

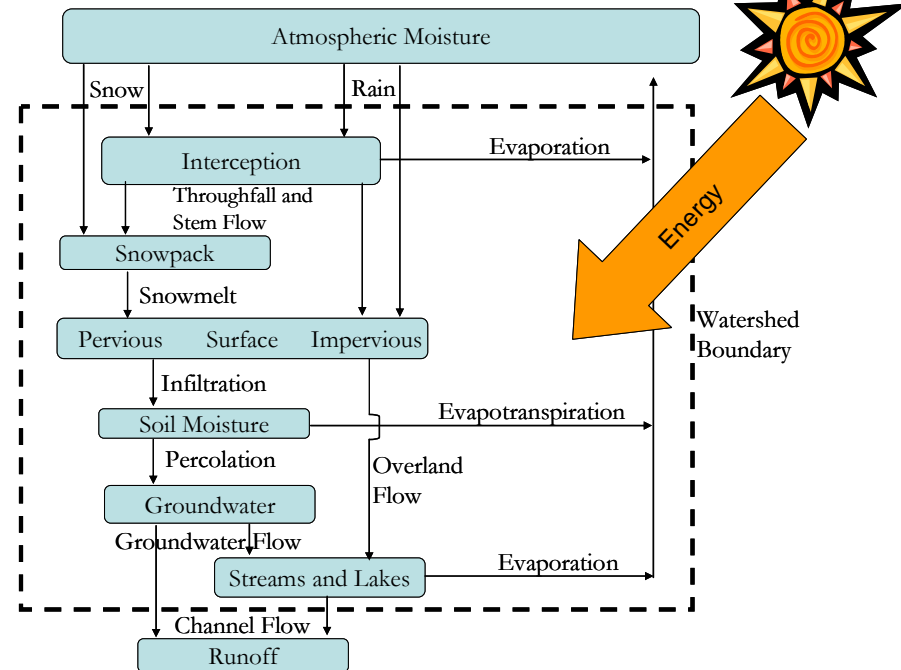
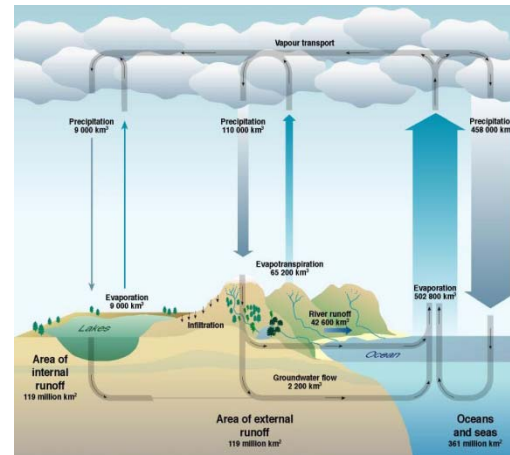
CE 374 K – Hydrology

First Quiz Review

Daene C. McKinney

Hydrologic Systems

- Global Water Cycle
 - Terminology
 - Some facts and figures
 - Hydrologic Cycle
- Systems Analysis
 - Watershed as a system



Transport in Hydrology

– Transport in Hydrology

- Mass, Momentum, Energy
- Equivalent depth over the watershed
- Water into/out of storage
- Manning's Equation
- Sensible and Latent heat
- Conduction and Convection
- Laminar and Turbulent
- Velocity Profile
- Radiation

$$\frac{dS}{dt} = I(t) - Q(t)$$

$$S_j = S_{j-1} + I_j - Q_j$$

$$V = \frac{1}{n} R^{2/3} S_f^{1/2}$$

$$u(z) = \frac{u^*}{k} \ln\left(\frac{z}{z_0}\right)$$

Atmospheric Moisture

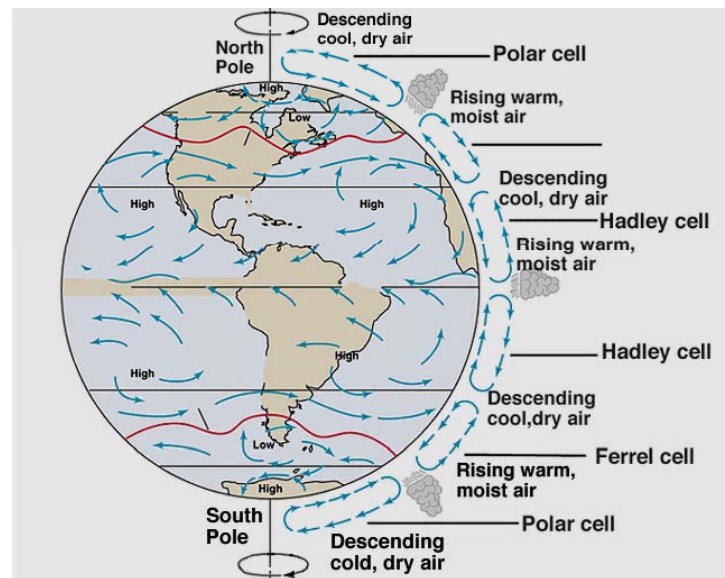
- Tilted, rotating Earth – How it affects radiation, warming and water transport
- Atmospheric structure and composition
- Water vapor
 - Vapor pressure
 - Partial pressure
 - Humidity
 - Saturation Vapor Pressure
 - Relative and Specific Humidity
 - Dew Point Temperature
 - El Niño

$$e = \rho_v R_v T$$

$$l_v = 2.501 \times 10^6 - 2370T$$

$$q_v \approx \frac{0.622e}{P}$$

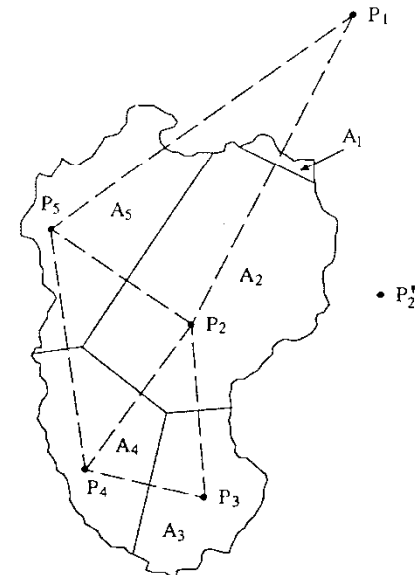
$$R_h = \frac{e}{e_s}$$



Precipitation

- Velocity of raindrops
- Precipitation mechanisms
 - Convective, Frontal , and Orographic
- Isohyet
- Rainfall depth and intensity
- Incremental and cumulative rainfall
- Areal precipitation estimates
 - Arithmetic method
 - Thiessen method
 - Isohyetal method

$$V_t = \sqrt{\frac{4gD}{3C_d} \left(\frac{\rho_w}{\rho_a} - 1 \right)}$$



Evaporation

- Terminology
 - Evaporation, Transpiration, Sublimation, Evapotranspiration
- Factors influencing evaporation
- Methods for estimating
 - Energy Balance, Aerodynamic, Combined

$$E_r = \frac{R_n}{l_v \rho_w}$$

$$E = 1.3 \frac{\Delta}{\Delta + \gamma} E_r$$