WATER Kidz

Watching the Clouds Go By

Have you ever lain on your back on a Sunday afternoon and just watched the clouds go by? Do you know how they form and what their purpose is?

Clouds are actually suspended masses of water and ice floating above us. Clouds form when warm, supersaturated air rises and condenses in cooler temperatures, releasing its watery burden and creating thousands of millions of droplets that are only micrometers in size.

DID YOU KNOW?

English naturalist Luke Howard created the system of cloud classification in 1803, based on Latin roots for layer (*stratus*), curl of hair (*cirrus*), heal (*cumulus*) and violent rain (*nimbus*).

There are 27 different sub-types of cloud – from the wispy to the ominous. Clouds are named according to their height and form. Cirrus typically forms high in the sky (above 6 000 metres), when strong winds sweep ice crystals into shapes that remind of wisps of fleece.

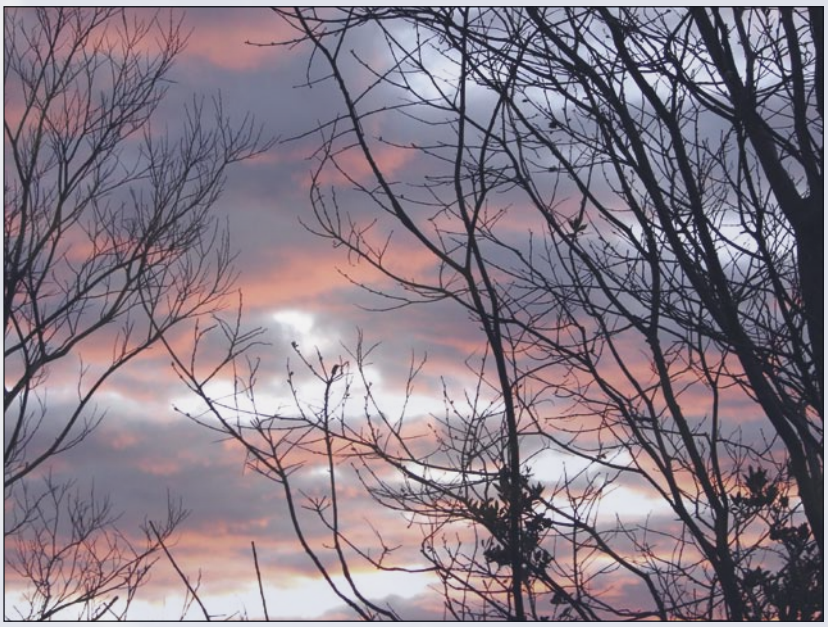
Impenetrable grey sheets, stratus creates the rainy-day look typical of Cape winters. Altostratus forms in the middle of the cloud-forming layer of the atmosphere (2 000 to 6 000 metres) and may contain ice and water. Rain-bearing sheets of cloud are called nimbostratus.

Those cauliflower-shaped clouds are called cumulus. These clouds begin in the lower level of the sky and may tower up to 16 km high. Although all clouds are white, dense, rain-bearing clouds with vertical development (cumulonimbus), often capped with an anvil-shaped head, appear dark grey when viewed from below.

Of the various miscellaneous cloud types, heavy mamatus, formed when clouds sink in air, is the most recognisable. Mammatus is characterised by grey cloud that hangs like cows udders, and is often a harbinger of rain. Other types of clouds are orographic clouds. These clouds are formed as moist air rises over mountains or other major geographic features. The air floats up the side of the mountain and cools quickly, condensing and turning into a cloud.

A pileus cloud is a smooth cloud that is found over or on the top of a major geographic feature, like a mountain. A contrail (short for CONdensation TRAIL) is a cloud-like vapour trail that forms behind some aircraft when flying in cold, clear, humid air. The contrail forms from the water vapour contained in the jet's engine exhaust.

Clouds play an important part in trapping and reflecting heat back to Earth – this is the 'greenhouse effect' that allows us to survive on Earth. Low, white, lumpy cumulus reflects sunlight away from the Earth, while thin, wispy, high-altitude clouds transmit light and trap heat, warming the Earth.



STORM CLOUDS

Storm clouds start small and grow as warm, humid air rises in an unstable atmosphere. Here, cool and warm air mixing creates strong updraughts that support large amounts of water.

CLOUDS ON THE WEB

- http://en.wikipedia.org/wiki/Clouds
- www.carlwozniak.com/clouds
- http://pals.agron.iastate.edu/carlson/main.html

MAKING CLOUDS

Clouds are created in five ways:

- As air heated by the ground rises in thermal currents into cold air.
- As air is forced upward by a topographic feature such as a mountain (called an orographic cloud).
- As two fronts meet and the warmer front is forced to rise.
- As turbulent air currents sweep across the Earth's lumpy surface.
- As cold air meets the warm ocean surface.

Eventually the updraughts weaken, or the amount of water becomes so great that the updraught can no longer support it aloft, and it falls to the ground as rain. Severe storms usually hit in the afternoon when the Earth's surface is hottest, but can be difficult to predict.

Hailstorms are the bane of car insurance companies and crop farmers, dangerous to anyone caught unawares. Hailstorms form as small particles of ice circulate in the updraughts of storm clouds, and can increase their size by accumulating layers and colliding with other ice fragments.

Clouds can also become electrically charged, building up a negative charge at the base and a positive charge at the top of the cloud. Although the mechanism is poorly understood, the charge imbalance may be created as collisions knock electrons off water molecules within the cloud. The intensive electric field created repels the electrons at the Earth's surface, creating a positive charge on the ground. Lightning addresses this imbalance with a surge of electricity, heating the air to around 30 000˚C.