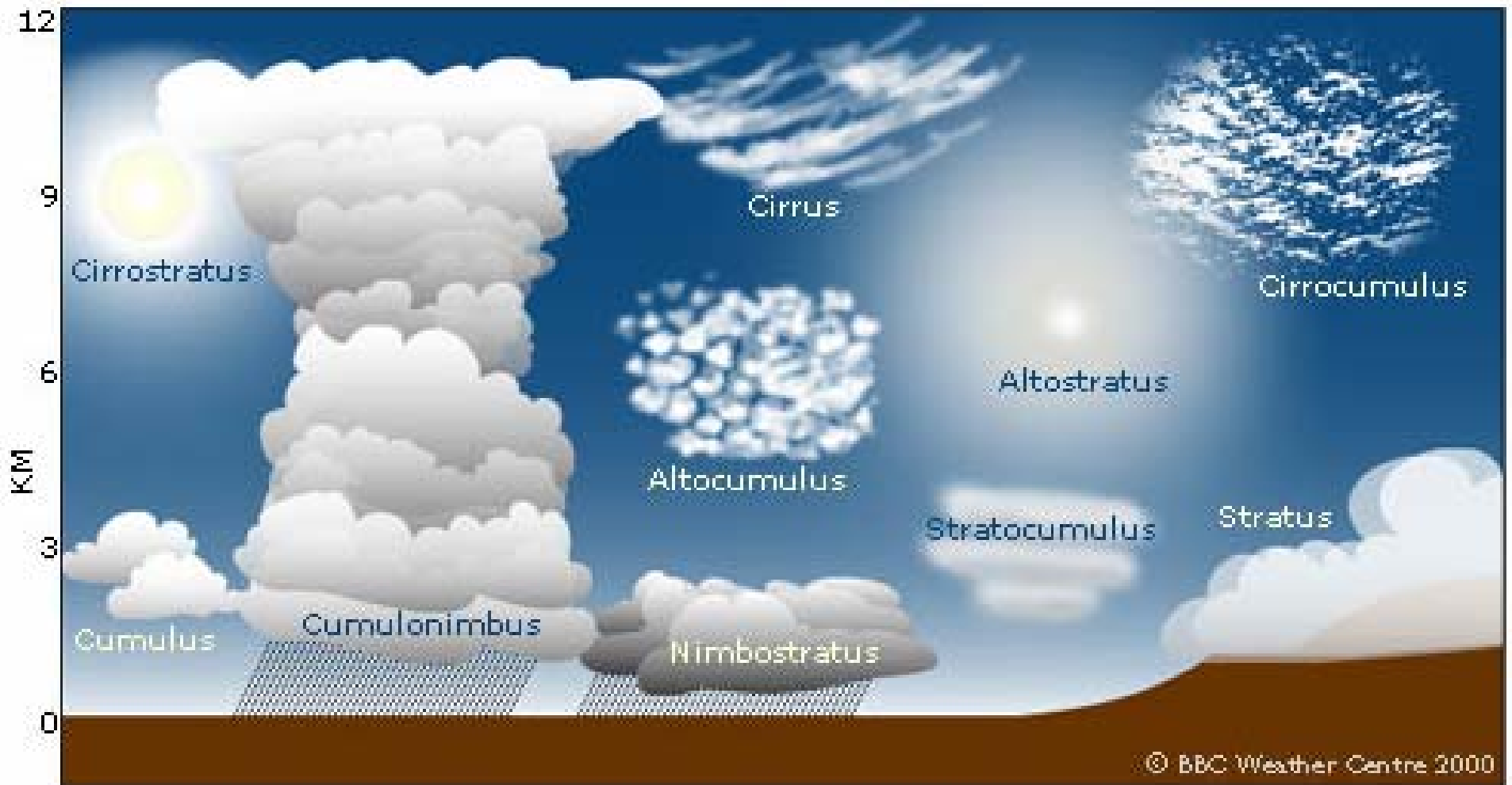


Common Cloud Names, Shapes, and Altitudes:



Low Clouds

Genus	Species (can be only one)	Varieties (can be more than one)
Cumulus	humilis mediocris congestus fractus	radiatus
Cumulonimbus (extend through all 3 levels)	calvus capillatus	(none)
Stratus	nebulosus fractus	opacus, translucidus, undulatus
Stratocumulus	stratiformis lenticularis castellanus	translucidus, perlucidus, opacus, duplicatus, undulatus, radiatus, lacunosus

Middle Clouds

Alto cumulus	stratiformis lenticularis castellanus floccus	translucidus, perlucidus, opacus, duplicatus, undulatus, radiatus, lacunosus
Altostratus	(none)	translucidus, perlucidus, opacus, duplicatus, undulatus, radiatus
Nimbostratus (extend through 1+ levels)	(none)	(none)

High Clouds

Cirrus	fibratus uncinus spissatus castellanus floccus	intortus, radiatus, vertebratus, duplicatus
Cirrocumulus	stratiformis lenticularis castellanus floccus	undulatus, lacunosus
Cirrostratus	fibratus nebulosus	duplicatus, undulatus

Cloud Classification:

Clouds are classified using a Latin “Linnean” system based on genera and species, originally developed by Luke Howard, an amateur meteorologist and Quaker in 1802.

The modern classification scheme is based on Howard’s system and is detailed in *The International Cloud Atlas*, published by the World Meteorological Organization since 1896.

In addition to standardizing the genus-species system, the WMO also classified clouds by altitude and divided the troposphere into 3 levels:

Low-level Clouds: < 6,500 ft.
 Mid-level Clouds: 6,500 to 23,000 ft.
 High-level Clouds: 16,500 to 45,000 ft.

Cumulus Clouds

("The cloud of choice for 6-yr.-olds")



There are three species of cumulus clouds:

- *humilis* are wider than they are tall
- *mediocris* are as wide as they are tall
- *congestus* are taller than they are wide

Often called "fair-weather" clouds, cumulus clouds are common over land on sunny days, when the sun heats the land creating thermal convection currents

Each thermal is distinct, and, consequently, each cumulus cloud is a distinct puff

Fast Facts:

Typical Altitude: 2,000-3,000 ft.

Location: Worldwide (except in Antarctica, where it's too cold)

Precipitation: Generally none, except for brief showers from congestus

Composition: Liquid water

Formation: Thermal convection currents



Cumulonimbus Clouds

("The towering thunderclouds that scare us senseless")

Three critical conditions for cumulonimbus formation:

- Ready supply of warm, moist air, which rises at speeds of up to 25-70 mph
- Tropospheric winds need to increase considerably with height to encourage it to slant forward
- The atmosphere around the cloud needs to be "unstable" – no temp. inversions here

Fast Facts:

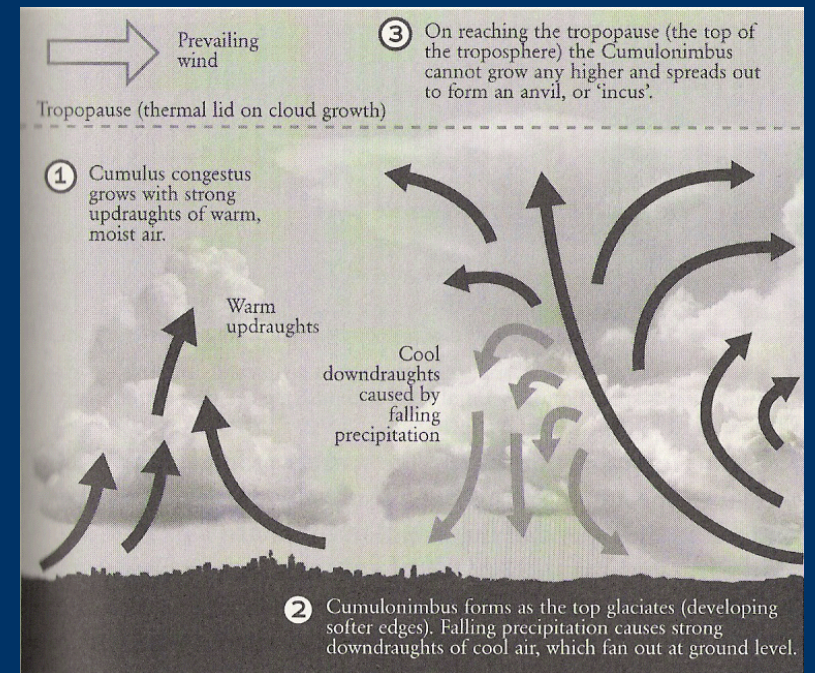
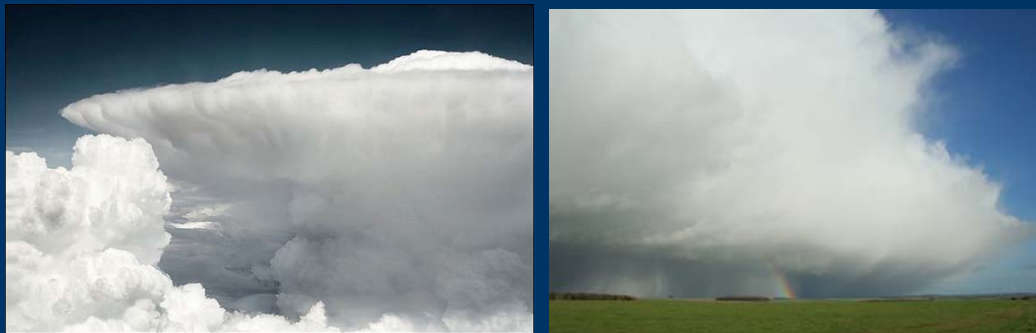
Typical Altitude: 2,000-45,000 ft.

Location: Common in tropics and temperate regions, rare at poles

Precipitation: Heavy downpours, hail

Composition: Liquid water throughout, ice crystals at the top

Formation: Upwardly mobile cumulus congestus clouds (thermals)



Stratus Clouds

("The clouds that weigh heavily on your mood")

Stratus clouds are the lowest forming and are often called fog or mists when they are earth-bound

Stratus clouds are formed when a large air mass cools at the same time (e.g. – a warm air parcel drifts into or above a cooler region)



Fast Facts:

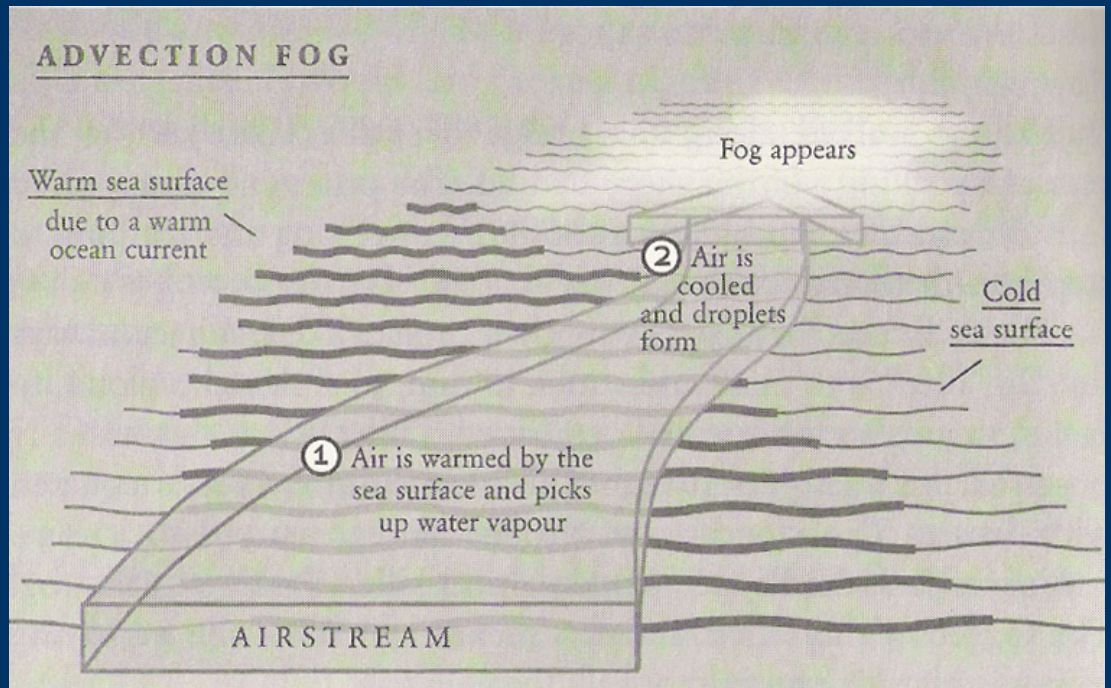
Typical Altitude: 0-6,500 ft.

Location: Worldwide, but especially common around coasts and mountains

Precipitation: No more than light drizzle

Composition: Liquid water

Formation: Advective or radiative cooling



Stratocumulus Clouds

("The low, puffy layers")

Similar to cumulus clouds in form and composition, stratocumulus clouds are textured and puffy, but also joined into a semi-continuous layer

Stratocumulus clouds usually form from cumulus or stratus clouds

Fast Facts:

Typical Altitude: 2,000-6,500 ft.

Location: Worldwide – very common

Precipitation: Occasional light rain, snow

Composition: Liquid water

Formation: Spreading and joining of cumulus clouds below a temperature inversion, wind turbulence in a stratus layer



AltoCumulus Clouds

("Layers of bread rolls")

Since altoCumulus clouds are high in the sky, they are generally above the influence of thermals, and form very differently from cumulus and stratocumulus clouds, who share similar names.

Fast Facts:

Typical Altitude: 6,500-18,000 ft.

Location: Worldwide

Precipitation: Very occasional light rain

Composition: Mostly liquid water, may also contain ice crystals

Formation: Mid-level atmospheric disturbances and wave propagation (from e.g. – mountains)



Altostratus Clouds

("The boring clouds")



Fast Facts:

Typical Altitude: 6,500-16,500 ft.

Location: Worldwide, common in middle latitudes

Precipitation: Occasional light rain, snow

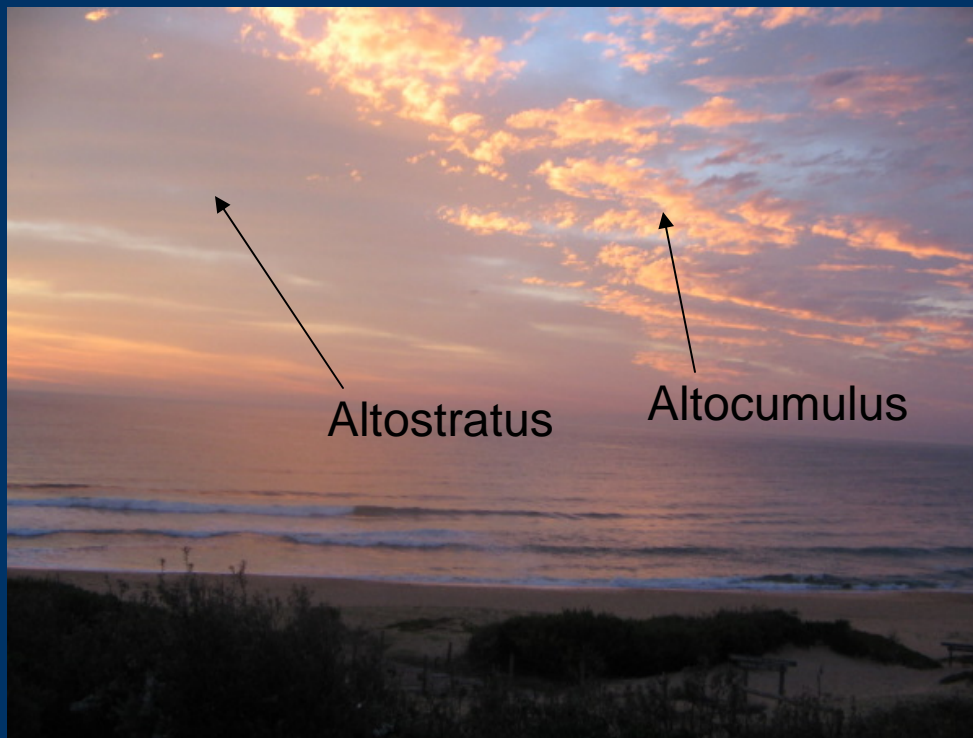
Composition: Both liquid water, and ice crystals

Formation: Usually formed from the thickening and lowering of a cirrostratus cloud on its way to becoming a nimbostratus cloud

Below 6,500 ft. it's stratus

Between 6,500 and 23,000 ft. it's altostratus

Boring! – but being so high up, they do make for nice sunsets.



Altostratus are potentially dangerous to aircraft because they can cause ice accumulation on the wings.

Nimbostratus Clouds

("Rainy day clouds")

The nimbostratus cloud has no species or varieties. It is a thick, wet blanket with a ragged base caused by the continual precipitation



Fast Facts:

Typical Altitude: 2,000-18,000 ft.

Location: Worldwide, common in middle latitudes

Precipitation: Moderate to heavy rain or snow, which is generally steady and prolonged

Composition: Liquid water, raindrops, snowflakes and ice crystals

Formation: Usually formed from the thickening and lowering of a altostratus cloud



Cirrus Clouds

("Delicate cloud streaks")

Cirrus clouds are the highest of all clouds and are composed entirely of ice crystals.

Cirrus clouds are precipitating clouds, although the ice crystals evaporate high above the earth's surface.

The crystals, caught in 100-150 mph winds create wisps of cloud.

Fast Facts:

Typical Altitude: 16,500-45,000 ft.

Location: Worldwide

Precipitation: None that reaches ground

Composition: Ice crystals

Formation: Fall streaks of ice crystals in upper troposphere winds



Cirrocumulus Clouds

("Regularly spaced cloudlets, often rippled")

Cirrocumulus clouds are usually a transitional phase between cirrus and cirrostratus clouds.

Large numbers of cirrocumulus clouds may indicate poor weather is approaching.

Fast Facts:

Typical Altitude: 16,500-45,000 ft.

Location: Worldwide

Precipitation: None that reaches ground

Composition: Ice crystals

Formation: Cloudlets formed by choppy winds and high moisture levels in upper troposphere



Cirrostratus Clouds

("Delicate cloud streaks")

Cirrostratus clouds are difficult to spot and appear as a pale, milky lightening of the sky.

Cirrostratus clouds never block out the sun completely, but rather produce a variety of optical effects.

Fast Facts:

Typical Altitude: 20,000-42,000 ft.

Location: Worldwide

Precipitation: None

Composition: Ice crystals

Formation: Spreading and joining of cirrus clouds



Contrails and Others

