

Clouds – How to Distinguish the Different Types of Clouds?



When we prepare notes of ClearIAS – we always keep one important thing in mind. Our study materials should help our readers learn faster! (See [Major Ocean Currents: How to learn faster?](#)) Now, after a break, we have come up with another easy-to-understand article from [Geography](#) – about Clouds.

In this article, we are going to discuss Clouds – different types of clouds, the shape of clouds, altitude of clouds and so on.

What is a cloud?

- A cloud is an accumulation or grouping of tiny water droplets and ice crystals that are suspended in the earth atmosphere.
- They are masses that consist of huge density and volume and hence it is visible to naked eyes.
- There are different types of Clouds. They differ each other in size, shape, or colour. They play different roles in the climate system like being the bright objects in the visible part of the solar spectrum, they efficiently reflect light to space and thereby helps in the cooling of the planet.
- Clouds are formed when the air becomes saturated or filled, with water vapour. The warm air holds more water vapour than cold air.
- Being made of the moist air and it becomes cloudy when the moist air is slightly cooled, with further cooling the water vapour and ice crystals of these clouds grew bigger and fall to earth as precipitation such as rain, drizzle, snowfall, sleet, or hail.

What are the different types of cloud?

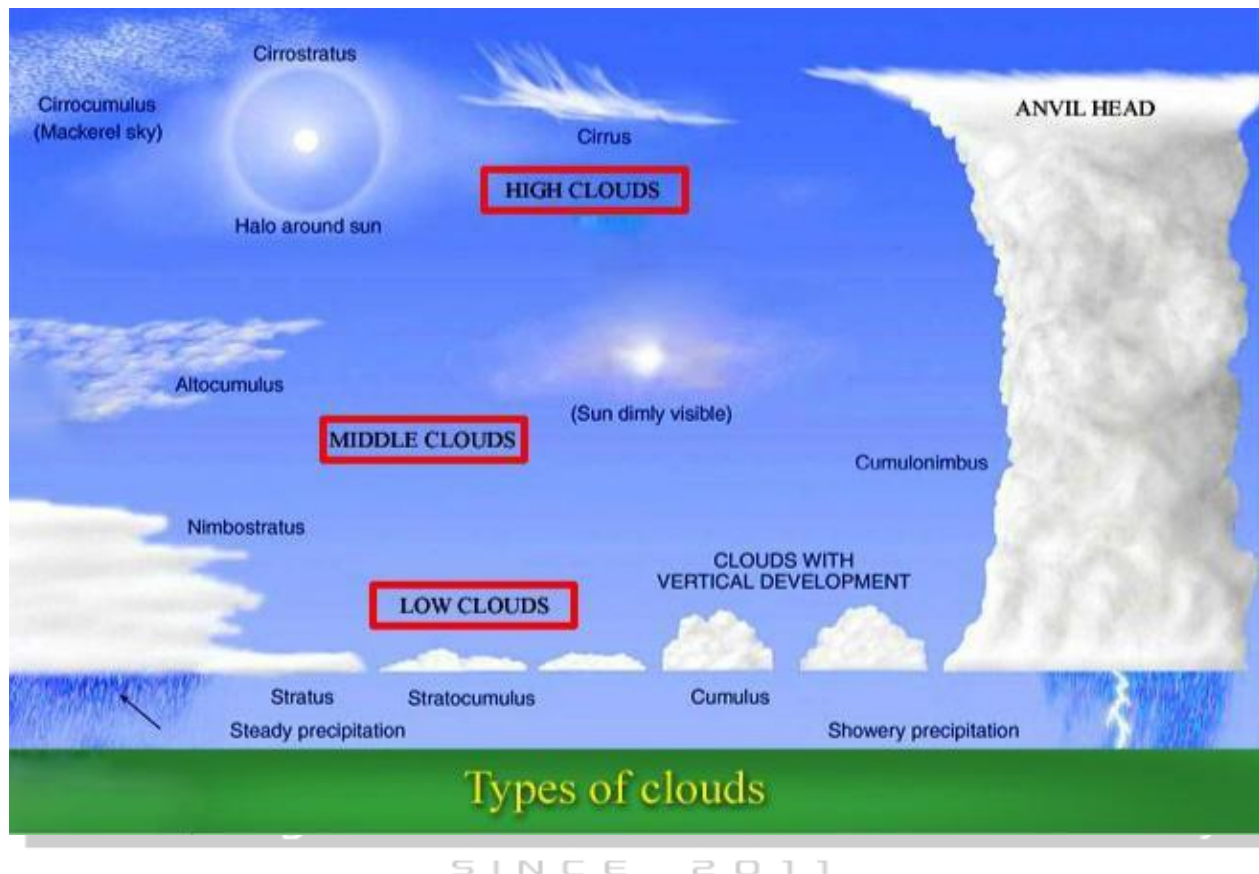
Clouds are classified primarily based on – their **shape** and their **altitude**.

1. Classification of clouds – based on their shape:

Based on shape, clouds are classified into three. They are:

1. Cirrus
2. Cumulus
3. Stratus

2. Classification of clouds – based on their altitude (height):



Based on the height or altitude the clouds are classified into three. They are –

1. High Clouds
2. Middle Clouds
3. Low Clouds

Note: You should also note about the another type of clouds here – ie. Clouds with great vertical extent.

1) High Clouds

- They can reach above 6000 metres or 20,000 feet.
- They are also known as **Cirrus Clouds**.
- They can reach above 6000 metres or 20,000 feet.
- They often indicate fair weather and hence do not produce rain.



Types of High Clouds

Description

- | Types of High Clouds | Description |
|----------------------|--|
| 1. Cirrus | They are thin and often wispy cirrus clouds. Typically found at heights greater than 20,000 feet (6,000 meters), they are composed of ice crystals that originate from the freezing of supercooled water droplets. |
| 2. Cirrostratus | They are high, very thin, comprises a uniform layer, and are composed of ice-crystals. It is difficult to detect and is capable of forming halos when the cloud takes the form of thin cirrostratus nebulosus. |
| 3. Cirrocumulus | They are small rounded puffs shaped clouds, that usually appear in long rows high in the sky and are usually white, but sometimes appear grey. |

Also read: Temple Architecture and Sculpture - Hindu, Buddhist and Jain (Indian Culture Series – NCERT)

2) Middle Clouds

- They form between 6,500 feet and cirrus level or from 2000 to 6000 metres.
- They are also known as “**Alto**” clouds.
- They frequently indicate an approaching storm.
- They may sometimes produce **Virga**, which is a rain or snow that does not reach the ground.

Types of Middle Clouds	Description
1. Altostratus	These clouds are in the form of continuous sheet or veil, grey or blue-gray in colour. They are composed of ice crystals and water droplets. In its thinner areas, the sun can still be visible as a round, dim disk. These clouds may often form ahead of storms with continuous rain or snow.
2. Alto cumulus	They are greyish sheet cloud, characterised by globular masses or rolls in layers or patches, the individual elements being larger and darker than those of cirrocumulus and smaller than those of stratocumulus.

3) Low Clouds

- They lie below 6,500 feet, which means from the surface to 2,000 meters.
- Low clouds are also known as **Stratus Clouds**.
- They may appear dense, dark, and rainy (or snowy) and can also be cottony white clumps interspersed with blue sky.



Types of Low Clouds	Description
1. Strato Cumulus	Usually arranged in a large dark, rounded or globular masses, usually in groups, lines, or waves.
2. Stratus	Usually looks like a huge grey blanket that hangs low in the sky that resembles fog, comprises uniform layer and appear dull, if these clouds are warm it means rain and if it is cold it snows.
3. Nimbostratus	They are known as 'Rain Clouds' and they are dark, thick and accompanied by light to moderately falling precipitation.

4) Great Vertical Extent Clouds

- They are most dramatic types of clouds.
- Great Vertical Extent Clouds are also known as the **Storm Clouds**.

- They rise to dramatic heights, and sometimes well above the level of transcontinental jetliner flights.



Types of Great Vertical Extent Clouds

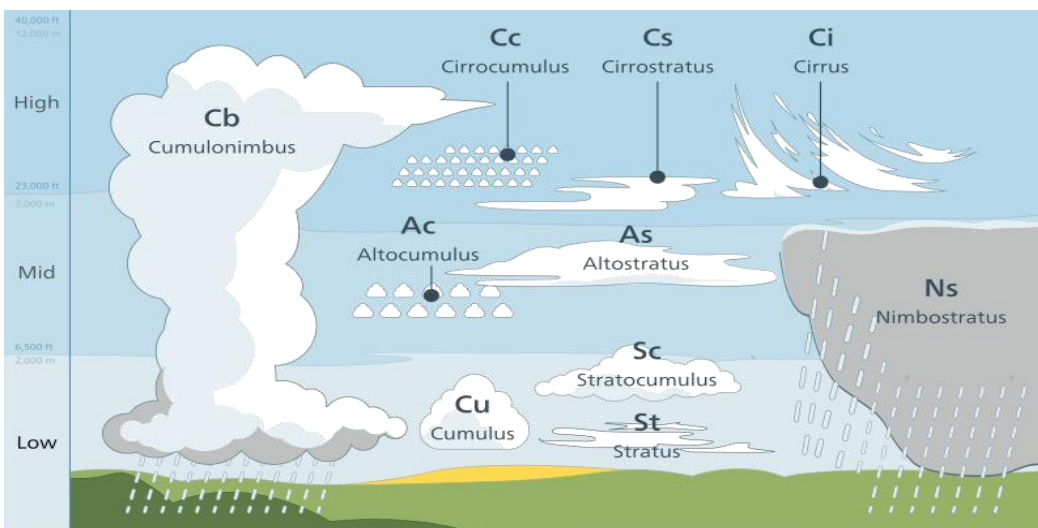
Description

1. Cumulus They are convection clouds, puffy, that sometimes look like pieces of floating cotton. The base of each cloud is often flat and may be only 1000 meters (3300 feet) above the ground. The top of the cloud has rounded towers.
2. Cumulonimbus They are dense towering vertical cloud, it's top acquiring an 'Anvil Shape', associated with thunderstorms and atmospheric instability, forming from water vapour carried by powerful upward air currents.



How to learn all cloud types in a single diagram?

Refer the below picture:



What is International Cloud Atlas?



- The International Cloud Atlas describes the classification system for clouds and meteorological phenomena used by all World Meteorological Organization Members.
- It includes a manual of standards and photographs of clouds and weather phenomenon.
- It was first published in the 19th century and was last updated 30 years ago.
- The new 2017 version of International Cloud Atlas was a digitalized one and has many additions.

Also read: Urban Heat Islands

The new cloud classifications that were introduced the International Cloud Atlas (2017)

1) The Species

Volutus

- They are long, typically low, horizontal, detached, tube-shaped cloud mass.
- They often appear to roll slowly about a horizontal axis.
- The species volutus is a soliton and hence not attached to other clouds.
- This species applies mostly to Stratocumulus and rarely Altocumulus.

2) The Supplementary Features

(a) Asperitas

- There are well-defined, wave-like structures in the underside of the cloud.
- Asperitas is characterised by localised waves in the cloud base, either smooth or dappled with smaller features, sometimes descending into sharp points, as if viewing a roughened sea surface from below.
- The varying levels of illumination and thickness of the cloud can lead to dramatic visual effects.
- They occur mostly with Stratocumulus and Altocumulus.

(b) Fluctus

- They are relatively short-lived wave formation, usually seen on the top surface of the cloud, in the form of curls or breaking waves (Kelvin-Helmholtz waves).
- They occur mostly with Cirrus, Altocumulus, Stratocumulus, Stratus and occasionally Cumulus.

(c) Cavum

- These are a well-defined generally circular hole in a thin layer of supercooled water droplet cloud.
- The Cavum is typically a circular feature when viewed from directly beneath, but may appear oval-shaped when viewed from a distance. When resulting directly from the interaction of an aircraft with the cloud, it is generally linear.
- They occur in Altocumulus and Cirrocumulus and rarely Stratocumulus.

(d) Murus

- It is a localised, persistent, and often abrupt lowering of cloud from the base of a Cumulonimbus from which tuba (spouts) sometimes form.
- Usually associated with a supercell or severe multi-cell storm.
- Murus showing significant rotation and vertical motion may result in the formation of tuba (spouts), Commonly known as a 'wall cloud'.

(e) Cauda

- A horizontal, tail-shaped cloud (not a funnel) at low levels extending from the main precipitation region of a supercell Cumulonimbus to the murus (wall cloud).
- It is typically attached to the wall cloud, and the bases of both are typically at the same height.
- Cloud motion is away from the precipitation area and towards the murus, with rapid upward motion often observed near the junction of the tail and wall clouds and are commonly known as a 'tail cloud'.

3) Accessory Cloud

Flumen

- They are bands of low clouds associated with a supercell severe convective storm (Cumulonimbus), arranged parallel to the low-level winds and moving into or towards the supercell.
- These accessory clouds form on an inflow band into a supercell storm along the pseudo-warm front.

- One particular type of inflow band cloud is the 'Beaver's tail'. This is distinguished by a relatively broad, flat appearance suggestive of a beaver's tail.

Also read: Sectors of Economy: Primary, Secondary, Tertiary, Quaternary and Quinary

4) Special Clouds

(a) Flammagenitus

- These are clearly observed to have originated as a consequence of localised natural heat sources (forest fires, wildfires or volcanic activity) and consist of water drops.

(b) Homogenitus

- These are originated specifically as a consequence of human activity.
- They include aircraft condensation trails (contrails), or clouds resulting from industrial processes, such as cumuliform clouds generated by rising thermals above power station cooling towers.

(c) Homomutatus

- These are formed as a result of persistent contrails (Cirrus homogenitus) that may be observed, over a period of time and under the influence of strong upper winds, to grow and spread out over a larger portion of the sky, and undergo internal transformation such that the cloud eventually takes on the appearance of more natural cirriform cloud.

(d) Cataractagenitus

- They may develop locally in the vicinity of large waterfalls as a consequence of water broken up into spray by the falls.
- The Cataractagenitus are formed when the downdraft caused by the falling water is compensated for by the locally ascending motion of air.

(d) Silvagenitus

- These are the clouds that may develop locally over the forests as a result of an increased humidity due to evaporation and evapotranspiration from the tree canopy.

What is Asperitas Cloud?

- Asperitas is formerly known as **Undulatus asperitus**.
- It is a cloud formation proposed by **Gavin Pretor-Pinney** of the Cloud Appreciation Society (2009).
- It is recently been accepted and added to the **International Cloud Atlas** on **March 23, 2017, on the occasion of World Meteorological Day**. The 'Asperitas'
- is a Latin word and its meaning is '**Rough**'.
- The Asperitas clouds tend to be low-lying and are caused by weather fronts that create undulating waves in the atmosphere.

Why clouds appear white in colour?

- The clouds usually appear white because the tiny water droplets and ice crystals inside them are tightly packed, and they reflect most of the sunlight that falls on these masses (scattering).
- The tiny cloud particles equally scatter all colours of light, which make the viewer to perceive all wavelengths of sunlight mixed together as white light.

Why do clouds darken at the time of rain?

- The clouds appear dark or grey in colour at the time of rain is due to their particulate density.
- The water vapour will bind together into raindrops, leaving larger spaces between these drops of water and hence less amount of light is reflected, lending a darker appearance of the rain clouds.

