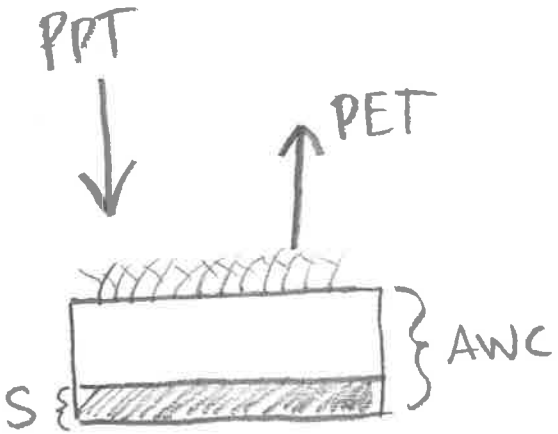
# Simplified Water Balance

INPUTS:
1) Precipitation (PPT)
2) Potential Evapotranspiration (PET)

OTHER VARIABLES:
3) Available soil water holding capacity (AWC)*
4) Soil moisture (S)
5) Actual Evapotranspiration (AET)
6) Unmet water demand (DEF)
7) Runoff (R)

* indicates time invariant




@ each time step calculate the net balance of

$$NET = PPT - PET$$

IF $NET > 0$

$$AET = PET$$

$$S(t) = \min\{AWC, S(t-1) + NET\}$$

$$R = \max\{S(t-1) + NET - AWC, 0\}$$

IF $NET < 0$

$$DEF = \max\{-NET - S(t-1), 0\}$$

$$AET = PET - DEF$$

$$S(t) = S(t-1) + NET \quad \text{if } DEF = 0$$

$$S(t) = 0 \quad \text{if } DEF > 0$$

Example water balance calculation

| | PPT | PET | S | AET | DEF | RO |
|---|---|---|---|---|---|---|
| Jan | 70 | 10 | 100 | | | |
| Feb | 50 | 20 | | | | |
| Mar | 60 | 50 | | | | |
| Apr | 40 | 80 | | | | |
| May | 50 | 120 | | | | |
| Jun | 40 | 140 | | | | |
| Jul | 20 | 180 | | | | |
| Aug | 20 | 160 | | | | |
| Sep | 20 | 100 | | | | |
| Oct | 40 | 50 | | | | |
| Nov | 80 | 10 | | | | |
| Dec | 80 | 10 | | | | |
| **Annual Sum** | 570 | 930 | | | | |

AWC=150mm