

Climatology: Classification of Clouds

A **cloud** is an accumulation or grouping of small droplets of water and ice crystals suspended in the atmosphere of the earth.

They are masses of enormous density and quantity and are therefore noticeable to naked eyes.

They play various roles in the climate system, such as being the bright objects in the visible portion of the solar spectrum, reflecting light to space effectively and thus helping the planet to cool down.

How are they formed?

When the air is saturated or filled with water vapour, clouds are created. There is more water vapour in the warm air than cold air.

Being formed of humid air it is cloudy. When the moist air is progressively cooled, the water vapour and ice crystals of these clouds become larger and fall on earth's surface as precipitation in the form of rain, drizzle, snowfall, sleet, or hail.

Why Clouds appear white in colour?

The clouds generally appear white because the small droplets of water and ice crystals inside them are densely packed, reflecting most of the sunlight falling on these masses (scattering).

The cloud particles disperse all light colours equally, making the viewer perceive all sunlight as white light.

Why they are dark in colour at the time of rain?

Due to their particulate density, the clouds appear dark or grey in colour at the moment of rain.

The water vapour binds together the raindrops, leaving larger spaces in between the drops of water. Due to this, less amount of light is reflected, which emits a darker appearance of the rain clouds.

Types of Clouds

Various kinds of clouds exist. They vary in size, shape, or colour from each other.

They are basically classified into 2 types:

1. Based on their shape



2. Based on their altitude

Clouds on the basis of their shapes:

1. Cirrus
2. Cumulus
3. Stratus

Cirrus Clouds:

Cirrus is an atmospheric cloud generally characterized by thin, wispy strands. It derives its name from the Latin word *cirrus*, which means a ringlet or curling lock of hair.

Cumulus Clouds:

Cumulus clouds have flat bases and are as "puffy", "cotton-like" or "fluffy" in appearance. Their name derives from the Latin *cumulo-*, meaning heap or pile.

Stratus Clouds:

Stratus clouds have a uniform foundation of horizontal layers. The word "stratus" is derived from the Latin prefix "strato-", meaning "layer". The term stratus represents flat, hazy, featureless clouds of low altitude varying in colour from dark grey to white.

Clouds on the basis of their altitude:

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

Low Clouds

They are situated below 6,500 feet or 2,000 meters.

Low clouds are also known as Stratus Clouds.

They 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



	mass, 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.

Middle Clouds

They develop between 6,500 feet and cirrus level or from 2000 to 6000 metres.

They are known as "Alto" clouds.

They frequently indicate an approaching storm.

They may sometimes produce Virga, which is a type of rain or snow that does not reach the ground.

Types of Middle Clouds	Description
1. Altostratus	These clouds are colored gray or blue-gray in the form of a constant sheet or veil. They consist of ice crystals and droplets of water. The sun can still be seen in its thinner fields as a round, dim disc. These clouds can often form with constant rain or snow in front of storms.
2. Altocumulus	They are grayish sheet cloud, characterized in layers or patches by globular masses or rolls, the individual components being bigger and darker than those of cirrocumulus and lower than those of stratocumulus.

High Clouds

They are situated above **6000 metres** or **20,000 feet**.

They are widely known as Cirrus Clouds.

They usually have a thin structure and are made up of ice.

They do not produce rain and hence indicate fair weather.



Types of High Clouds	Description
1. Cirrus	They are thin cirrus clouds that are often wispy. Typically discovered at heights higher than 20,000 feet (6,000 metres), they consist of ice crystals originating from the freezing of supercooled droplets of water.
2. Cirrostratus	They are large, very thin, consisting of a uniform coating of ice crystals. When the cloud takes the form of thin cirrostratus nebulosus, it is hard to identify and is capable of forming halos.
3. Cirrocumulus	They are tiny rounded, cloud-shaped puffs, generally appearing in lengthy rows elevated in the sky and generally white, but sometimes appearing grey.



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