Global Weather 3

**Outcome: (115-2), (331-1)**

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## **Clouds**

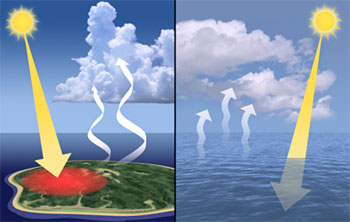
**Have you ever wondered how clouds are formed?**

* Recall from other lessons that **when air is warmed it begins to rise**.
* As the air rises **it begins to cool and expand**.
* This cooled air **can no longer hold all its moisture**.
* The water vapour begins to **condense on dust particles as very tiny water droplets**.
* There are so many water droplets that they **appear white and block out the sky above**.
* Depending on the temperature clouds may be made up of **tiny water droplets and or tiny ice crystals**.

#### **Three main types of clouds:**

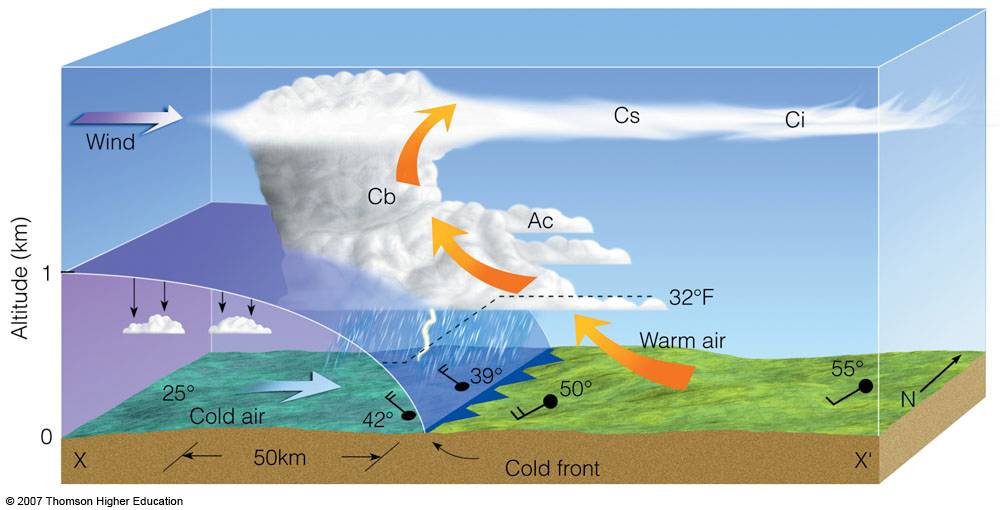
#### **1. Convective**

* Formed when a land mass is heated and the **warmed air begins to rise, expand, cool and water condenses**.
* We see these types of clouds where **thermals and sea breezes are formed**.



#### **2. Frontal**

* Form at the frontal zone where **two large air masses meet**.
* The warmer air mass is forced to **rise up over the cooler air mass**.
* As the warmer air mass is forced to rise it **expands and cools resulting in the formation of condensation**.



#### **3. Orographic**

* Formed because of **geography**.
* Formed when air is forced to **rise up a large hill or mountain**.
* As the wind blows into the **side of the mountain it rises up**.
* As the air rises it **expands and cools causing water vapour to condense as clouds**.

#### http://t0.gstatic.com/images?q=tbn:ANd9GcR7q6-3PXuHTCAjQMi6lrFfzPiDjBqethylWdqGKTX0r8tG5wRhqzGWcJ28Gg

#### **Fog:**

* Cloud type that **forms near the ground**.
* Fog forms when **warm moist air moves over a colder surface**
* The cool surface causes the warm air to **cool and release its moisture as very fine water droplets**.
* In Newfoundland warm air from the south follows the **Gulf Stream**.
  + This warm moist air then pushes over the **cold Labrador Current**.
  + These **two ocean currents collide** off the coast of Newfoundland at the Grand Banks.
  + Not surprisingly, the Grand Banks are **known as one of the foggiest places in the world**!

#### **Cloud shapes tell us about atmospheric conditions:**

#### http://eo.ucar.edu/webweather/images/cloudchart.gif

#### **1. Cumulus Clouds:**

* Heaped" or "lumpy" clouds result when **strong vertical (upward) motions exist in the atmosphere**.
* This shows us that the air mass is **being forced to rise very rapidly**.
* Cumulus clouds are a clue that the **atmosphere is unstable and are usually associated with stormy or severe weather**.

#### **2. Stratus Clouds:**

* Wide **spread out, smooth, layered clouds**.
* These clouds give a clue that the air **motion is horizontal** (across) rather than vertical (up and down).
* We see this when the **air mass that the clouds are forming in are rising slowly**.
* This type of cloud is a **sign of a stable atmosphere**.

**Cloud cover Maintains balance on earth:**

* Clouds play two main roles
* The first is that they **simply act as a blanket**.
  + On cloudy nights the **cloud cover traps the heat from the earth keeping the air warm**.
  + When the night sky is clear **the earth's heat escapes and the air cools quickly**.
* The second role of clouds is to **keep the earth cool during the day**.
  + The formation of white cloud cover, **reflects the sun's energy away**.

**When is there a greater risk of frost, on a cloudy night or a clear night?**

* **Clear night because temperature drops quickly therefore reaching the dew point and if it is cold enough, frost will form**

Deserts regions are so dry that clouds do not form during the day or the night. What do you think the temperature conditions would be like?

* **In the day due to lack of cloud cover, the desert would receive high temperatures caused by direct sunlight**
* **In the night, the temperatures will likely get very cold due to lack of cloud cover which results in most of the heat escaping into space**

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