120 cm per annum.
- Because of moist maritime airmass oceans receive more rainfall than continents.
- Coastal regions receive higher precipitation than the interior.

THUNDERSTORMS (11:53 AM)

- It is due to intense heating and strong vertical convection cumulonimbus clouds are formed.
- The raindrops in this cloud move up and down due to strong air currents creating electric charges that accumulate on opposite sides of clouds.
- When both types of charges are attracted, a flash of light is produced called lightning.
- Lightning causes a vacuum in the cloud due to the rapid expansion of air.
- It is filled by surrounding cold air producing a clap of thunder.

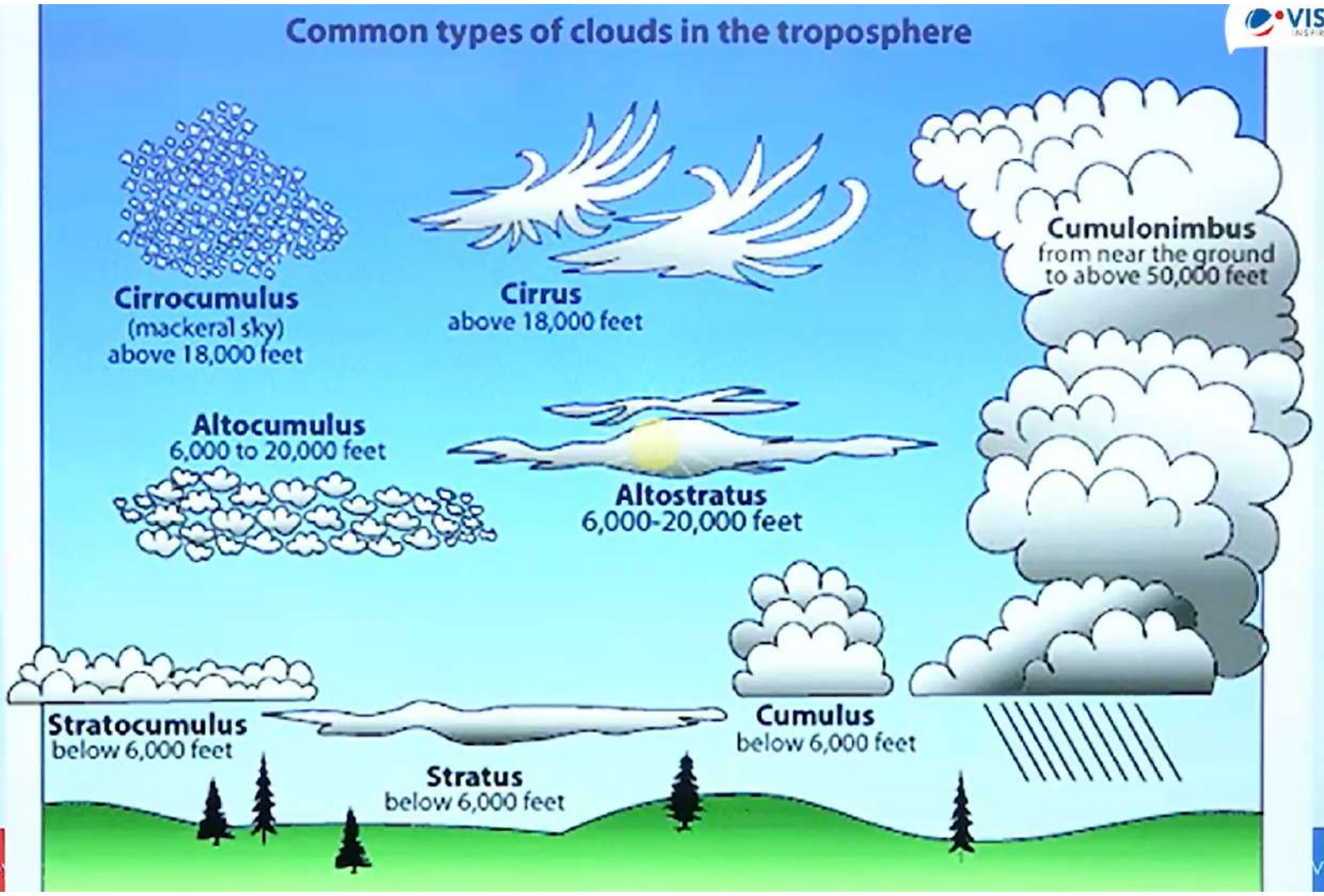
TOPIC OF THE NEXT CLASS- CLOUDBURST, TORNADO, JET STREAM, AIRMASSES

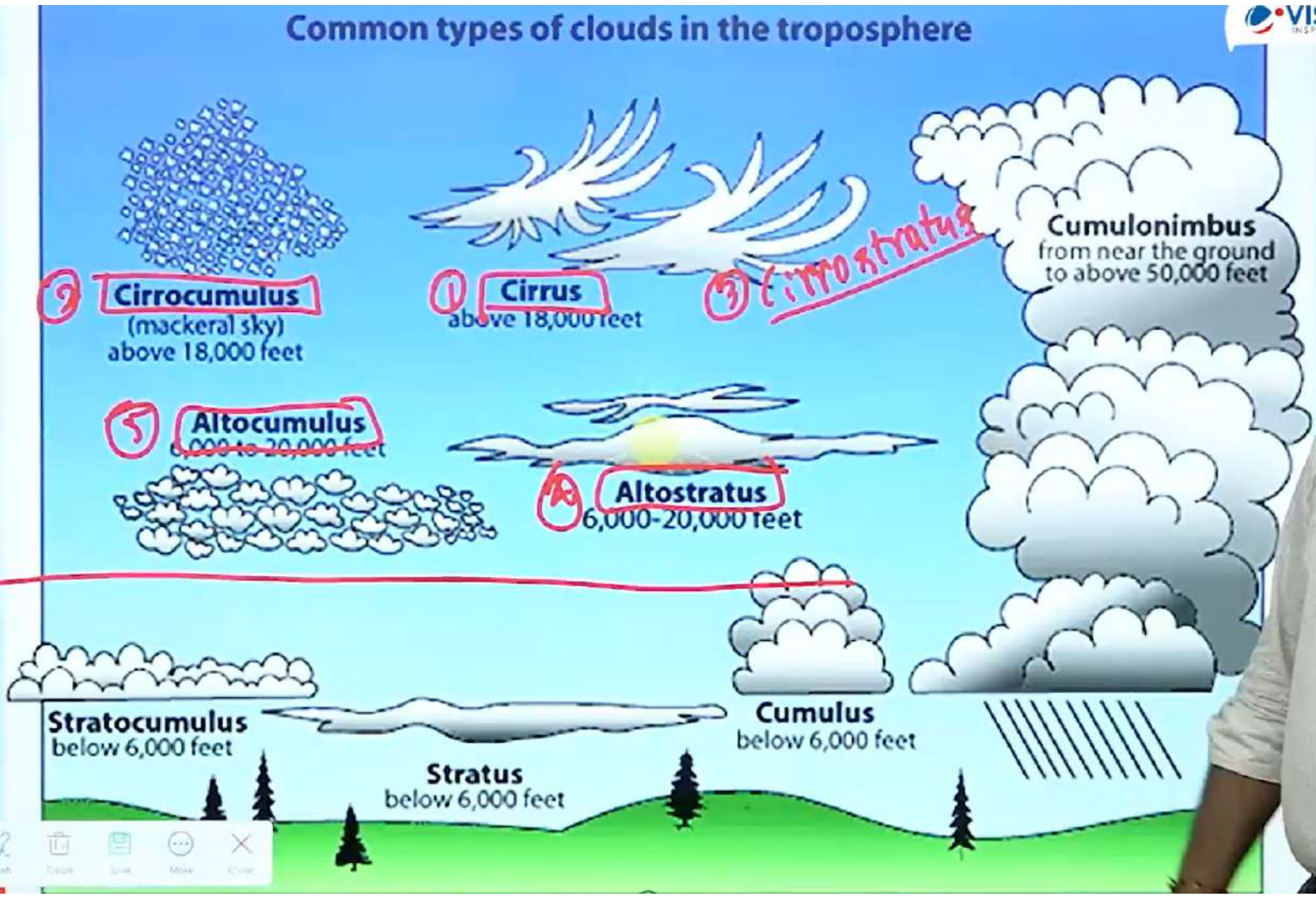
Frost

Dew

Rime


Mist
① Mist
② Fog
③ Haze
Rajesh Govindaraj


Common types of clouds in the troposphere
Cirrocumulus
(mackeral sky)
above 18,000 feet
Cirrus
above 18,000 feet
Cumulonimbus
from near the ground
to above 50,000 feet
Altocumulus
6,000 to 20,000 feet
Altostratus
6,000-20,000 feet
Stratocumulus
below 6,000 feet
Cumulus
below 6,000 feet
Stratus
below 6,000 feet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Cumulus
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Stratus
below 6,000 feet

Cirrus clouds - Met Office

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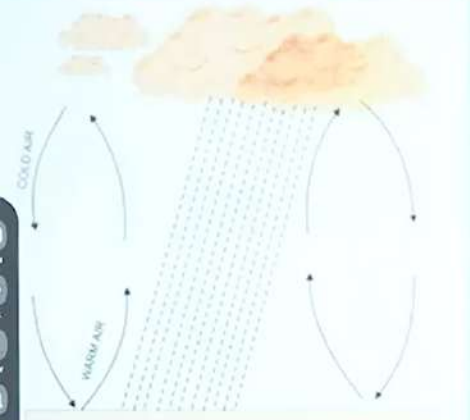

Fig. 17.7. Convectional rainfall

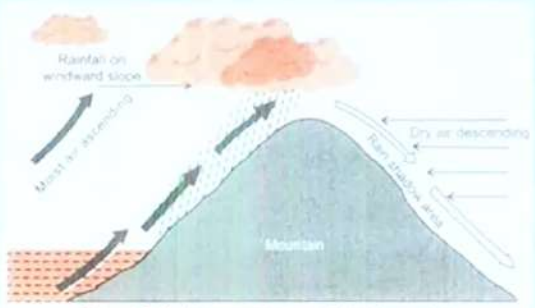

Fig. 17.8. Orographic or Relief rainfall

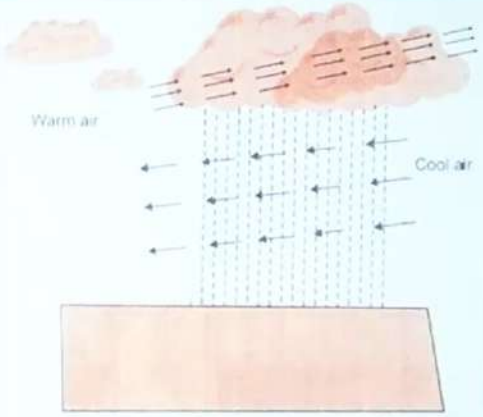

Fig. 17.9. Cyclonic or frontal rainfall


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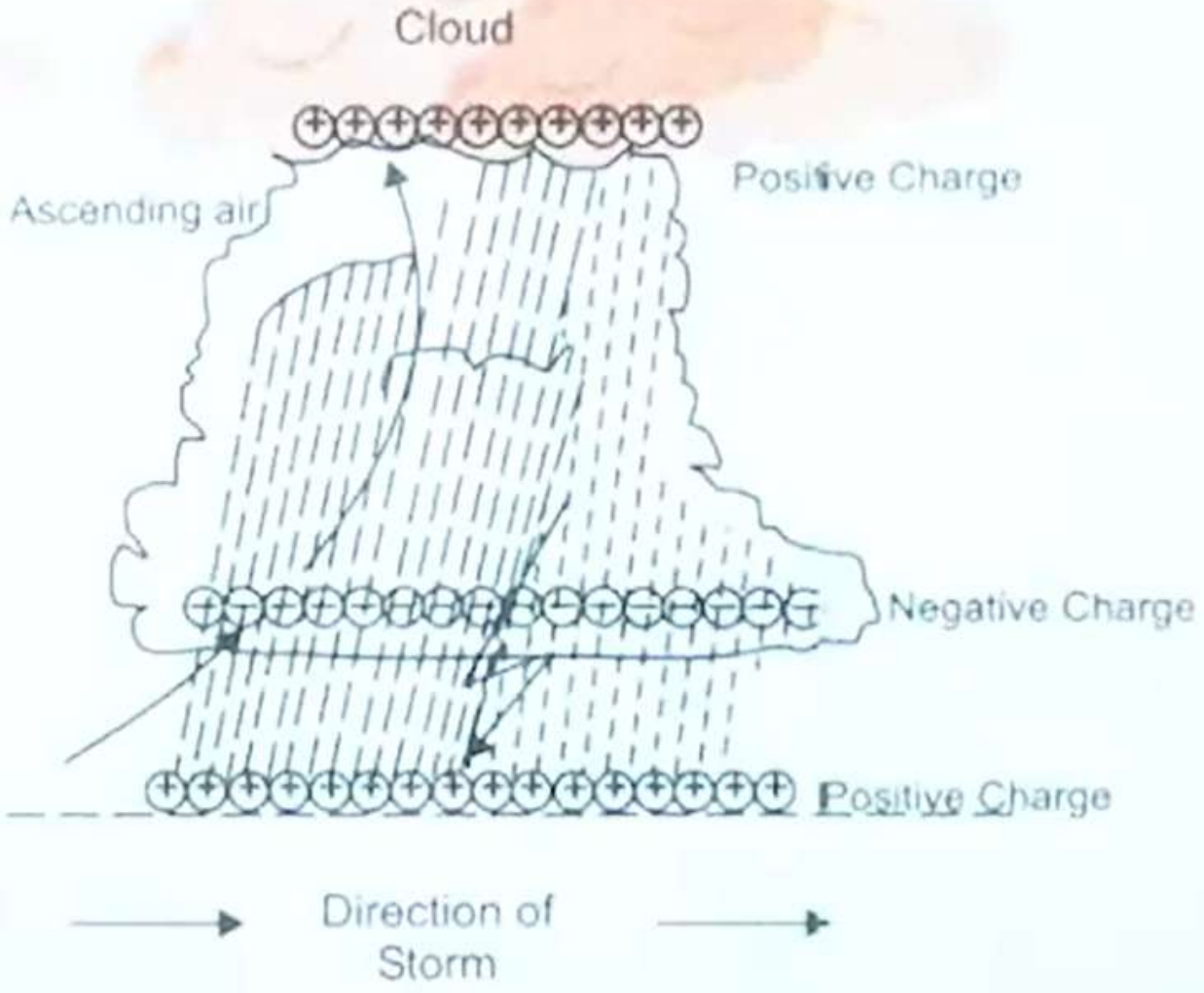

Fig. 17.10. Thunderstorm