





### Rain formation in warm (not frozen) clouds

- In a supersaturated environment, **activated cloud drops grow by water vapor condensation**
  - It takes many hours for the cloud drop to approach rain drop size.
- Collisions** between cloud drops can produce large rain drops much faster through **coalescence**
  - Collisions occur in part due to different settling rates of large and small drops
  - Not all collisions result in coalescence
- Rain formation favored by
  - Wide range of drop sizes
  - Thick cloud
  - Fast updrafts

### Forces Acting on the Air

- Pressure gradient force (pushing)
- Gravity (falling)
- Friction (rubbing against the surface)
- “Apparent” forces
  - The Coriolis Force
  - Centrifugal Force

$$\sum \vec{F} = m\vec{a}$$

### Jet Streams

- Subtropical Jet is zonal mean response to poleward flow in upper branch of Hadley Cell
- Polar front jet is response to meridional temperature gradients

