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## Climate Change

- weather can change very drastically
- weather and climate can change across small distances

### Air Pressure

- move from high to low
- force exerted by the air above us
  - more air pressure at lower elevation (closer together)
  - less air pressure at higher elevation (farther apart)
    - \* An example of this is Denver, Colorado. Sporting events played at this location notice farther ball travel and that is because it is a mile above sea level. This makes the air thinner as there is less of it.
- things want to move towards sea level (equilibrium)
- air is wanting to move perpendicularly to isobars
- The change from high pressure to low pressure cause the formation of wind.
- Gas molecules at higher elevations tend to spread out.
- Air pressure reacts laterally

### Local Winds along Coasts

- rocks are not good capacitors to heat
  - they will be really warm in the morning and afternoon but quickly cool at nighttime.
- air will sink in colder zones (the water during the day) and rise when hot (the ground during the day)
  - this cycle is actually swapped during the nighttime because water can retain its heat much better than air can
- there are wind patterns globally
- prevailing westerlies (winds from the West)
- prevailing easterlies (winds from the East)
- the earth is always moving

## The Coriolis Effect

- an effect whereby a mass moving in a rotating system experiences a force (the Coriolis force ) acting perpendicular to the direction of motion and to the axis of rotation.
- On the earth, the effect tends to deflect moving objects to the right in the northern hemisphere and to the left in the southern and is important in the formation of cyclonic weather systems.
- Affects anything moving in the air
- slow moving objects are more subject to this effect rather than fast moving objects
- since an object is on a moving sphere, the expected trajectory of the object will not be the actual trajectory when launched across a large distance. The ground is moving at a constant rate when the projectile is in the air.

## Three Phases of Water

- Solid (heat ↓)
- Liquid (heat is neutral)
- Gas (heat ↑)

Unique to Earth and makes it possible for life to exist

## Perciptation

- Heat it up and have it condensate into a liquid

Liquid → gas → liquid

## Condensation nuclei

- dust
- pollution
- salt

Things that water binds to in the atmosphere and creates rain drops

Most of our rain drops start off as ice, it heats up and creates rain drops

Mountains are high and the heavy clouds cannot make it over the mountain. They rain on us and then they are able to make it over the mountain

This is called the “rain shadow desert.”

## Cold Front

Cold mass encounters a hot mass and causes the hot mass to rise even more.

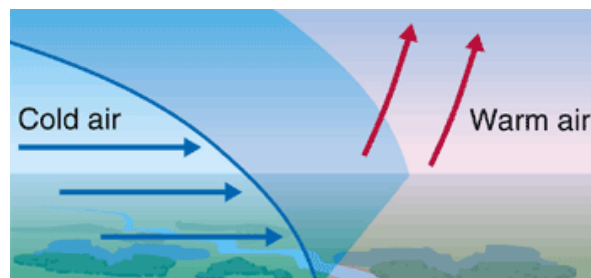


Figure 1: Cold Front

## Thermohaline Conveyor

- global circulation of surface and deep water driven by . . . .



Figure 2: Thermohaline Conveyor

## Large Weather Patterns

### Hurricanes

- northern hemisphere rotates counter-clockwise
- southern hemisphere rotate clockwise
- They are fighting the Coriolis Effect which makes it peter out
- These storms form in the middle of a warm ocean waters because they water will rise.
  - This water then fuels the large moving system and will eventually die if it reaches cold water or land, depriving its source of warm water
- Water in the equator is warmer and there is more rainfall/precipitation

### Tornadoes

- Tornadoes start over land
- These tend to move faster because there is more moving air condensed into a smaller area
  - Think of an ice skater tucking in to increase it's speed
- Tornado alley is right in the Mid-West.

### El Nino

- really warm and wet weather

### La Nina

- really dry and no rain

Faster the air means more things it can move.

## Global Climate Variability

The new name to global warming. There are a lot of different competing viewpoints on factors that contribute to the rise in carbon and the resulting heating up of the Earth.

There is no one solution/answer to how this will be fixed and if it is even entirely our fault. The Earth will go through cycles of cooling and heating. This is shown in the geologic time scale and we have no idea when or how much the Earth will change in temperature at a given time frame.

All we can do is to accommodate for the current situation and hope that our efforts make a difference.