

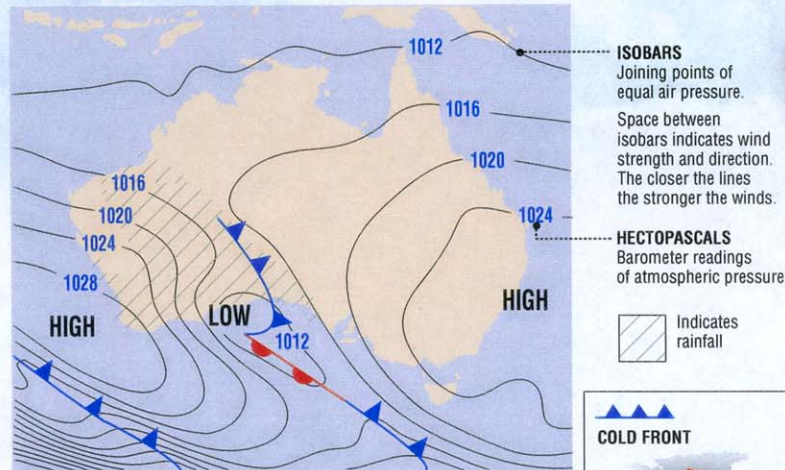
# Learning



<http://ink.news.com.au/mercury>

Few sciences are as much the subject of everyday discussion as meteorology or the study of the earth's atmosphere and the weather. It affects each of us every day and we all comment on the ability of scientists to predict the day's weather, making sure that we don't leave the house without hearing, watching or reading a weather report. Although humanity has come a long way in understanding the science of weather since Aristotle coined the term "meteorology" in the 4th century BC, there are still many mysteries to be solved and our ability to predict weather based on scientific evidence is constantly being honed through advances in science and technology.

## Reading a weather map



This is a synoptic chart meaning "seen together"

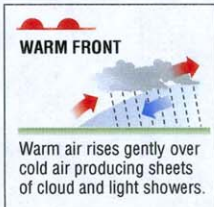
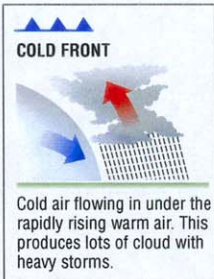
### Highs

When you hear a weather forecaster say that an area of high pressure will dominate the weather. This usually means your region has several partly to mostly sunny days in store with little or no precipitation. Air tends to sink near high-pressure centres, which inhibits precipitation and cloud formation. This is why high-pressure systems tend to bring bright, sunny days with calm weather.



### Lows

When forecasters say a low pressure area is moving toward your region, cloudy weather and precipitation result. Air rises near low pressure areas - as air rises, it cools and often condenses into clouds and precipitation. The low strengthens as cold and warm air clash. Low pressure systems have different intensities with some producing a gentle rain while others produce high-force winds and a massive downpour.



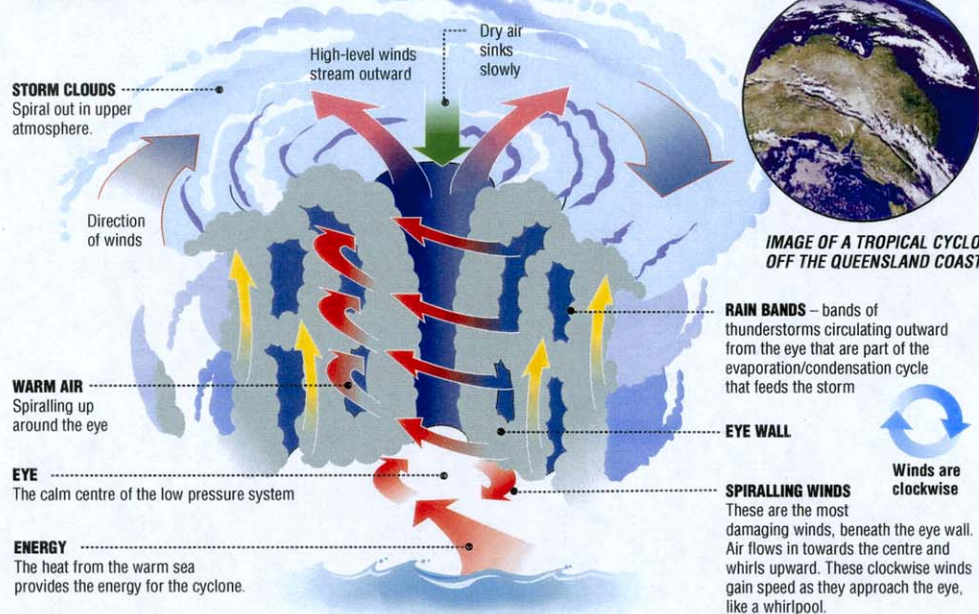
# Reading the Weather



## Tropical cyclones

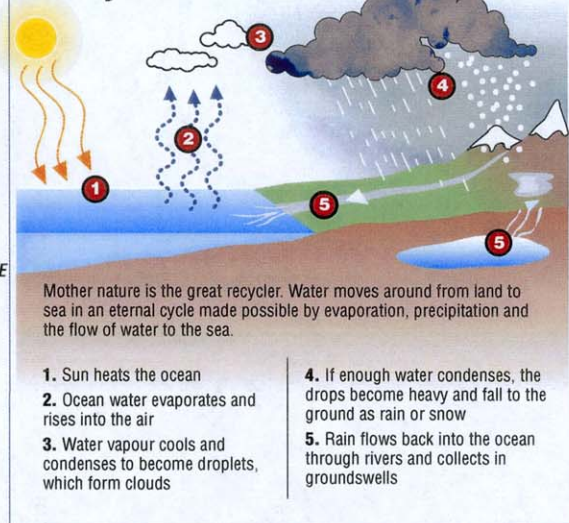
Tropical cyclones, as their name suggests, are generated in tropical areas of the ocean near the equator. They are cyclonic, meaning that their winds swirl around a central eye. Wind direction is clockwise in the Southern Hemisphere and counterclockwise in the Northern Hemisphere. Cyclones form in low pressure systems, the eye of a cyclone is always a low-pressure area. The winds swirling around the centre of the storm have a sustained speed of at least 119 km/h, enough to rip up trees and destroy buildings. One of the worst tropical cyclones to hit an Australian city was Cyclone Tracy, which levelled large areas of Darwin at Christmas in 1974.

### MAIN PARTS OF A CYCLONE



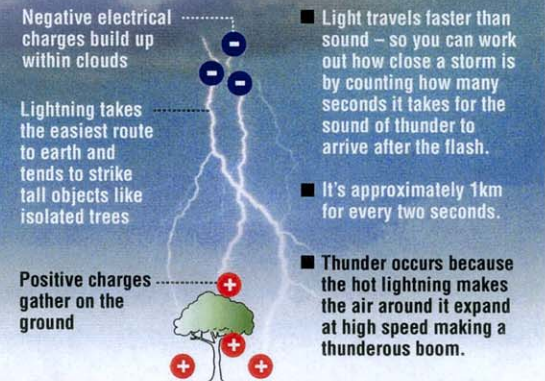
Snow forms when ice crystals in clouds stick together and form snowflakes. When these grow large enough, they fall. No two snowflakes are alike - they come in all sorts of shapes but usually have six sides.

## Rain cycle



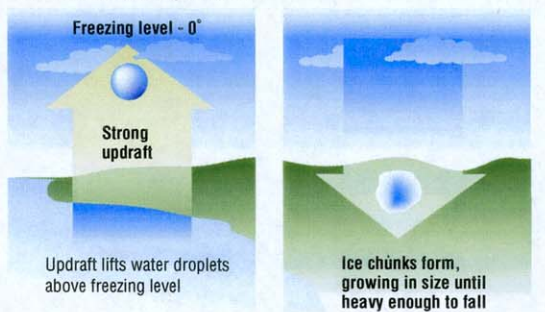
## Lightning

As a thunderstorm grows, electrical charges build up within the cloud. Oppositely charged particles gather at the ground below. The attraction between positive and negative charges quickly grows strong enough to overcome the air's resistance to electrical flow. Racing toward each other, they connect and complete the electrical circuit. Charge from the ground then surges upward at nearly one-third the speed of light and we see a bright flash of lightning.



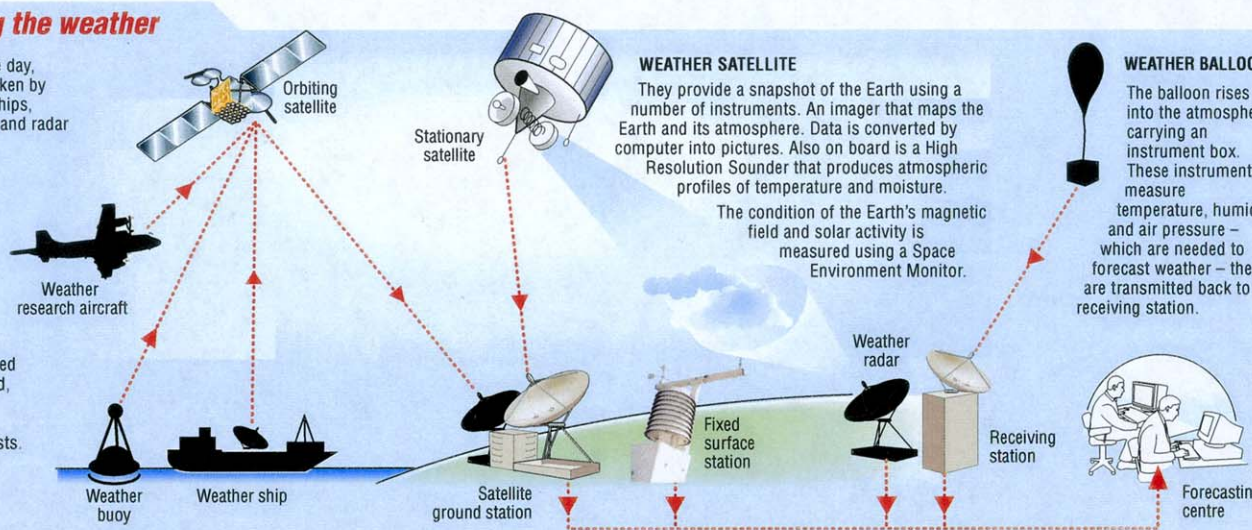
## Hail stones

Thunderstorms are often accompanied by hail. Hail forms when strong currents of rising air, known as updrafts, carry water droplets above the freezing level in thunderstorms and the water freezes into ice. Hail often melts before it reaches the ground, but in some cases ice chunks the size of golf balls fall.

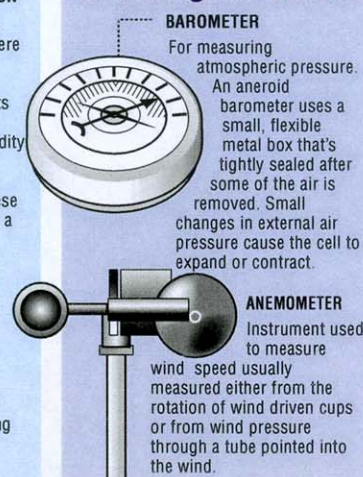


## Forecasting the weather

Every minute of the day, observations are taken by weather stations, ships, satellites, balloons and radar the world over. All this data is fed into super computers at forecasting centres. Meteorologists then use this information to draw up maps indicating air pressure, wind speed and direction, cloud, temperature and humidity to make short-range forecasts.



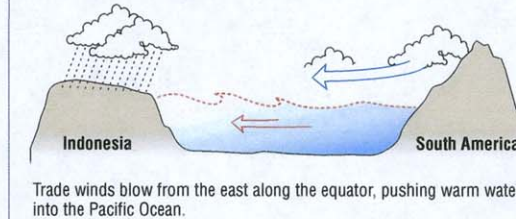
## Measuring the weather



## Drought and El Nino

El Nino is the perfect example of how truly global weather patterns can be. A simple change in direction of the prevailing winds across the Pacific Ocean affects continents on different sides of the globe.

### Normal conditions



### El Nino conditions



Every 5-7 years the winds, normally blowing from east to west, change direction pushing warm water toward the coast of South and Central America where it piles up causing humidity, rains, floods and savage waves. Meanwhile the west Pacific becomes drier, with drought in Indonesia and Australia. It was dubbed El Nino - the Christ Child - by South Americans, because the phenomenon normally begins at Christmas. El Nino also affects the amount and type of fish in the ocean because nutrients are not washed up from colder layers of water deep in the ocean as they are under normal conditions. Although the phenomenon (the warming of the coastal waters off South America) has been known of for centuries, it only became known to western science 100 years ago. It is only since the '60s that in-depth monitoring and research have brought a better understanding of its effects and a link to drought in Australia. The current drought in NSW is not linked to El Nino but climatologists say that conditions may become worse with an El Nino event possible at the end of 2002.

