

Types of Precipitation



There are three important points to remember about precipitation:

1. Air cools as it rises.
2. As air cools, water vapour (which is invisible) condenses. Clouds begin to form. Clouds are made up of very tiny drops of **liquid** water, which are held aloft by air currents because they are so light.
3. If there is sufficient condensation, the cloud droplets will start to merge together and eventually start to fall as they get too heavy to stay aloft. This is precipitation.

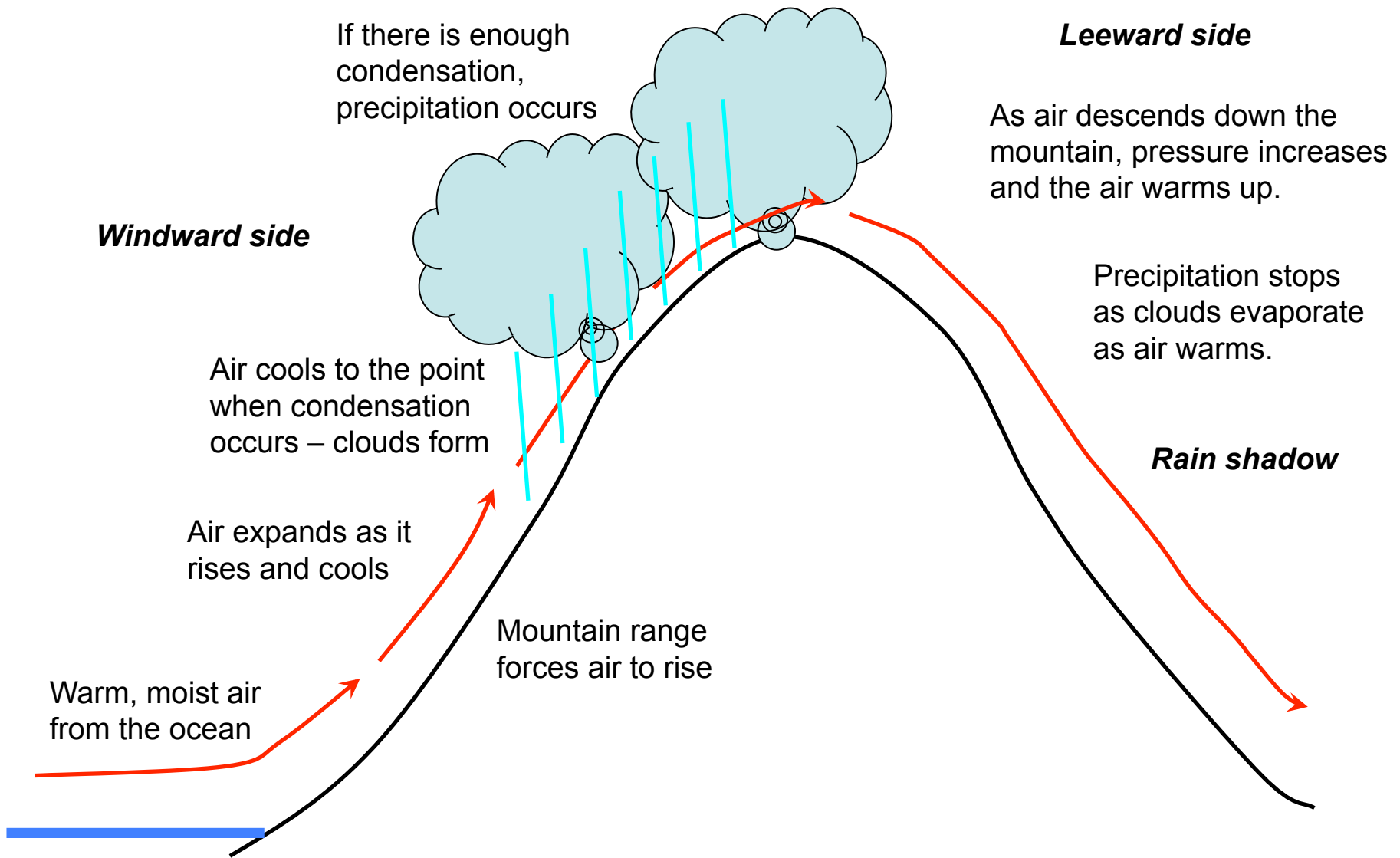
Air may be caused to rise in one of three ways:

1. As it cross an area of higher elevation – causes **relief (or orographic) precipitation**.
2. It absorbs heat from the ground and rises – causes **convective precipitation**.
3. Cooler, denser air flows underneath it forcing air aloft – causes **cyclonic precipitation**.

Relief Precipitation



<http://www.nicholaskrebs.com/Hawaii/Kauai/Rain%20over%20Kahili%20Mountain.jpg>



Relief Rainfall

- **Stage 1.**
Warm wet air is forced to rise over high land.
- **Stage 2.**
As the air rises it cools and condenses. Clouds form and precipitation occurs.
- **Stage 3.**
The drier air descends and warms.
- **Stage 4.**
Any moisture in the air (e.g. cloud) evaporates.





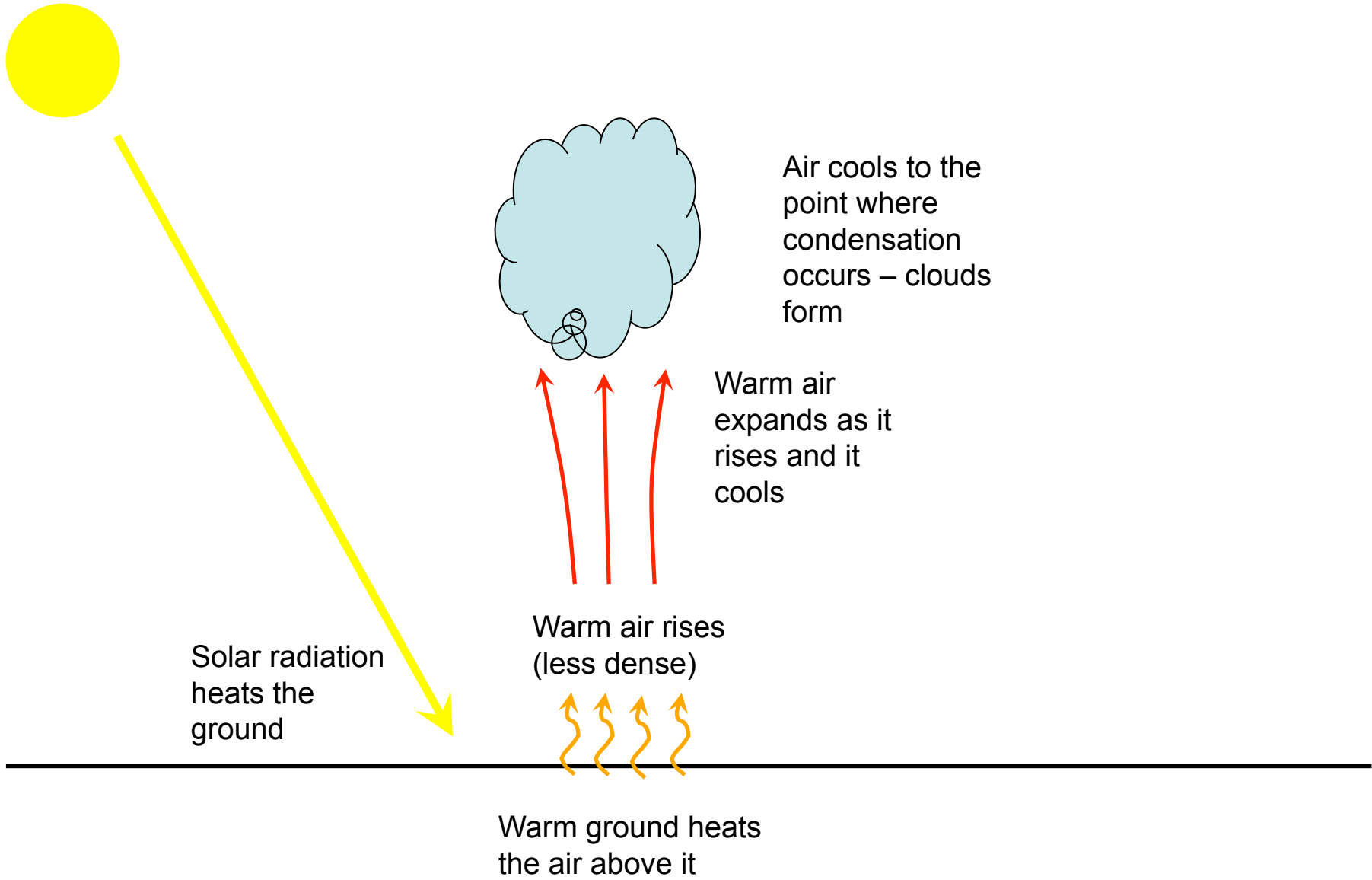
<http://www.srh.weather.gov/srh/jetstream/synoptic/images/upslope.jpg>

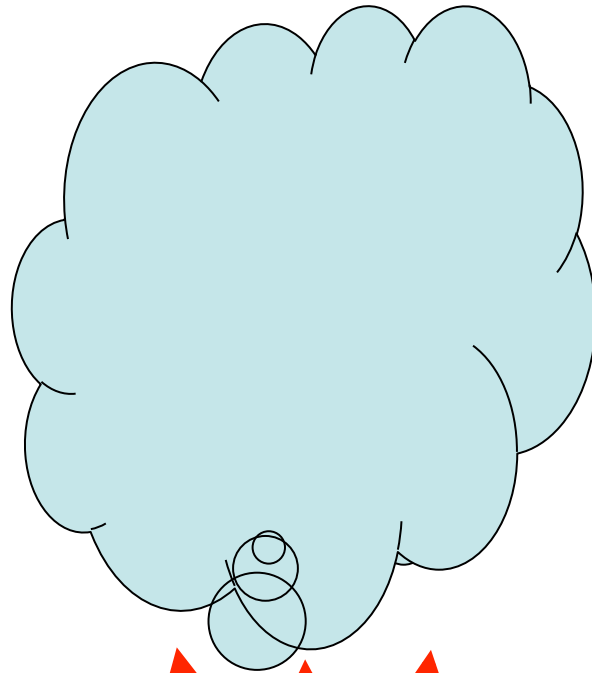
Convective Precipitation



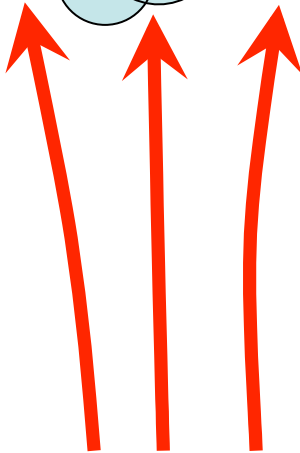
<http://www.okeechobeeec.com/images/thunderstorm.jpg>







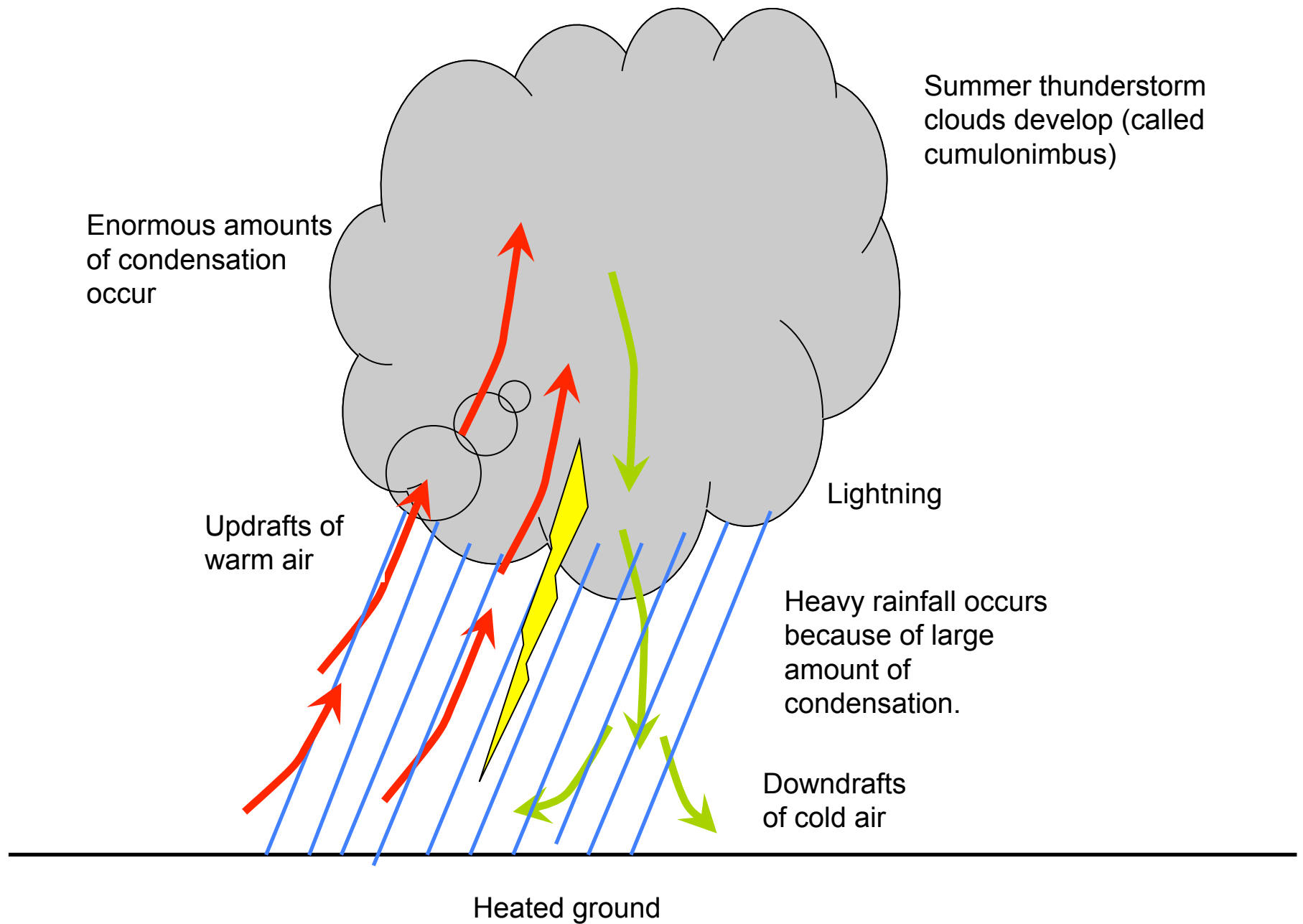
Condensation continues
and clouds grow
vertically

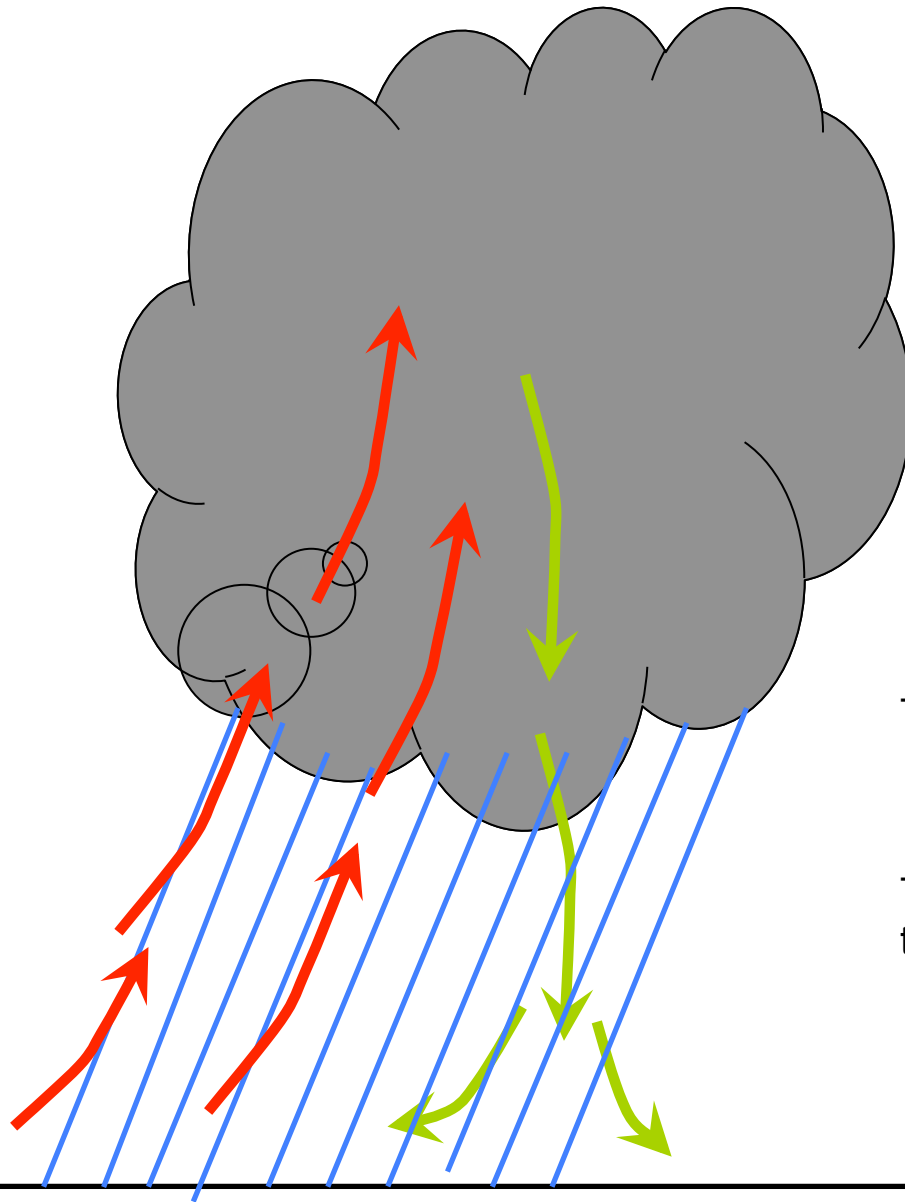


Warm air
continues to
rise



Heated ground





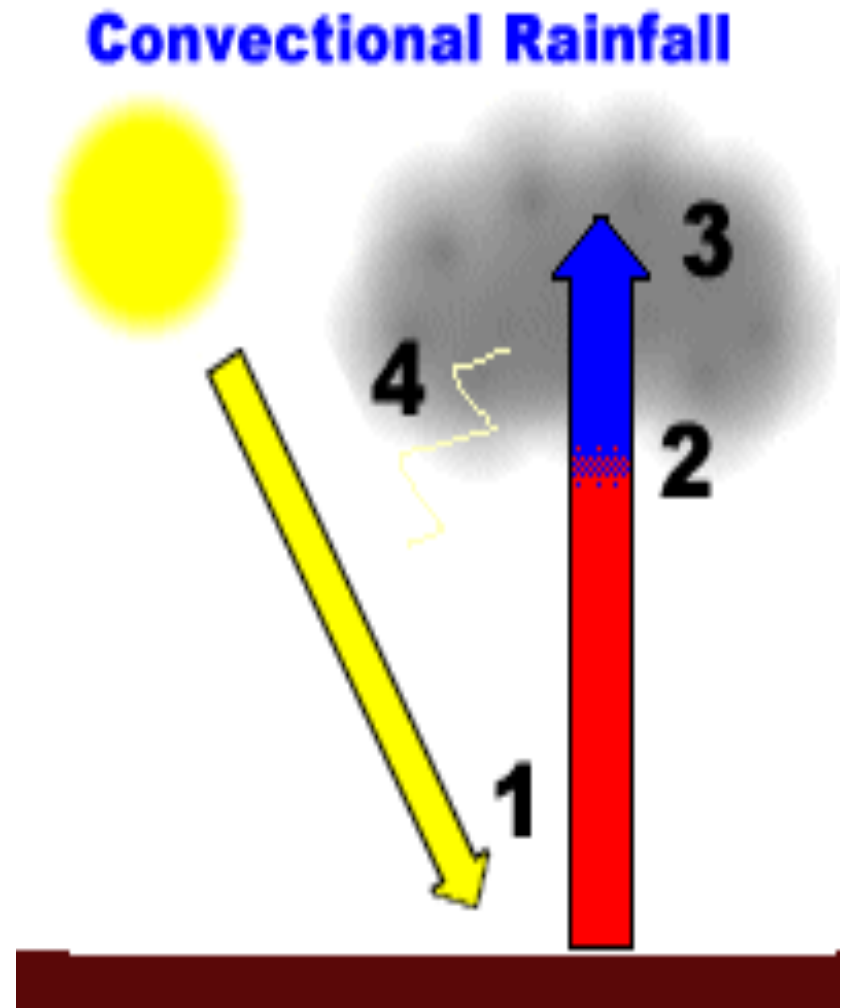
Eventually the cooling effects of the rain, the cold down drafts, and the lack of solar heating because of the clouds stop the updrafts as the ground cools off.

The rain stops.

The down drafts and the clouds disappear

Convictional Rainfall

- Stage 1.
The sun heats the ground and warm air rises.
- Stage 2
As the air rises it cools and water vapour condenses to form clouds.
- Stage 3.
When the condensation point is reached large cumulonimbus clouds are formed.
- Stage 4.
Heavy rain storms occur. These usually include thunder and lightening due to the electrical charge created by unstable conditions.



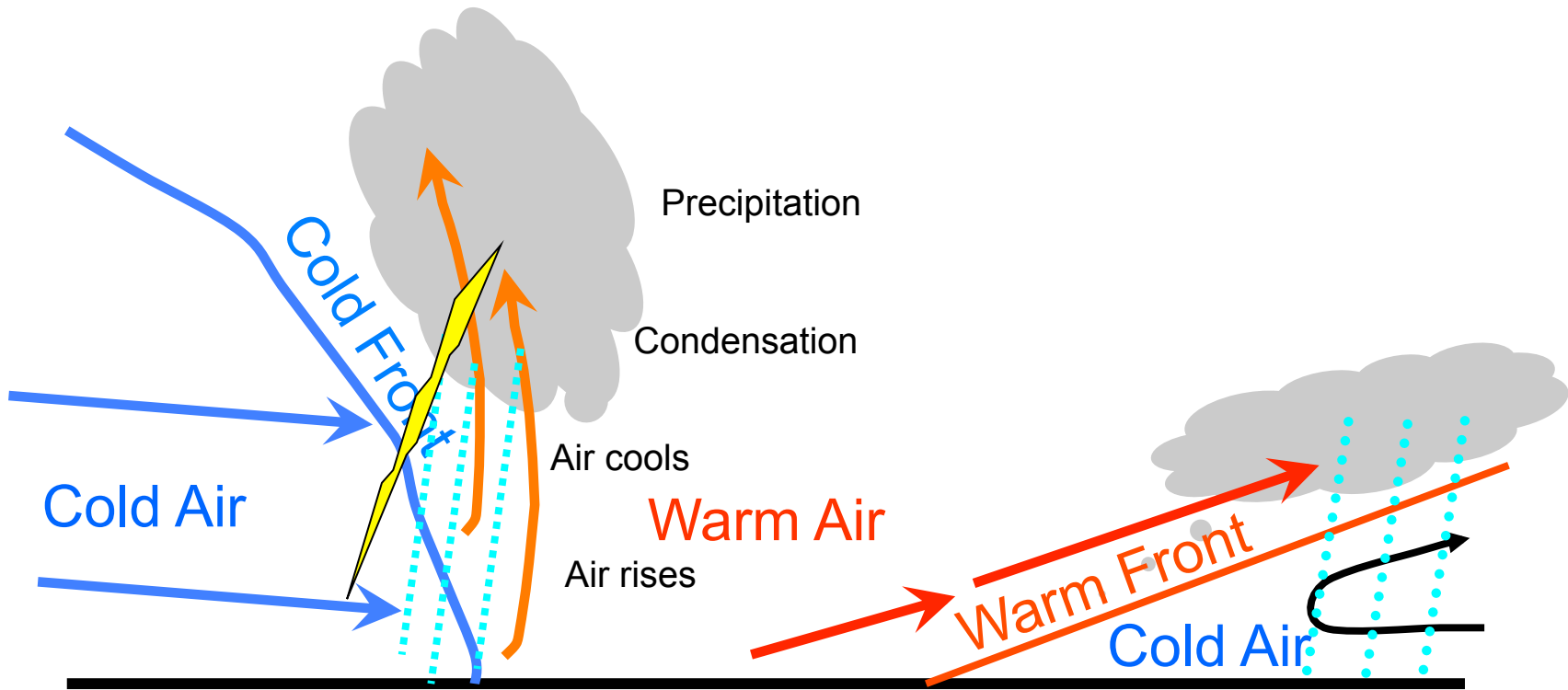
Cyclonic Precipitation



<http://www.engineering.usu.edu/uwrl/atlas/photos/ch2storm.gif>

Cross-section of a mid-latitude cyclonic storm

*Because the air is being forced to rise, mid-latitude storms are also called **low pressure cells or systems**.*



Cyclonic/Frontal Rainfall

- **Stage 1.**
An area of warm air meets an area of cold air.
- **Stage 2.**
The warm air is forced over the cold air
- **Stage 3.**
Where the air meets, the warm air is cooled and water vapour condenses.
- **Stage 4.**
Clouds form and precipitation occurs.

frontal rainfall

