

U3A Port Fairy  
*Science...naturally!*

## Clouds Part 2 – Mid-level Clouds

Ross Knudsen, 2 June 2020



**Altocumulus stratiformis undulatus over Port Fairy at sunset during summer**

In Part 2 of this cloud presentation, I shall take you through the journey of the mid-level clouds and how they fit into the patterns of our weather.

The mid-level clouds are a little denser than the Cirrus clouds of Part 1. This is a start in being able to recognise the differences, even if you are unable to gauge their altitudes. They look different and are different to Cirrus clouds.

They are not as wispy as Cirrus, as they contain water droplets as well as ice crystals. Mid-level clouds form lower in the troposphere where there are more condensation nuclei for the water or ice to grow on and therefore make them denser.

### **Three types**

Altocumulus & Altostratus and Asperitas clouds\* (see note)

### **Composition**

A mixture of water and/or ice crystals

### **Precipitation**

Altocumulus – very occasionally causes light rain or sometimes ‘virga’ (ice crystals not reaching the ground)

Altostratus – occasionally light rain or snow

Asperitas – Nil precipitation

### **Formation**

Worldwide from the tropics to the poles. Form between 6,500 and 20,000 feet (2000 to 6000 m)

### **Visual effects**

Altocumulus – layers or patches of cloudlets in the shape of rounded clumps or almond/lens shapes. **Sometimes stunning!**

### Very picturesque clouds at sunrise or sunset

Altostratus – A very boring and featureless cloud that can cover large amounts of the sky. The sun can appear through this cloud as if looking through ground or etched glass.

Asperitas – A chaotic cloud with a wavy appearance. Great to see with time-lapse photography.



**Altostratus cloud at sunrise over South Beach, Port Fairy in late summer. The underside of the rounded clumps is illuminated with brilliant visual effects**

**Note** - Asperitas\* are associated with Altostratus clouds when forming in the mid-level. They are a rare cloud formation and may form near storms. Can be seen in the sky above Port Fairy prior to a south westerly change.

Asperitas clouds became the tenth type of cloud to be officially placed in the International Cloud Atlas in 2017.

### **More important info:**

- The mid-level clouds are the next type of clouds we usually associate with the change of weather after the Cirrus clouds
- They follow a typical sequence as a depression or front advances, and we encounter these types of layer clouds
- As time passes the cloud thickens and lowers and becomes dirty white or dull grey in colour. At first the sun may shine weakly through the cloud but as it becomes lower and thicker the sun is obscured

- They indicate the ascent of air is widespread which is evident if there is sufficient moisture in the atmosphere
- Altostratus is a sign of **regular** ascent of air creating a large layer of flat cloud
- Altocumulus is a sign where the ascent of air is more **irregular** (there is some convection or turbulence) and the cloud will have a lumpier appearance
- If there is sufficient moisture in the atmosphere, light rain will fall
- Shows up well on satellite images as masses of white cloud in association with upper-level clouds
- Able to be seen throughout the year and a regular feature in our skies

I shall now present some photos and place a name of the cloud type, and explanation with them. This is perhaps a better way of providing more detail on specific mid-level clouds.

The cloud type, I shall give its correct name which includes the species and variety (if it has one). You do not necessarily have to remember the whole name. Just recognising whether it is Altocumulus, Altostratus or Asperitas is sufficient.



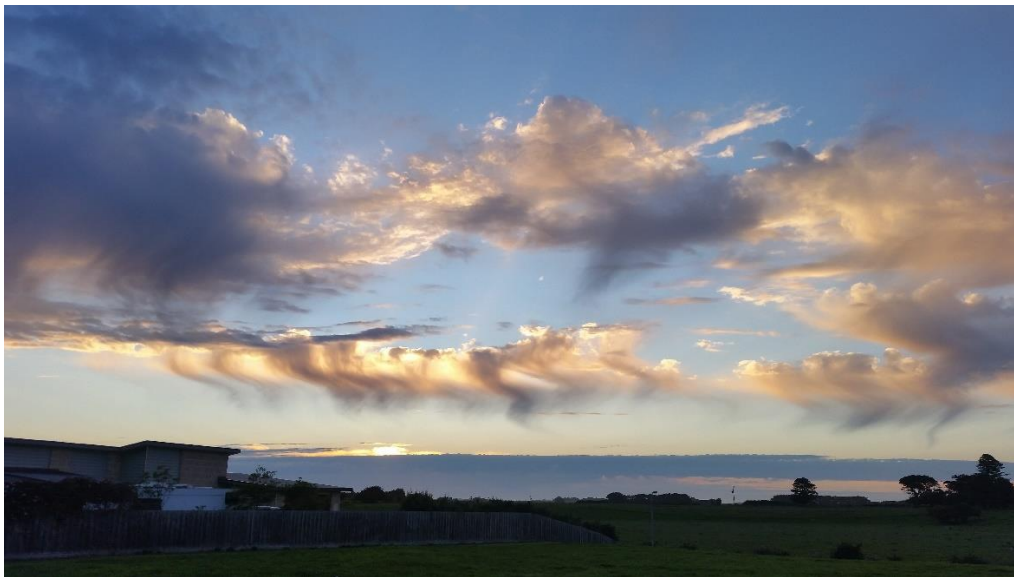
**Altocumulus stratiformis undulatus** – this image shows the identical cloud on page one. This photo though is during the middle of the day.

**The name defines it as being a mid-level cloud in layer form and structured in undulations**



**Altocumulus undulatus** over Port Fairy after sunrise. Although the photo shows only a portion of the cloud/sky, nearly the entire sky at the time showed extensive lines of cloud from west to east and north to south.

The name defines mid-level cloud in undulations. Its colour and density indicate mid-level cloud.



**Altocumulus floccus with virga** at sunset from Port Fairy.

Defined as mid-level cloud in cumulus-like tufts with ragged bases and fibrous tails (virga) of ice crystals falling below. You will see the dark and illuminated section of virga. The darker lower portion is created by the shadow of the Altostratus nearer the horizon. Also, something to note with the virga, is the direction and shape of the fibrous tails as they fall through the atmosphere where the wind changes speed and direction to give it a 'stepped' appearance.



**Alto cumulus lenticularis** over the Snowy Mountains south of Thredbo Village NSW.

These are mid-level clouds forming almond or lens-shaped masses that appear dense with pronounced shading. A beautiful formation created by very strong winds being forced upwards over the mountains. Indicative of very strong winds even at ground level. Often called a 'pile'o'plates' for good reason, if they stack one on top of each other. It also indicates many layers of moisture-laden air.



**Alto cumulus lenticularis** over the Dandenong Ranges. This shows a very well-formed almond or lens-shape. These clouds are also known as '**orographic cloud**'.

These lenticular clouds are stationary clouds and appear to remain in situ until the moist air has gone and they dissipate. The flat base is the condensation level and the slight arc on top indicates air ascending then quickly descending and evaporating in drier air. In this photo the wind is a strong northerly blowing from left to right.



**Lenticular cloud** downwind of Gariwerd (the Grampians) on a summer day.  
**On this occasion the clouds are individual elements and there is no stacking.**



**Lenticular cloud** at sunset somewhere on Earth.

**This shows two layers of moist air with a drier layer in between, forming orographically over the mountain**

**I told you that Altocumulus clouds presented stunning images!**



**Altostratus castellanus** on a summer day near Peshurst, Victoria.

**Often called castellanus, these clouds indicate instability in the atmosphere and the weather from this point will change within 24 hours. They get their name from appearing like turrets of a castle. Castellanus appears quite often in our skies.**

**Cirrus fibratus and uncinus appear as the wispy clouds at top of photo.**



**Altostratus translucidus** over Victoria's western plains.

**A featureless cloud where the sun appears as if looking through ground glass. The cloud is now thickening and lowering prior to a change.**



**Altostratus opacus** over Rocklands Reservoir (west of Gariwerd)

This cloud is of the 'opacus' variety as it is thick enough to mask the position of the sun (or moon if at night).

And the final photo.....



**Altocumulus asperitas** looking over the Southern Ocean from South Beach, Port Fairy.

If you look closely, you can make out the two waves (parallel lines) at the base of this formation. Chaos reigns in this cloud. If you were to see this under time-lapse, it would appear as though you were in the water looking up as breaking waves pass over you.

**Asperitas** translates to 'roughness' and relates to 'undulatus' clouds.



**Summary:**

The mid-level atmosphere presents spectacular motions and development. A combination of air and moisture, along with pressure, all work in a manner to assist in the formation of these wonderful clouds and a visual display for us to witness.

They form regular cloud patterns in our skies, and although the patterns may be regular, the clouds are always individual.

*Acknowledgements:*

*The Bureau of Meteorology*

*The Wonders of the Weather by Bob Crowder (a BOM publication 1995)*

*Nic Knudsen – photograph of lenticular clouds over the Snowy Mountains – page 5*

*Album cover of The Infamous Stringbusters – titled Silver Sky 2012 – lenticular cloud - page 6*

**Part 3 – Low-level clouds will be the next chapter**