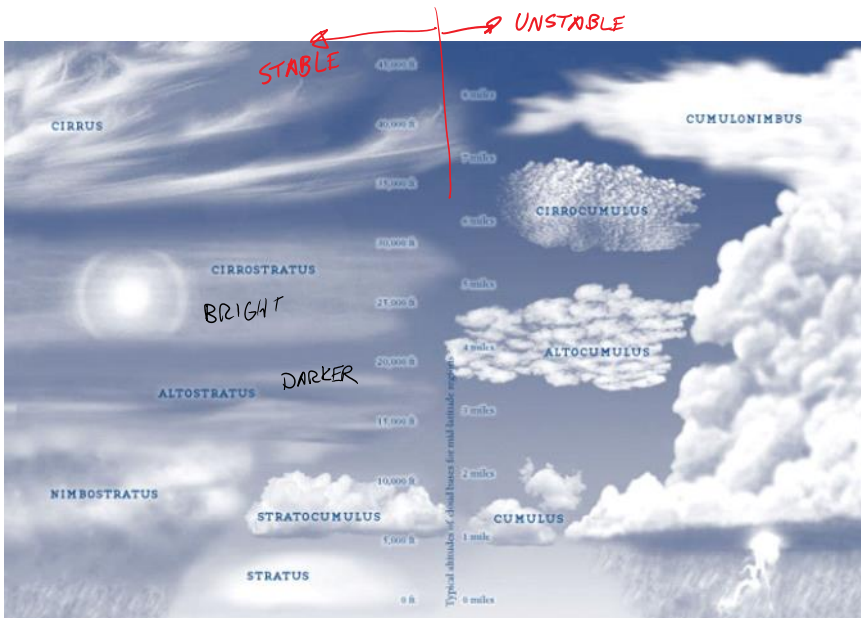


## Clouds = droplets or ice MOVING UPWARDS

Lift mechanisms:

1. Instability
2. Orographics: terrain, mountains
3. Synoptic scale weather systems. Both at warm and cold fronts; cold air pushes under in a cold front, warm air overruns in a warm front.
4. Convergence: shoreline temperature differences



Clouds classified by

A. **Structure:** stratus = flat layers, cumulus = clumps

B. **Base height:** (2 km)

a. low: up to 6500 ft (above ground, not from sea level) and vertically developed (includes cumulonimbus)

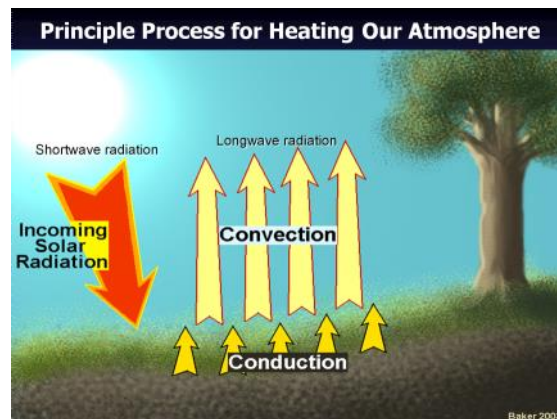
b. middle: 6500 to 23,000 ft (2 - 7 km)

c. high: 16,000 to 45,000 OVERLAP (4.9 - 14 km)

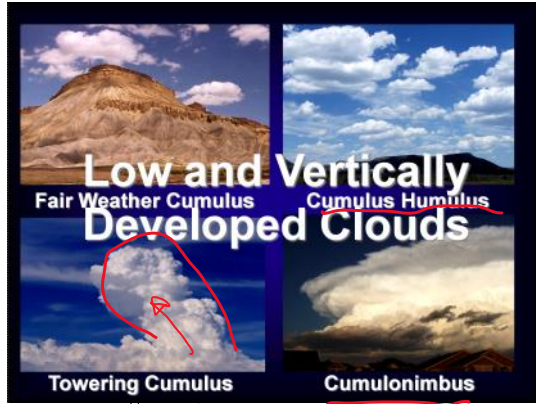
Cirrostratus: bright, no observable thickness, thin, uniform veil

Altostratus: darker, may have noticeable thicker regions

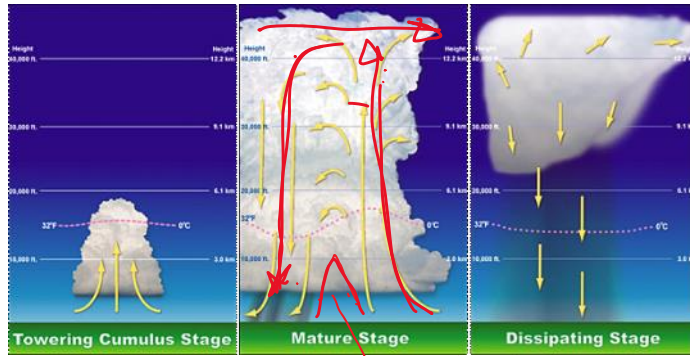
1. OK, atmosphere is unstable. Impact on clouds? Instability driven clouds



If atmosphere is UNSTABLE, the heated air will continue to go up!



castellanus



CAPE > 1000

vault

<http://www.k3jae.com/wxstormdevelopment.php>

Dark ground (plowed field etc.) can create local hot spot, starting a thermal. Mountain uplift can also trigger start of cycle.

Thunderstorm anatomy, visible in Mike Olbinski's time lapse *Monsoon IV*: <https://vimeo.com/239593389?ref=fb-share&1> or his *Pursuit*: <https://vimeo.com/226958858>

Pyrocumulus = cloud formed at the top of a wildland fire smoke plume.

**Stratocumulus: Sort of flat, sort of fluffy.** Probably the world's most common cloud.

Stratocumulus  
Formation mechanisms:

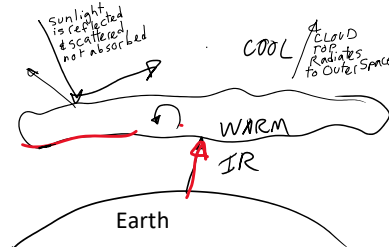
<http://www.flowvis.org/category/flow-categories/clouds/stratocumulus/>



<http://www.flowvis.org/2013/04/11/stratocumulus-boulder-co-18th-of-february-2013-at-1131-a-m/>

- 1) Cumulus joined together, caused by an inversion, a stable layer that stops upward convection
- 2) Stratus broken up. Top reflects UV, visible light, cools (maybe radiates IR to space). Bottom absorbs IR from the earth, warms. Cool on top, warm on the bottom = unstable, wants to turn over, breaking up stratus layer. Stratocumulus stratiformis

$0 < \text{CAPE} < 200$   
Marginal stability



Bénard cells

## 2: Orographic clouds, caused by topography, i.e. mountains

Orography (from the Greek ὄρος, hill, γραφία, to write) [Wikipedia]

Most common interesting cloud in winter and spring is the

Altocumulus lenticularis (higher than 6500 ft above local ground level) or

Stratocumulus lenticularis (lower)

or

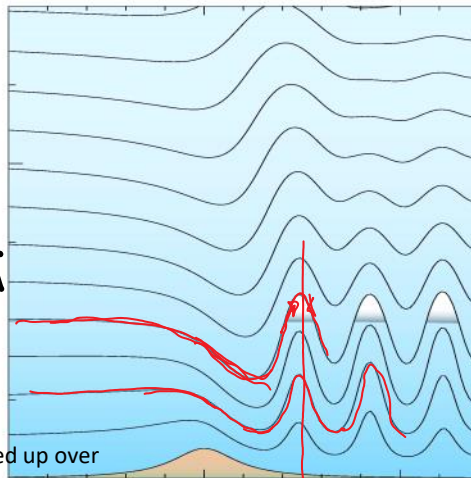
Mountain Wave Cloud, trapped or lee

ACSL

requires STABLE atmosphere: note exception to unstable/cumulus pairing

### STANDING WAVE Clouds Produced by Vertically Trapped Mountain Waves

Thomas Carney et al.,  
AC 00-57 Hazardous  
Mountain Winds and  
Their Visual Indicators  
(Federal Aviation  
Administration, 1997),  
[http://rgl.faa.gov/Regulatory and Guidance Library/rgAdvisoryCircular.nsf/0/780437D88C8DAFD086256A94006FD5B8?OpenDocument](http://rgl.faa.gov/Regulatory%20and%20Guidance%20Library/rgAdvisoryCircular.nsf/0/780437D88C8DAFD086256A94006FD5B8?OpenDocument).

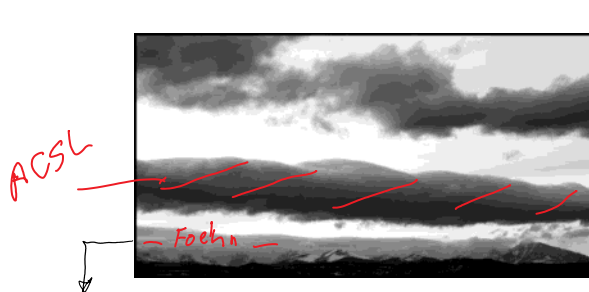


Clouds that sit right on the Divide =  
FOEHN cloud wall.  
From air being forced up over the mountains

Fayne

Altocumulus lenticularis. Typically 1 to 5 wave crests.

Clouds stay stationary, but may move off and reform periodically



Ben Britton, FV 2010

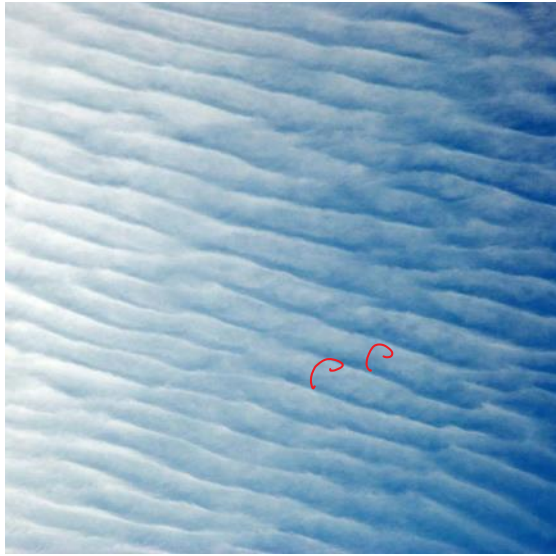
1-5 wave crest

it covers sky

If there's more wave crests, or short wavelengths, it's probably NOT a mountain wave cloud; more likely altocumulus undulatus, from gravity waves in the atmosphere, like ripples on a liquid surface.

<http://www.colorado.edu/MCEN/flowvis/galleries/2007/assignment2.html>





from  
synoptic  
lift

Tracy Eliasson FV 2007

Could also be from wind shear, via the Kelvin Helmholtz instability



Rare to be able to see cross section like this

<http://cloudappreciationsociety.org/collecting/terry-robinson/>



canonical flow: shear layer  
much studied

Minute paper: Which way is the wind going?  
Where is it faster?

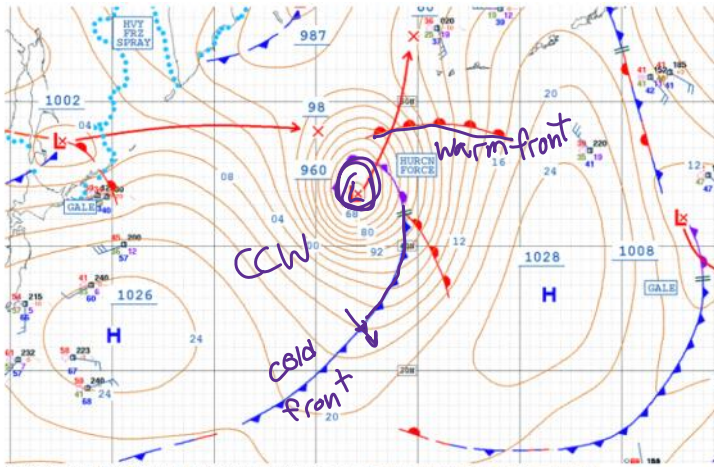
fluctus

3: Synoptic uplift = weather system clouds.

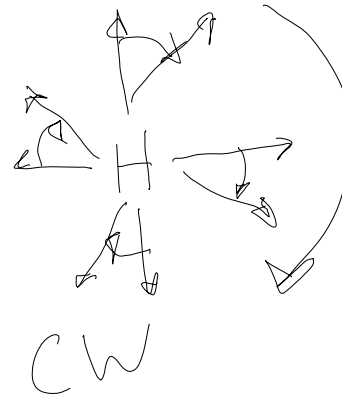
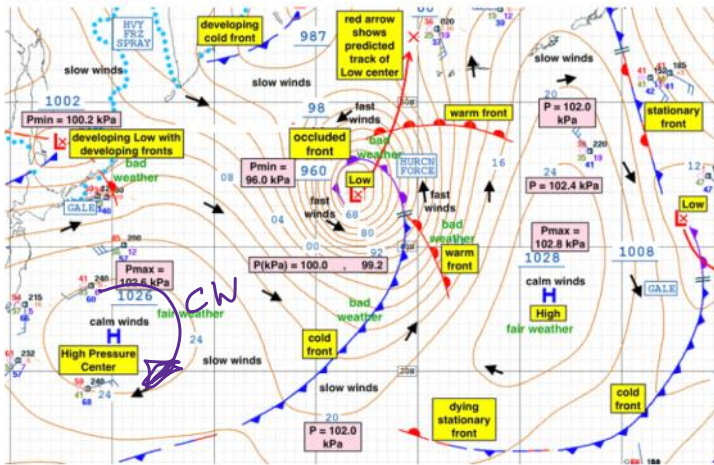
Weather system progressions; 'synoptic scale' uplifts (1000 km across).  
Any type of cloud is possible.

10 km = 6 miles  
1000 = 600 miles



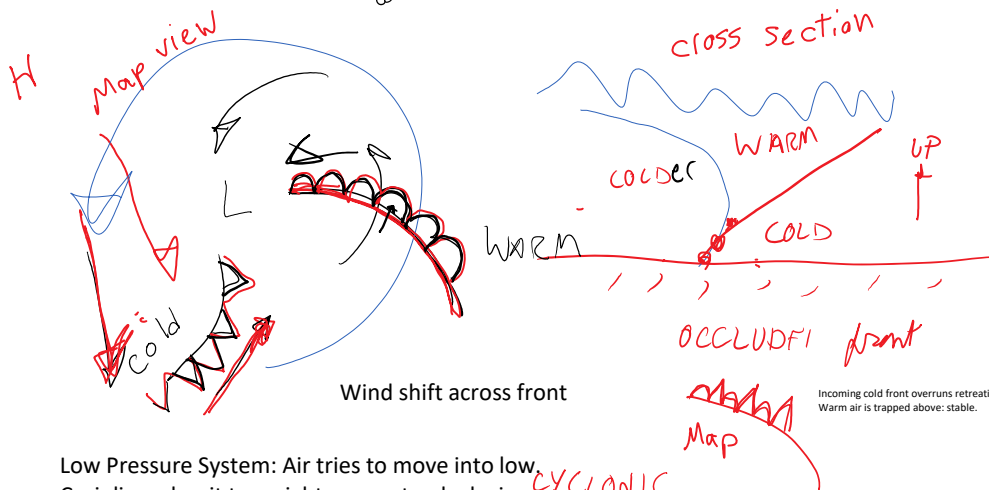
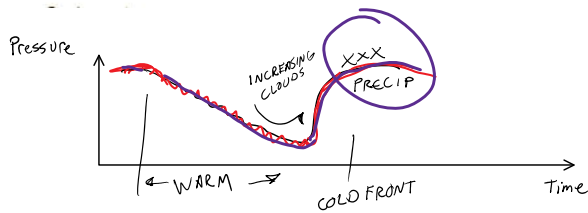
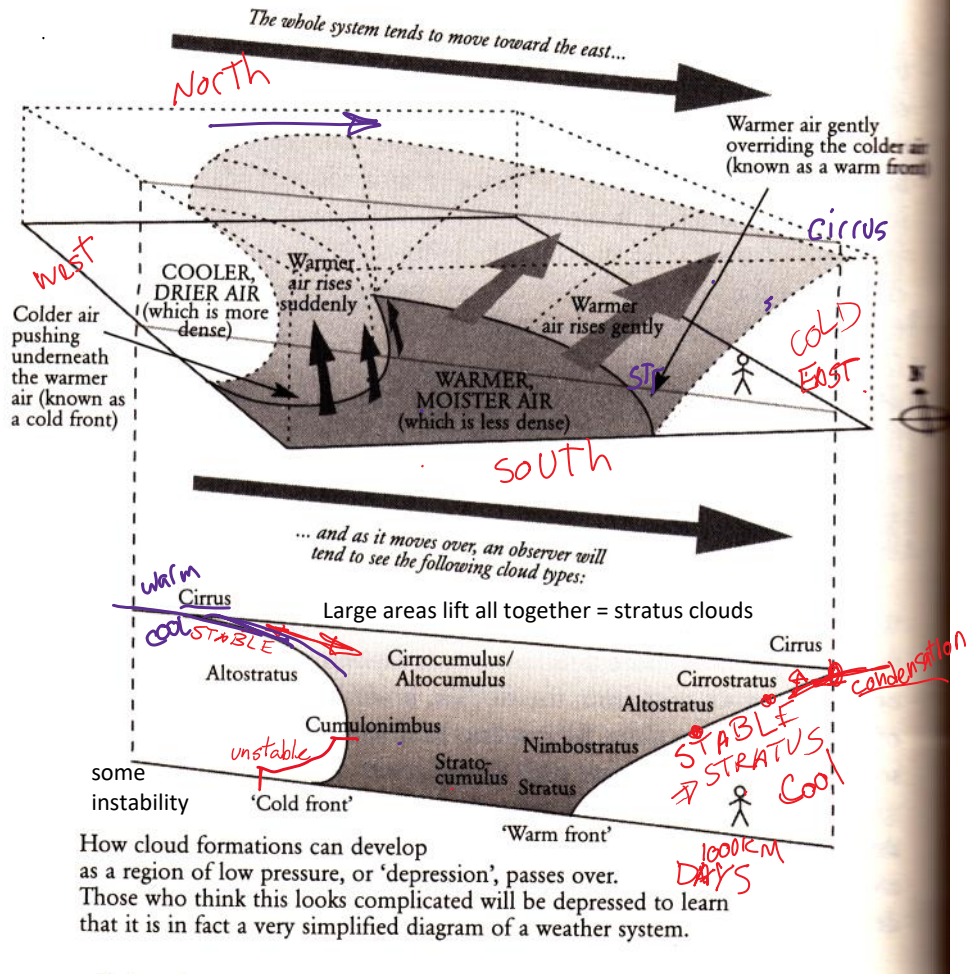


Annotated map below.



[https://www.eoas.ubc.ca/courses/atc113/sailing/met\\_concepts/11-met-marine-weather/11c-forecasting/](https://www.eoas.ubc.ca/courses/atc113/sailing/met_concepts/11-met-marine-weather/11c-forecasting/)

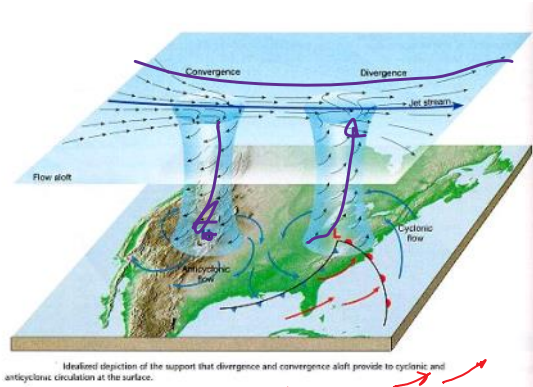
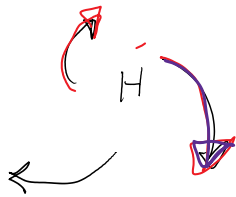
Inserted from: <file:///C:/Users/bertzbe/Documents/01CLASSE5/FlowVis/Content/scanned images/TypWeatherSystem.tif>



Low Pressure System: Air tries to move into low. Coriolis makes it turn right = counterclockwise circulation. Typically unstable. **CYCLONIC** **CCW**

High pressure system: Air tries to move out. Coriolis makes it turn right = clockwise circulation. Weak or nonexistent fronts, so no **ANTICYCLONIC**

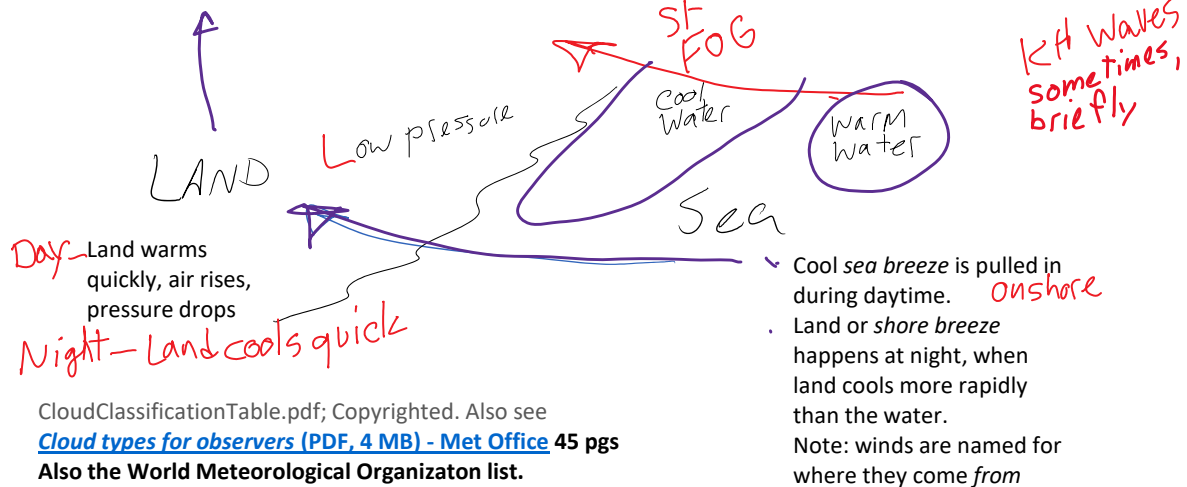
instability.



<http://earth.usc.edu/~stott/Catalina/WeatherPatterns.html>

Divergence aloft creates convergence and lift at surface. Pumping action. Bad for wildland fires.

#### 4: Convergence uplift along shorelines



The Cloud Identifier's Guide  
**CLOUD CLASSIFICATION TABLE**  
 Gavin Prater-Panney, Geron Press 2006  
 Clouds are classified according to Latin. Latinate system similar to the one used for plants and animals, which is based on their height and appearance. Most clouds fall into one of ten basic groups, known as 'genera'. They can further be defined as one of the possible 'species' for that genus, and any combination of the possible 'varieties'. There are also various accessory clouds and supplementary features that sometimes appear in conjunction with the main cloud types. (If all this Latin freaks you out, don't worry - it freaks me out too.)

genus	SPECIES (CAN ONLY BE ONE)	VARIETY (CAN BE MORE THAN ONE)	ACCESSORY CLOUDS AND SUPPLEMENTARY FEATURES
Cirrus	limbens		piris, serice
	nebulosus	nebulosus	velum, pinnus
	capensis		capus
Cirrostratus (clouds through the sun)	lenticularis		precipitans
	radiatus		precipitans, pinnus, velum
	capitatus	(none)	capus, pinnus, serice, velum
Stratus	nebulosus	spissus	serice
	lenticularis	translucidus	precipitans
	fractus	translucidus	
Stratocumulus	stratus	radiatus	serice
	lenticularis	spissus	serice
	capitatus	duplex	capus, pinnus, precipitans
Altostratus	capitatus	radiatus	precipitans
	lenticularis	spissus	serice
	fractus	duplex	capus, pinnus, precipitans
Altostratus (clouds through the sun)	lenticularis	spissus	serice
	capitatus	duplex	capus, pinnus, precipitans
	fractus	duplex	capus, pinnus, precipitans
Nimbostratus (clouds through the sun and rain)	lenticularis	spissus	serice
	capitatus	duplex	capus, pinnus, precipitans
	fractus	duplex	capus, pinnus, precipitans
Cirrocumulus	lenticularis	spissus	serice
	capitatus	duplex	capus, pinnus, precipitans
	fractus	duplex	capus, pinnus, precipitans
Circumstratus	lenticularis	spissus	serice
	capitatus	duplex	capus, pinnus, precipitans
	fractus	duplex	capus, pinnus, precipitans

### HOW TO SPOT CUMULUS CLOUDS

Cumulus are low, detached, puffy clouds that develop vertically in rising air masses, domes or towers, and have generally flat bases. Their upper parts often resemble cauliflower and they appear brilliant white when reflecting high sunlight, but can look dark when the sun is behind them. Cumulus tend to be randomly scattered across the sky.





**CUMULUS SPECIES:**  
**borealis:** Minimal vertical extent. They look flattened and appear wider than they are tall. Do not cause precipitation.  
**mediocris:** Moderate vertical extent. Might show protuberances and sproutings at the top. Appear as tall as they are wide. Do not cause precipitation.  
**congestus:** Maximum vertical extent. The tops are like cauliflowers. Appear taller than they are wide. Cause brief downpours.  
**fractus:** Ragged edges and looks up. Can form in the moist air below rain clouds.

**CUMULUS VARIETIES:**  
**radiatus:** When Cumulus have formed into rows, or 'cloud streets', which are roughly parallel to the wind direction. Due to perspective, the rows appear to converge towards the horizon.  
**translucidus:** Cumulus clouds are detached, not joined into a layer like Strato-cumulus.  
**duplex:** Cumulus are not usually as regularly spaced as a layer of the higher Alto-cumulus. The clouds also look larger than the clouds of the Alto-cumulus. When they are above the cloudtops, Cumulus appear larger than the width of three fingers, held at arm's length.  
**capitatus:** which often develops from a large Cumulus congestus. A cloud is still a Cumulus when its upper region has a sharp outline, compared with the softer top of the Cumulo-nimbus.

\* These approximate altitudes (above the surface) are for mid-latitude regions.



**TYPICAL ALTITUDES\*:**  
2,000-45,000ft  
**WHERE THEY FORM:**  
Common in tropical  
and temperate regions.  
Rare in polar ones.  
**PRECIPITATION:**  
(REACHING GROUND)  
Heavy downpours,  
often of hail.



*Cumalorimbui capillatus* (reata 'hairy')

**NIMBOSTRATUS** which is a dark, ragged precipitating layer, covering the sky. It can look similar to a *Cumulonimbus* that is directly overhead (and also appears to cover much of the sky) but the precipitation will tend to be more steady and more persistent than the short heavy showers of the *Cumulonimbus*. If thunder, lightning or hail is present, then the cloud is a *Cumulonimbus*.

**CUMULINUS CONGESTUS**: from which a *Cumulonimbus* often develops. Seen from a distance, the cloud is said to have changed into a *Cumulonimbus* when parts of its upper region begin to lose their sharp edges, due to the droplets freezing into ice crystals. Thunder, lightning or hail will also identify the *Cumulonimbus*.



\* These approximate altitudes (above the surface) are for mid-latitude regions.

**TYPICAL ALTITUDE<sup>a</sup>:** 0-4,500  
**WHERE THEY LIVE:**  
Worldwide. Most commonly around coasts and mountains.  
**PRECIPITATION (RAINING, CLOUDS):**  
No more than occasional drizzle, snow or snow grains.



...which is

a mid-level layer cloud, often consisting of droplets, like Stratus. Through a layer of Stratus, the curl of the Sun (where it is discernible) is less distinct compared with the 'ground-glass' appearance

**translucent:** When the layer is thick enough to completely mask the sun or moon.  
**translucent:** When it is thin enough to show the outline of the sun or moon.  
**translucent:** A rare variety, in which the layer has wave-like undulations to its surface. The surface of Stratus is rarely distinct enough for this to be observed.

<sup>†</sup> These uncertainties should allow the reader to be well-informed.

**CIRROSTRATUS** which is a high layer cloud that can look similar to a very thin Stratus. Being made of ice, however, it has a white tone.

Through a layer of  
Seras, the cornea of  
the Sun (when it is  
discernible) is less difficult  
conquered with the  
'ground-glass' appearance

a thick, dark layer of precipitating cloud that might be confused with a thick Stratus. But this has a less ragged base than the Nimbostatus and produces lighter

[illegible]

## HOW TO SPOT STRATOCUMULUS CLOUDS

**S**tratocumulus are low layers or patches of cloud, with well-defined bases. They are usually composed of clumps or rolls, and often show strong variations in tone - from bright white to dark grey. Their cloud elements may be joined into continuous, unbroken layers or have gaps between them.



*Stratocumulus stratiformis opacus*...

**TYPICAL ALTITUDES\***  
2,000-4,500ft  
**WHERE THEY FORM:**  
Worldwide - it's a very common cloud.  
**PRECIPITATION**  
(REACHING GROUND):  
Occasionally light rain, snow or snow pellets.



...and *perforatus*

**STRATOCUMULUS SPECIES**  
**STRATIFORMIS:** The most common, when the clumps or rolls extend over a large area. A 'roll cloud' is a particular formation, in the shape of a large, individual tube of cloud.  
**LENTICULARIS:** When one or more mass of cloud is in a smooth, solid-looking almost or less shape.  
**CASTELLANUS:** When the elements have castellated tops.

**STRATOCUMULUS VARIETIES**  
**OPACUS:** When the layer is thick enough to completely mask the sun or moon.  
**TRANSLUCENS:** When it is thin enough to show the outline of the sun or moon.  
**PERFORATUS:** When there are gaps between the cloud elements.  
**DUPLICATUS:** When there are layers at different altitudes, sometimes partly merged.  
**UNDULATUS:** When the elements are arranged in nearly parallel lines.  
**RADIATUS:** When lines of closely bunched elements appear to converge towards the horizon.  
**LACUNOSUS:** When the layer shows large net-like holes fringed with cloud.

**NOT TO BE CONFUSED WITH...**  
**CUMULUS:** which is also clumpy, well defined, and forms at similar altitudes. The elements of Stratocumulus tend to be closer together and to have flatter tops.  
**ALTOCUMULUS:** which is a mid-level layer of cloudlets. These appear smaller than the Stratocumulus elements, which - looking above 30° from the horizon - appear larger than the width of those fingers, held at arm's length.  
**FRAGILIS:** which is a low, indistinct layer, with much less variation in tone and less definition than Stratocumulus.

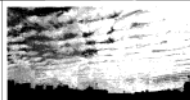
\* These approximate altitudes (above the surface) are for mid-latitude regions.

## HOW TO SPOT ALTOCUMULUS CLOUDS

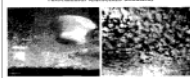
**A**lto cumulus are mid-level layers or patches of cloudlets, in the shape of rounded clumps, rolls or almonds/lenses. These are white or grey, and the sides away from the Sun are shaded. Alto cumulus are usually composed of droplets, but may also contain ice crystals.

### ALTOCUMULUS SPECIES

**STRATIFORMIS:** Most common, when the cloudlets extend over a large area.  
**LENTICULARIS:** When it is in the form of one or more individual almond- or lens-shaped masses that appear dense, with pronounced shading.  
**CASTELLANUS:** When the cloudlets have castellated tops.  
**RADIATUS:** When the cloudlets are Cumulus-like rolls, with ragged bases, often with fibrous trails (trails of ice crystals falling below).



*Alto cumulus stratiformis undulatus*



*Alto cumulus lenticularis*

*Alto cumulus fractus*

### ALTOCUMULUS VARIETIES

**OPACUS:** When the layer is thick enough to completely mask the sun or moon.  
**TRANSLUCENS:** When it is thin enough to show the outline of the sun or moon.  
**PERFORATUS:** When there are gaps between the cloudlets.  
**DUPLICATUS:** When there are layers at different altitudes, sometimes partly merged.  
**UNDULATUS:** When the cloudlets are arranged in nearly parallel lines.  
**RADIATUS:** When long lines of them appear to converge towards the horizon.  
**LACUNOSUS:** When the layer shows net-like holes fringed with cloud.

### NOT TO BE CONFUSED WITH...

**CIRROCUMULUS:** which is a higher layer of cloudlets, that appear like little grains of salt. Looking above 30° from the horizon, the larger Alto cumulus cloudlets generally appear the width of between one and three fingers, held at arm's length. Also, these exhibit shading, which those of Cirrocumulus don't.  
**CIRRUS:** which is a high cloud, whose strands of falling ice crystals can resemble Alto cumulus cloudlets showing wings, but do not have their dense-looking heads.

\* These approximate altitudes (above the surface) are for mid-latitude regions.

Photo: Roger Smith (from *Clouds* by Roger Smith, 1975)

HOW TO SPOT  
**ALTOSTRATUS CLOUDS**

**A**ltostratus are mid-level layers of grey cloud, which are either featureless or fibrous in appearance, and typically extend over an area of several thousand square miles. Usually composed of both water droplets and ice crystals, they are often thin enough in parts to reveal the position of the sun, which appears as if through ground glass. Altostratus can cause a white or (when very thin) coloured 'corona' (disc of light) around the sun or moon.



*Altostratus nimbosus*

**TYPICAL ALTITUDE\***:  
6,500-23,000ft

**WHERE THEY FORM**:  
Worldwide. More common in the middle latitudes.

**PRECIPITATION (RAINING CLOUDS)**: Usually not, but occasionally light rain or snow.

**ALTOSTRATUS SPECIES**:  
There are no species, as the cloud's appearance is so uniform.



*Altostratus nimbosus*

**ALTOSTRATUS VARIETIES**

**OPACUS**: When the cloud layer is generally thick enough to mask the position of the sun or moon.

**FRANSCULUS**: When it is generally thin enough to show the position of the sun or moon.

**DUPLICATUS**: When there is more than one layer at different altitudes, these often being partly merged. This is generally only visible when, by the light of a low sun, the higher layer is lit and the lower is in shadow, or when shearing winds cause the separation of the layers to differ.

**CONULATUS**: When the layer shows largely parallel undulations.

**MODICUS**: When lengthy undulations appear to converge toward the horizon.

**NOT TO BE CONFUSED WITH...**

**CIRROSTRATUS**: which is a higher layer of ice crystals that looks like a thin, milky veil across the sky, and often thickens and lowers to develop into Altostratus. The Altostratus will tend to be more opaque, making the sunlight too diffuse for objects to cast shadows, as they do below Cirrostratus.

While coloured or white discs of light, called coronas, can appear around the sun/moon through Altostratus, this cloud will not cause the 'halo' phenomenon of the Cirrostratus.

**NEBULOSUS**: which is a thick, dark layer of precipitating cloud that often develops out of an Altostratus. Generally darker, it produces considerably heavier rain or snow.

\* These approximate altitudes (above the surface) are for mid-latitude regions.

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HOW TO SPOT  
**NIMBOSTRATUS CLOUDS**

**N**imbostratus are thick, grey, featureless layers of cloud that cause prolonged, continuous, often heavy, rain, snow or ice pellets. They tend to have very diffuse bases, as a result of all the falling precipitation. Nimbostratus are the deepest of all the layer clouds - sometimes extending from 2,000ft up to around 18,000ft - and generally extend over many thousand square miles. As with other precipitating clouds, the falling precipitation can cause Stratus fractus to form in the air below Nimbostratus clouds. These are known as 'panna' and appear as shreds of cloud, looking darker than the underside of the Nimbostratus. When these join together, they tend to lower the bases of Nimbostratus clouds even further. They are inevitably thick enough to completely hide the sun or moon.

**HOW TO BE CONFUSED WITH...**  
**ALTOSTRATUS**: which is a thinner - though also indistinct - layer of cloud. Nimbostratus is always darker than it is, by definition, produces precipitation. Altostratus only does sometimes, and this will generally be light. While the position of



*Nimbostratus - never a pretty sight*

**TYPICAL ALTITUDE\***:  
2,000-18,000ft

**WHERE THEY FORM**:  
Worldwide. More common in middle latitudes.

**PRECIPITATION (RAINING CLOUDS)**: Causes moderate to heavy rain or snow (steady and prolonged).

**NIMBOSTRATUS SPECIES**:  
There are no species, as the cloud's appearance is so uniform.

**NIMBOSTRATUS VARIETIES**:  
There are no varieties, as the cloud's appearance is so uniform.

**THE SUN CAN GENERALLY**  
be determined through at least part of a layer of Altostratus, it will never be so through a Nimbostratus.

**CUMULONIMBUS**: which, when observed from directly below, can also appear as a very dark layer, covering the whole sky. The precipitation falling from a Nimbostratus will not generally be as heavy and will be more prolonged and continuous, compared with the sudden showers of the Cumulonimbus. Nor will the Nimbostratus produce its hail, thunder or lightning.


\* These approximate altitudes (above the surface) are for mid-latitude regions.

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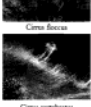
HOW TO SPOT

CIRRUS CLOUDS

Cirrus are the highest of the ten main cloud types. In the form of delicate, white streaks, patches or bands of falling ice crystals, they are detached from each other, and have fibrous or silky appearances. Cirrus rarely appear very thick. They are often seen with the other high clouds, Cirrostratus and Cerecumulus and, like them, can show "halo phenomena" around the sun or moon.



Cirrus uncinus



Cirrus fibratus

**CIRRUS SPECIES:**  
**FIBRATUS:** When it is in the form of straight or curved filaments that are mostly distinct from each other and do not terminate in hooks or clumps.  
**UNCINUS:** When in "fishhook" are the shape of hooks or combs.  
**SEMPER:** The thickest Cirrus - when it is in patches that appear grey at front of the sun - which tends to originate from the arrival of a Cerecumulus.  
**CAPELLATUS:** When it is in the form of small distinct clumps with conical tops.  
**NEBULOSUS:** When it is in the form of independent small round tufts, which often show trails of ice crystals falling from them.


**CIRRUS VARIETIES:**  
**IMBEBRATUS:** When the filaments are irregular and tangled.  
**KARSTIUS:** When the filaments are in parallel bands, usually aligned to the wind at high altitude, which converge towards the horizon, due to perspective.

**NOT TO BE CONSIDERED WITH:**  
**VERGATUS:** When the filaments look like a fish skeleton.  
**DUPLEXATUS:** When the filaments, streaks or hooks are arranged at more than one altitude, which can be apparent when the winds cause them to point in different directions.


**TYPICAL ALTITUDES\*:**  
16,500-45,000ft

**WHERE THEY FORM:**  
Worldwide.

**PRECIPITATION (REACHING GROUND):**  
None.



Cirrus uncinus



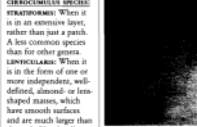
Cirrus fibratus

\* These approximate altitudes (above the surface) are for mid-latitude regions.

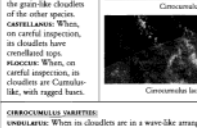
HOW TO SPOT

CIRROCUMULUS CLOUDS

Cirrocumulus are high patches of cloud or layers of tiny cloudlets that appear as white grains. These show no shading, even on the sides away from the sun. These cloudlets are generally regularly spaced, and often arranged in ripples, known as the undulatus variety.



Cirrocumulus stratiformis



Cirrocumulus lacunosus undulatus

**CIRROCUMULUS SPECIES:**  
**STRATIFORMIS:** When it is in an extensive layer, rather than just a patch. A less common species than for other genera.  
**LACUNOSUS:** When it is in the form of one or more independent, well-defined, almond- or lens-shaped masses, which have smooth surfaces and are much larger than the grain-like cloudlets of the other species.  
**CAPELLATUS:** When, on careful inspection, its cloudlets have conical tops.  
**NEBULOSUS:** When, on careful inspection, its cloudlets are Cerecumulus-like, with ragged bases.


**CIRROCUMULUS VARIETIES:**  
**UNDULATUS:** When its cloudlets are in a wave-like arrangement of ripples or broad undulations (or both at the same time).  
**LACUNOSUS:** When the layer has holes tinged with cloud, like a net or honeycomb.

**NOT TO BE CONSIDERED WITH:**  
**CIRROUS AND CIRROSTRATUS:** which are streaks and smooth/fibrous layers of high cloud. Cerecumulus layers, by contrast, are subdivided into many grain-like cloudlets.  
**ALTOCUMULUS:** which is a mid-level layer of larger cloudlets. Looking above 30' from the horizon, the smaller Cirrocumulus cloudlets generally appear less than the width of one finger, held at arm's length.


**TYPICAL ALTITUDES\*:**  
16,500-45,000ft

**WHERE THEY FORM:**  
Worldwide.

**PRECIPITATION (REACHING GROUND):**  
None.



Cirrocumulus stratiformis



Cirrocumulus lacunosus undulatus

\* These approximate altitudes (above the surface) are for mid-latitude regions.

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HOW TO SPOT

CIRROSTRATUS CLOUDS

Cirrostratus are largely transparent, milky veils of high cloud that look either smooth or fibrous. They tend to cover large areas of the sky, extending over many thousands of square miles, but are often so subtle as to be missed. They do, however, sometimes produce the white or coloured rings, spots or arcs of light around the sun or moon that are known as 'halo phenomena'.



Cirrostratus undulatus



Cirrostratus creating a '12° halo' around the sun



Cirrostratus Stratus creating a 'sundog' at the same elevation as the sun

**CIRROSTRATUS SPECIES:**  
**UNDULATUS:** When the cloud veil has a fine fibrous or undulated appearance.  
**NEBULOSUS:** When it shows no variation in tone.

**CIRROSTRATUS VARIETIES:**  
**UNDULATUS:** When the veil has a wave-like appearance.  
**DIFFUSUS:** When there is more than one layer, at different altitudes. This is generally only visible when, by the light of a low sun, the higher layer is lit up when the lower is in shadow, or when blowing winds cause the strata of each layer to differ.

**NOT TO BE CONFUSED WITH:**  
**ALTOSTRATUS:** which is a mid-level, generally thicker, layer cloud. Besides being thinner, the ice crystals of the Cirrostratus can sometimes produce halo phenomena around the sun or moon. These are far less common in Altostratus, which will generally only produce a corona (a white or coloured disc of light).  
**CRENSATA OR CRENULOSA:** which are small and jagged/irregular layers of high cloud. Cirrostratus, which often appears in conjunction with them, is a more continuous and diffuse layer.

\* These approximate altitudes (above the surface) are for mid-latitude regions.

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