

# NEW ZEALAND CLOUD TYPES

20,000 ft – 40,000 ft

## Cc Cirrocumulus



**Billowy hair-like high cloud**  
Whitish high cloud composed of small billow-like cloud elements. Some turbulence may be experienced when flying through Cc. This cloud type is not often observed.



## Ac Lenticularis Alto cumulus Lenticularis



**Middle-level wave cloud**  
This cloud forms most often when a layer of air is lifted over hills or mountains in stable conditions. Ac lentic can occur as separate lens-shaped clouds, or 'stacked', as in this photo taken at 25,000 ft looking south over Lake Wairarapa. Within the cloud, flying conditions are usually smooth; however, moderate or even severe turbulence can be encountered below the cloud. Moderate or severe icing may occur depending on the thickness and height of the cloud.

## As Altostratus



**Middle-level layer cloud**  
A greyish or bluish middle-level cloud sheet. It usually develops from gradually thickening cirrostratus, and it may lower and thicken into nimbostratus. Unlike cirrostratus, 'solar halos' are not observed with this cloud. Turbulence is usually negligible in thin As but may be moderate to severe when thick As is associated with fronts. Light or moderate icing commonly occurs in As; the chance of severe icing increases near active fronts. (The low cloud in this photo is Sc).

## Cb Cumulonimbus



**Rainy heaped cloud**  
Tall convective cloud, usually with an anvil-shaped top. In the New Zealand area, Cb tops reach to between about 20,000 ft and 35,000 ft. Cbs can occur individually, in organised groups or lines, or embedded in frontal layer cloud. Within Cbs, strong vertical motions, severe turbulence, severe icing, thunderstorms and hail are common.

## Rotor Cloud



**Rotor cloud**  
A ragged-looking and very turbulent low-level cloud. In a sufficiently strong and stable air flow across a range of mountains or hills, a large eddy may form underneath the lee waves generated on the downstream side. Then, if enough moisture is present, a 'rotor cloud' may develop in the upper part of the eddy. Rotor clouds often occur in lines parallel to the mountain range. The lee waves above may be visible as lenticular cloud or a northwest arch.

## St Stratus



**Low-level layer cloud**  
Fairly uniform-looking grey low-level layer cloud. It forms when warm moist air moves over a cool surface or when rain from nimbostratus saturates the air below the main cloud base. Before fog dissipates completely, it often lifts to stratus. Common when fronts are passing by, and in coastal areas under the influence of 'old' anticyclones.

## Sc Stratocumulus



**Flattened and heaped cloud**  
Grey or whitish layer cloud, often with a lumpy-looking base. Sc can be formed by low-level turbulence and also by cumulus spreading out when reaching a stable layer. Sc layers are usually only 1000 ft to 2000 ft thick. Light to moderate turbulence may be experienced below and in the cloud and, if the freezing level is low enough, occasional rime ice formation is possible. Sc is common in anticyclonic conditions, particularly over the sea.

## Cs Cirrostratus



**Veil-like high layer cloud**  
Whitish veil-like high cloud made of ice crystals. It is usually translucent and has a smooth appearance. The sun, when viewed through Cs, is often seen to be surrounded by a rainbow-like ring called a 'solar halo'. This cloud often invades the sky well ahead of a frontal system and may 'thicken' to Altostratus as the front approaches.

## Ac Floccus Alto cumulus Floccus

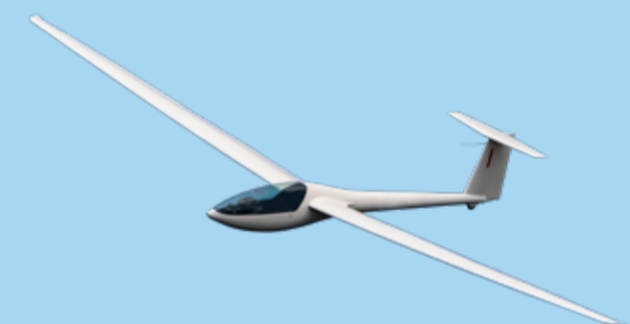


**Billowy middle-level cloud with tufts**  
This cloud looks like cotton wool in the sky. It is not a common cloud type.

## Northwest Arch



**Orographic middle and high cloud**  
This cloud often forms east of New Zealand's main mountain ranges as a result of an increasing northwest flow ahead of a frontal system. At first, single Ac lenticas form, but as the front approaches, upper level moisture increases and an 'arch cloud' develops. This arch cloud usually displays a very sharp western edge. Flying conditions within the arch are usually smooth; however, conditions will be very turbulent below the cloud at low levels. Moderate or severe icing may be encountered within the arch depending on its thickness. When the atmosphere is most turbulent, the base of the middle cloud develops swirls resembling the cloud type 'asperitas'.



## Cu Humilis Cumulus Humilis



**Low heaped cloud**  
A convective cloud which is also called 'fair weather cumulus'. It has little vertical development and each cell of Cu is usually short lived. Light or moderate turbulence may be experienced when flying through Cu humilis.

## TCu Towering Cumulus



**Towering heaped cloud**  
This convective cloud usually has a sharp horizontal base and a cauliflower-shaped top. Within TCu, relatively strong vertical motions, light or moderate turbulence and moderate or severe icing are common. TCu indicates the presence of 'thermals', and may grow into Cb if conditions are right.



## Ci Cirrus



**Hair-like high cloud**  
White, fibrous-looking cloud made of ice crystals. This cloud is often the first sign of a front approaching. Cirrus streaks are sometimes known as 'mares' tails'.

## Ac Altocumulus



**Billowy middle-level cloud**  
A grey or whitish middle-level cloud which generally has some shading and texture. Turbulence in Ac is usually light, and icing is not normally a problem. Ac may signal the approach of a front.

## Ns Nimbostratus



**Rainy layer cloud**  
Grey dark middle-level layer cloud usually associated with a frontal system. The cloud base can be hard to see because of continuously-falling rain or snow beneath it. The base may lower to near ground level as precipitation increases the low-level moisture. Turbulence within Ns is not usually a problem; however, moderate icing is always a possibility.

## Abbreviations

**HIGH CLOUDS**  
Base usually above 20,000 ft over New Zealand.

- Ci Cirrus
- Cc Cirrocumulus
- Cs Cirrostratus

**MIDDLE CLOUDS**  
Base usually between 6500 ft and 20,000 ft over New Zealand, although Ns may lower to near the Earth's surface.

- Ac Altocumulus
- As Altostratus
- Ns Nimbostratus

**LOW CLOUDS**  
Base usually below 6500 ft over New Zealand.

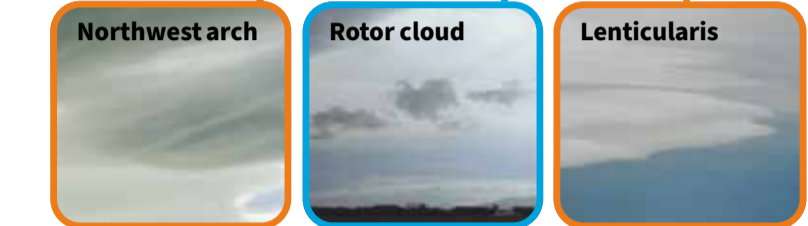
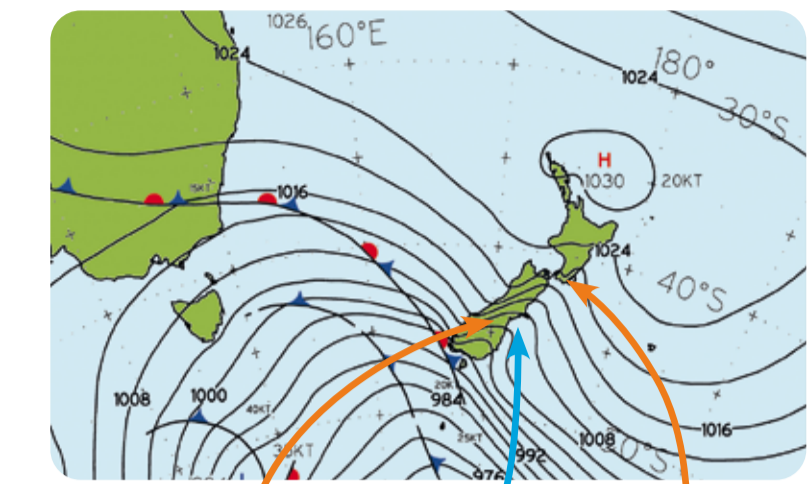
- Sc Stratocumulus
- St Stratus
- Cu Cumulus
- TCu Towering Cumulus
- Cb Cumulonimbus

## Situations

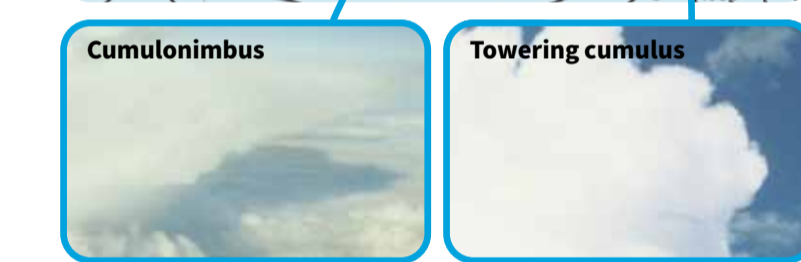
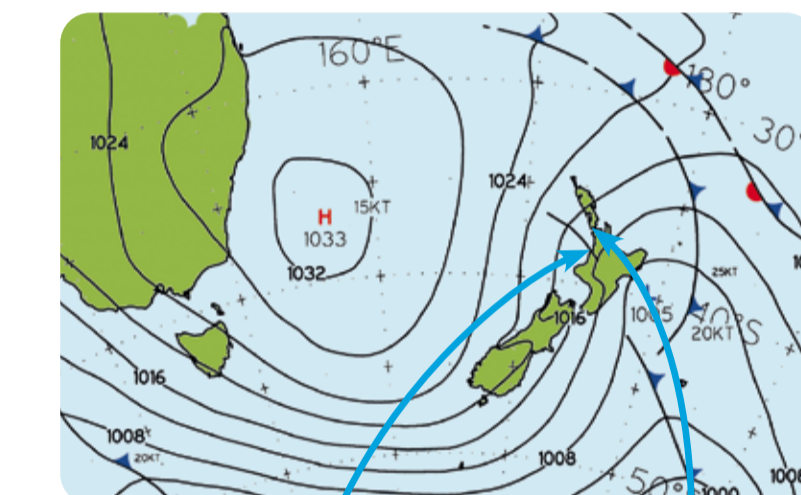
There are many different weather situations that can affect aviation safety. Sometimes the clouds themselves are the danger (for example, cumulonimbus). At other times the clouds simply indicate that a danger is present (for example, rotor clouds). When assessing the threat – or absence of threat – to aviation safety, each weather situation must be taken on its merits.

The weather situations below are three examples of the many in which there may be threats to aviation safety.

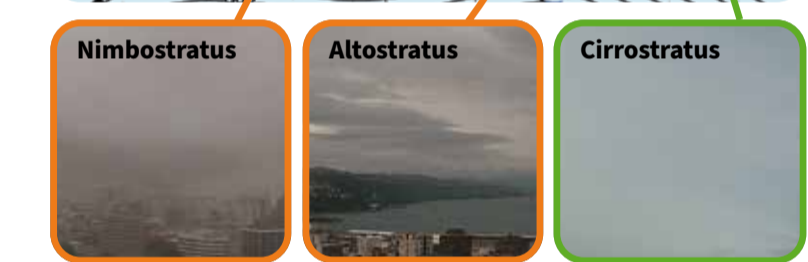
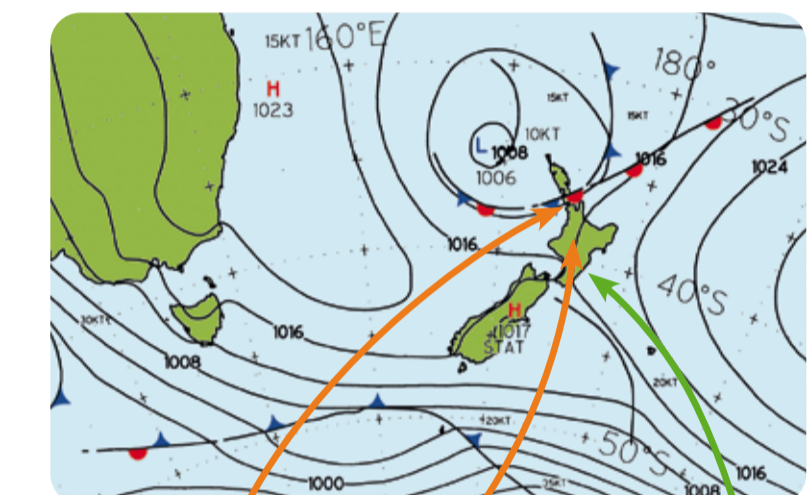
**Strong northwest flow across most of New Zealand.**  
Lenticular clouds, northwest arch and rotors may be encountered in many areas east of the main mountain ranges.



**Cold front to the east of New Zealand with a secondary trough across the North Island.**  
Southerly flow over central parts of the country. TCu and Cb often occur in the cold air behind a significant cold front.

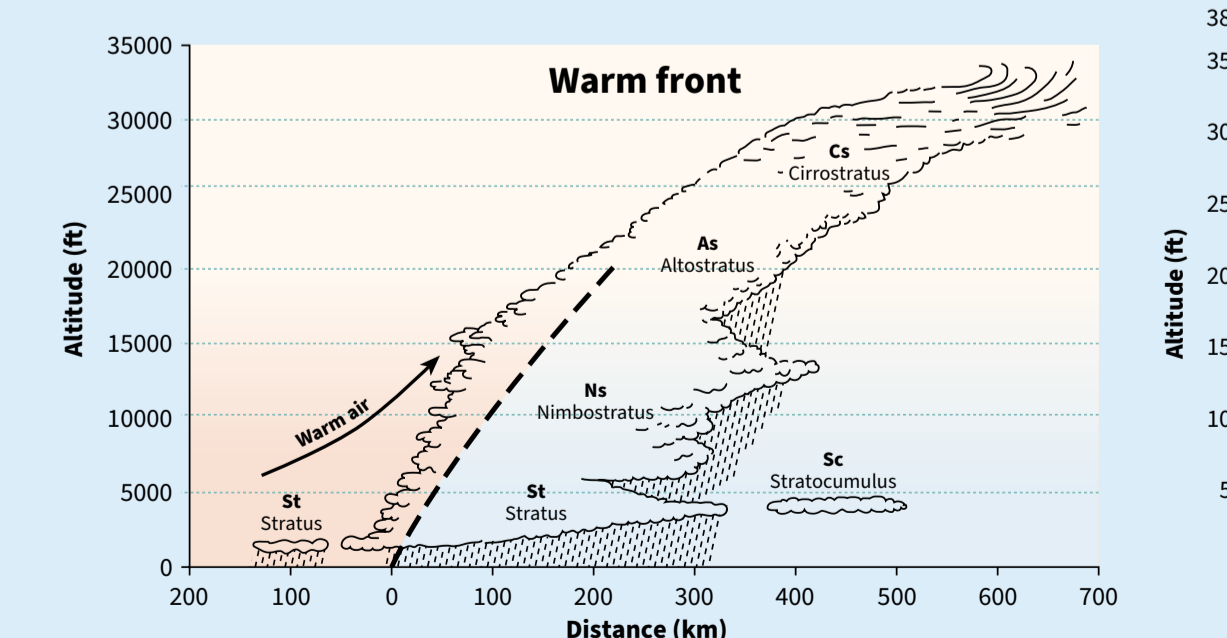
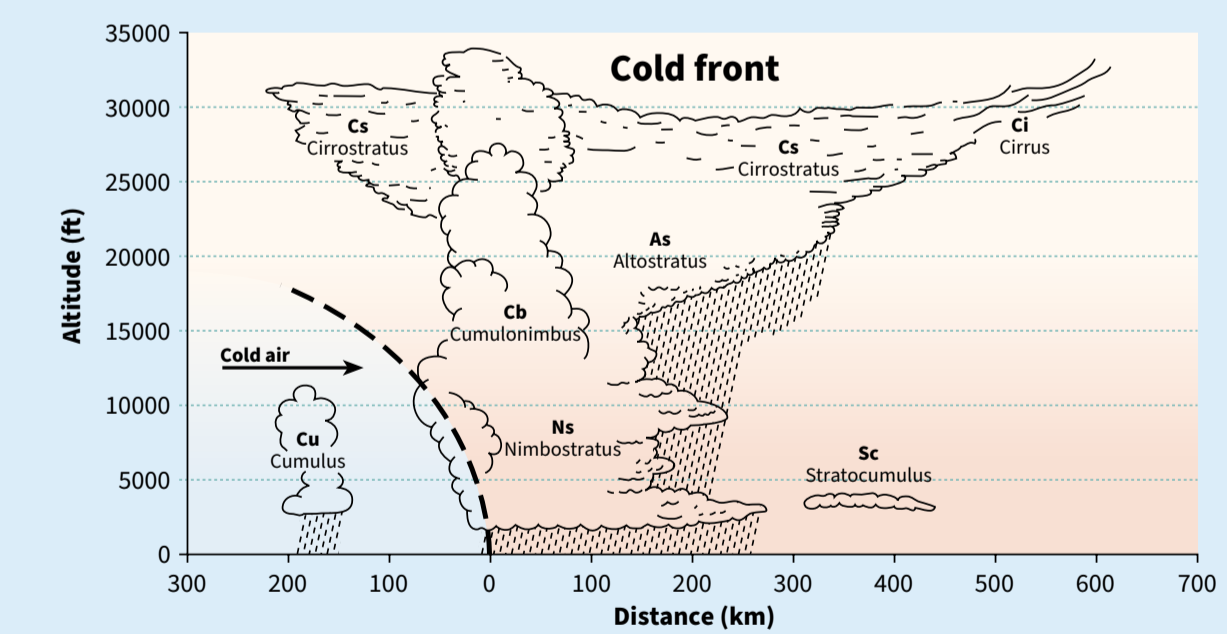


**A low over the northeast Tasman Sea with an associated frontal system over northern New Zealand.**  
This type of situation may bring Ns to areas near the front, lifting to As at some distance ahead of the front and to Cs even further away.

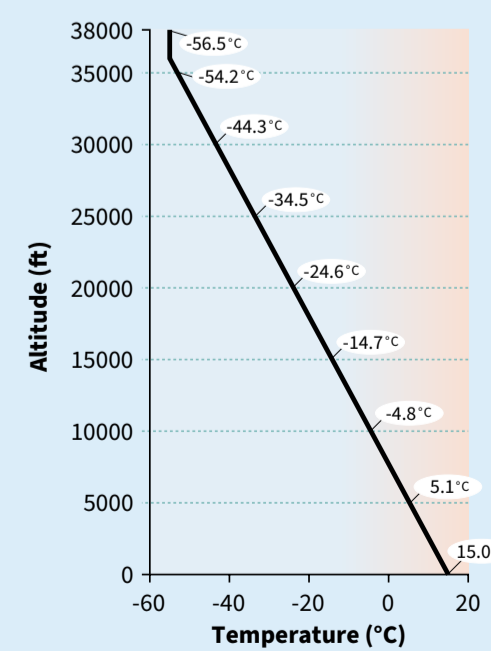


## Weather fronts

Vertical cross-section through idealised cold and warm fronts. Precipitation is shown by dashed lines. Actual fronts may vary considerably from these idealised views.



**International Standard Atmosphere**



6500 ft – 20,000 ft

Cloud base: Surface – 6500 ft