

Hydrologic Cycle

- 1) Earth has a water content of 1.36 billion cubic kilometers
- 2) 97.2% is stored in the oceans
- 3) The remainder is tied up in glaciers (2.15%), groundwater (0.62%), lakes, streams, atmosphere and soil moisture
- 4) Occurs in three states of matter, solid (ice), liquid, and gas (atmosphere)
 - a) Sublimation
 - b) Melting
 - c) Evaporation
 - d) Deposition
 - e) Condensation
 - f) Freezing
- 5) Hydrologic Cycle
 - a) endless circulation of water between ocean, atmosphere, and land
 - b) powered by energy from the sun
 - c) Evaporation
 - i) Process by which water passes from liquid to vapor
 - ii) Solar Energy heats up the water
 - iii) Occurs at both the ocean and on land (either from surface water or soil moisture)
 - d) Precipitation (ppt)
 - i) Rain, snow, sleet, etc.
 - ii) Minimal conditions needed for ppt
 - (1) Humid air mass must be cooled to dew point
 - (2) Condensation nuclei must be present
 - (3) Droplets must coalesce to form raindrops
 - (4) Raindrops have to be large enough to prevent complete evaporation as it falls
 - e) Infiltration
 - i) Water migrated through the subsurface (groundwater)
 - ii) Enters into surface water or the ocean
 - f) Transpiration
 - i) Water that is taken up by plants, but is released back into the atmosphere
 - g) Evapotranspiration
 - i) The combination of evaporation and transpiration
 - h) Runoff
 - i) Ppt exceeds the capacity of infiltration, thus water flows on the Earth's surface
 - ii) Factors affecting runoff
 - (1) Geology - is it soil, unconsolidated material, or bedrock. Is it fractured? Is it porous?
 - (2) Slope - a high angle of slope increases runoff
 - (3) Vegetation covering - the more vegetation the less runoff
 - (4) Time of the year - frozen ground vs. non-frozen ground, lower evapotranspiration vs. high evapotranspiration
 - (5) Soil Saturation - if the soil is saturated there is no room for water to infiltrate
 - (6) Type of precipitation - fast, hard rain increases runoff, slow soft rains allow for infiltration, snow vs. rain

- i) More evaporation than precipitation occurs over the oceans
- j) Conversely, on land more precipitation than evaporation occurs
- k) Runoff balances the water budget