

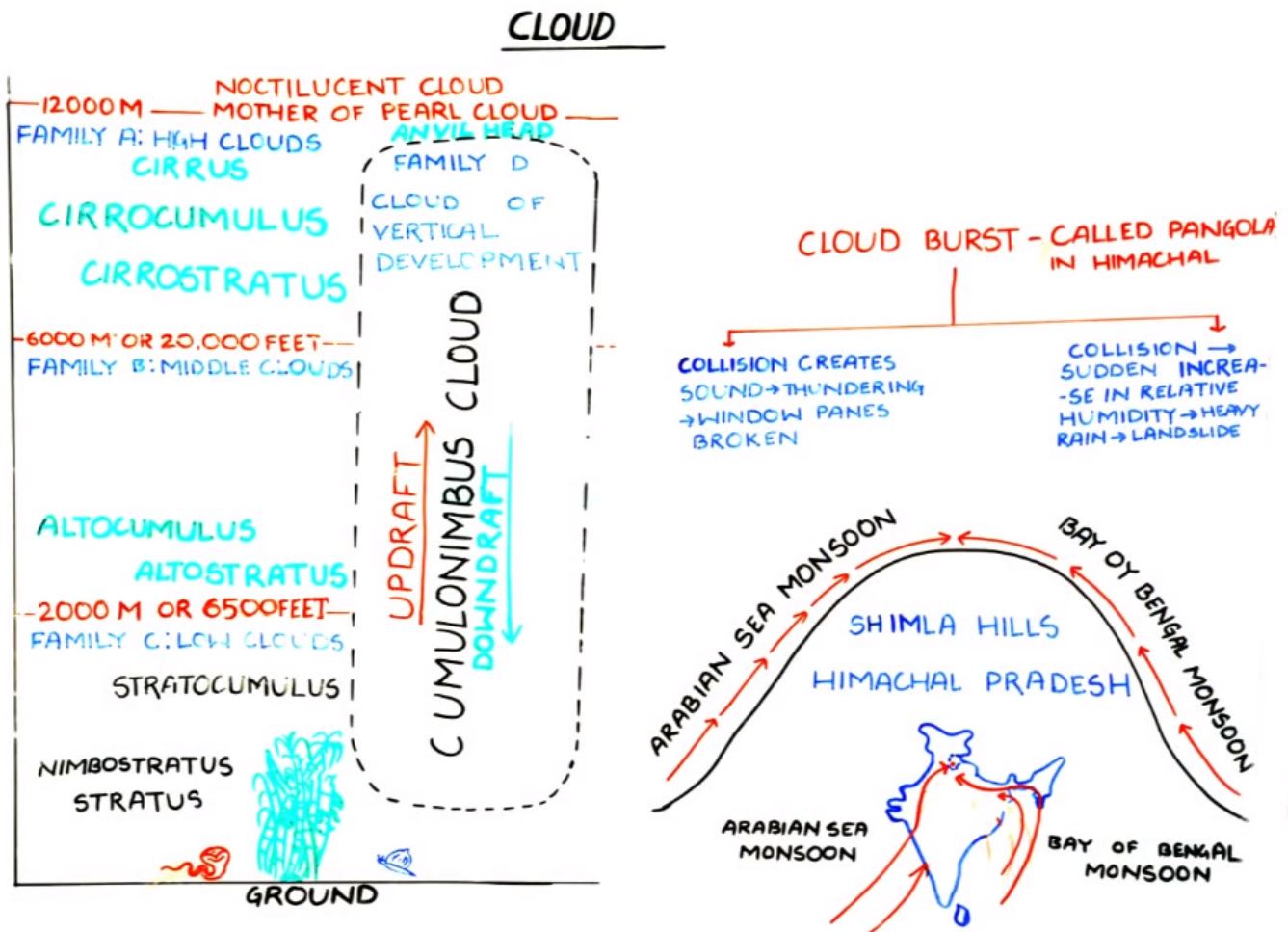
# Cloud Formation

Clouds are made of water droplets or ice crystals that are so small and light they are able to stay in the air. But how does the water and ice that makes up clouds get into the sky? And why do different types of clouds form?

The water or ice that makes up clouds travels into the sky within air as water vapor, the gas form of water. Water vapor gets into air mainly by evaporation – some of the liquid water from the ocean, lakes, and rivers turns into water vapor and travels in the air. When air rises in the atmosphere it gets cooler and is under less pressure. When air cools, it's not able to hold all of the water vapor it once was. Air also can't hold as much water when air pressure drops. The vapor becomes small water droplets or ice crystals and a cloud is formed.

## Classification of clouds

Clouds with rounded tops resembling heaped cotton or cauliflower are termed cumuli form while those forming as sheets in layers are referred to as stratiform. Rain bearing clouds are categorized as nimbus. Clouds with fibrous appearance like silken tufts are called cirriform clouds. Clouds are classified combining their levels of formation and appearance as follows:



### **Amount of Cloudiness:**

Cloud cover (also known as cloudiness, cloudage, or cloud amount) refers to the fraction of the sky obscured by clouds when observed from a particular location. Okta is the usual unit of measurement of the cloud cover. The cloud cover is correlated to the sunshine duration as the least cloudy locales are the sunniest ones while the cloudiest areas are the least sunny places.

### **Role in the Climate system:**

Clouds play multiple critical roles in the climate system. In particular, being bright objects in the visible part of the solar spectrum, they efficiently reflect light to space and thus contribute to the cooling of the planet. Cloud cover thus plays an important role in the energetic balance of the atmosphere and a variation of it is a consequence of and to the climate change expected by recent studies.

### **Identification of Clouds:**

How many types of clouds are there? Generally speaking, there are ten main types of clouds you'll see in the sky, and we discuss each of them below. For each of these different types of clouds, we've included a picture of the cloud, a short description, and the following additional information:

- **Height:** Where in the sky the cloud typically occurs (low-level, mid-level, or high-level)
- **Color:** The color of the cloud
- **Shape:** The form the cloud typically takes
- **Weather:** The weather the cloud is usually associated with or predicts

### **Alto cumulus**



- Height: Mid
- Color: White
- Shape: Heap-like and often grouped together
- Weather: Varies

Altostratus clouds are fairly common clouds that look like **round white or gray patches in the sky**. They are sometimes grouped in parallel lines and have been described as looking similar to tufts of wool or fish scales.

### Altostratus



- Height: Mid
- Color: White or light gray
- Shape: Thick and flat
- Weather: Usually indicate warmer weather is approaching; can cause light precipitation

These clouds form a white or gray layer that blankets the sky at mid-level. There are usually no patches of blue sky when these clouds appear, but **the sun is often visible as a dimly lit disk behind the clouds** (although no shadows appear on the ground).

### Cirrocumulus



- Height: High
- Color: White or gray
- Shape: Rows of small patchy clouds
- Weather: Typically sunny and cold

Cirrocumulus clouds are much smaller than most other types of clouds, and they are sometimes called cloudlets. They are found at high altitudes and are made of ice crystals. **They often are arranged in parallel rows.** They are one of the rarer types of clouds and usually don't last long.

### Cirrostratus



- Height: High
- Color: Transparent/white
- Shape: Wispy, but thicker than cirrus clouds
- Weather: Varies

These are transparent, wispy clouds that cover most or all of the sky. **The best identifier for cirrostratus clouds is a halo or ring of light surrounding the sun or moon.**

### Cirrus



- Height: High
- Color: White
- Shape: Wispy or feathery
- Weather: May mean a warm front is approaching

Wispy clouds located high in the atmosphere are likely cirrus clouds. **They are thin and white with lots of blue sky visible.** They can occur in fair weather or when a warm front or large storm is approaching.

## Cumulonimbus



- Height: Low (although can span all layers)
- Color: Pale to dark gray
- Shape: Dense and towering
- Weather: Thunderstorms

Cumulonimbus are the **classic “thunderstorm clouds”** and are large towering clouds that are often dark in color. Seeing them is a sign that a storm is likely on its way. They can be very large, appearing like a mountain (sometimes with a flat top).

## Cumulus



- Height: Low
- Color: White
- Shape: Fluffy, tall, often described as looking similar to cauliflower
- Weather: Typically sunny

The **stereotypical puffy cloud** you probably drew a lot of when you were a kid, cumulus clouds are dense individual clouds that are bright white on top and gray underneath. They typically appear earlier in the day when it’s sunny.

## Nimbostratus



- Height: Low
- Color: Dark gray
- Shape: Large thick layer
- Weather: Steady rain or snow

Nimbostratus clouds form a **thick, dark layer across the sky**. They are often thick enough to blot out the sun. Like cumulonimbus clouds, they are associated with heavy precipitation, but, unlike cumulonimbus, you can't pick out individual nimbostratus clouds.

## Stratocumulus



- Height: Low
- Color: White
- Shape: Fluffy
- Weather: Appear before or after a front/when there is weak convection in the atmosphere

Stratocumulus clouds are somewhat similar to cumulus clouds but are **flatter, thicker, and darker**. There is less blue sky between the clouds, and the weather will appear more cloudy than sunny.

## Stratus



- Height: Low
- Color: Gray or white
- Shape: Featureless flat layer
- Weather: Gloomy weather, sometimes with light precipitation

**Similar to fog** (but on the horizon instead of on the ground), stratus clouds are a gray featureless layer of clouds that cover all or most of the sky.