# Modeling sediment accumulation in tidal marshes

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Important terminology

- **Sediment**: inorganic/mineral particles
- **Accumulation**: used to refer to a mass accumulation rate [mass/area-time]
- **Accretion**: vertical growth above a defined horizon [length/time]
  - Accretion can be calculated by dividing total mass accumulation by bulk density
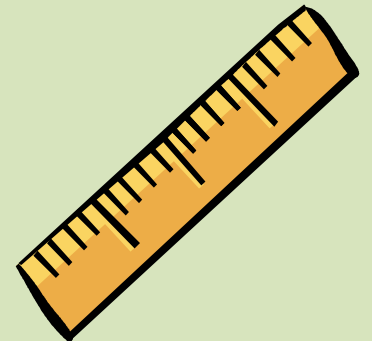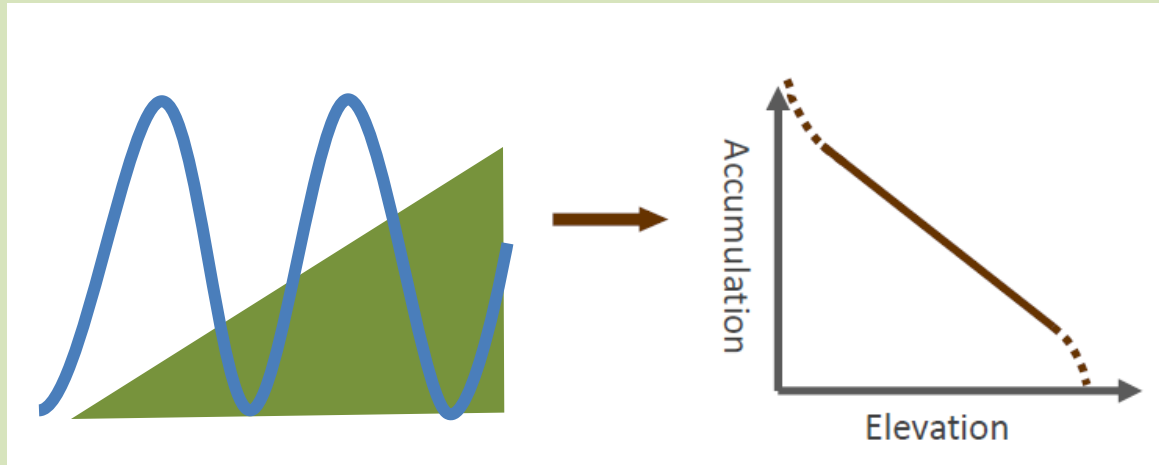
Common methods

- Constant
- Function of elevation
- Function of SSC
- Function of settling velocity
- Function of distance from sediment source
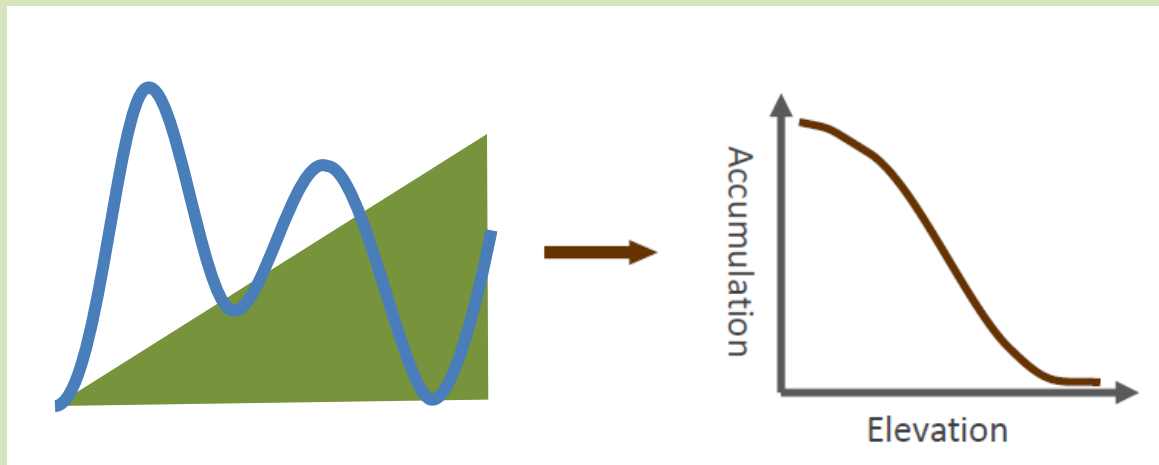- Deposition-Erosion

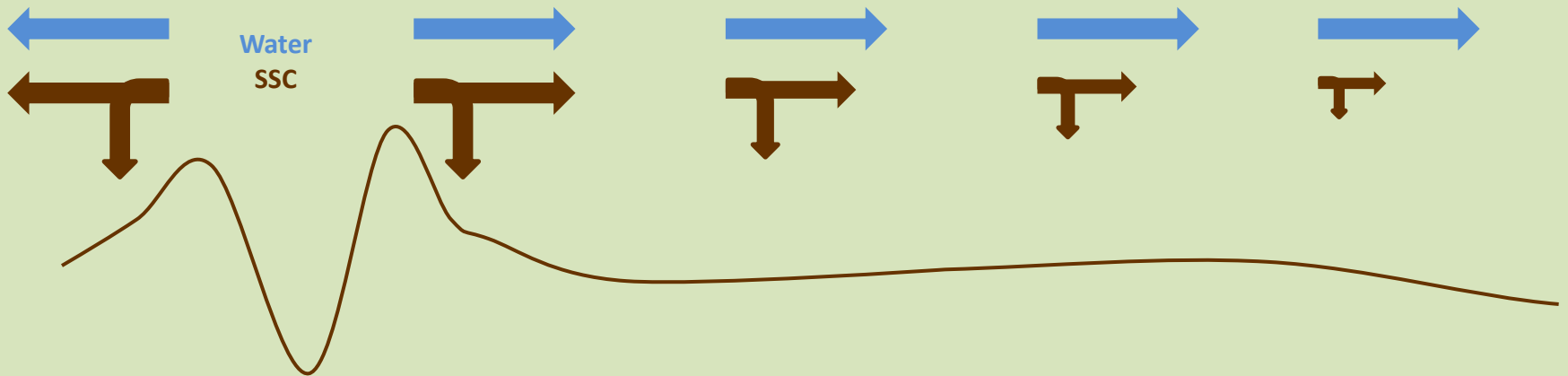(Or some combination thereof!)

Elevation dependence

surrogate for inundation

Linear approximation (French, 1993) or defined by tidal inundation record
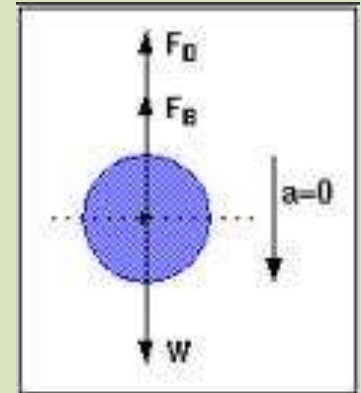
Intra-marsh spatial variability

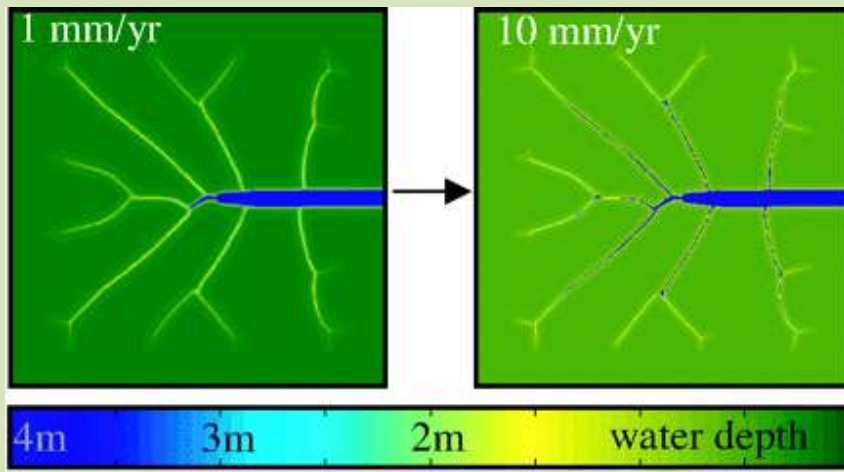Sediment concentration and accumulation rate decrease with increasing distance from the sediment source

Settling Velocity

- Constant
- Stokes
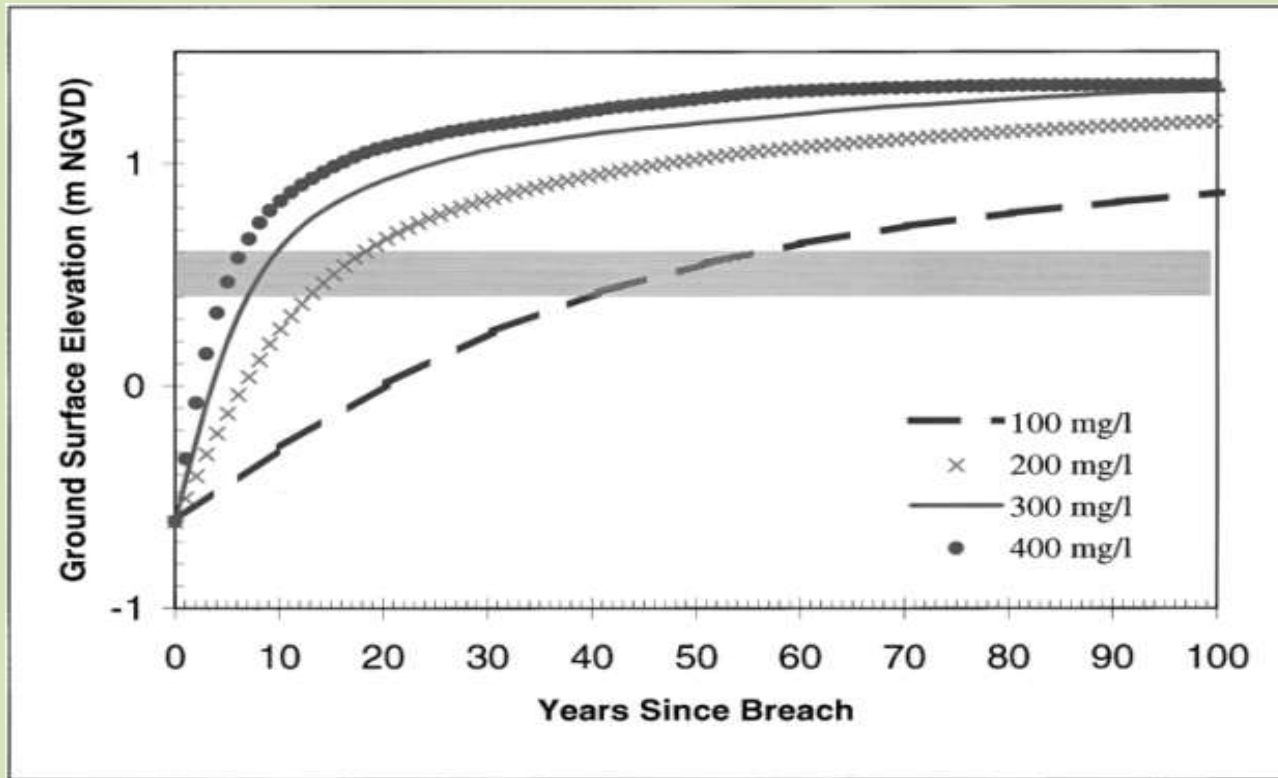- Floc settling velocity (Krone, 1987)

$$w_s = a \, SSC^x$$

Deposition-Erosion

Kirwan and Murray (2002)

- Requires a coupled geomorphic and hydrodynamic model
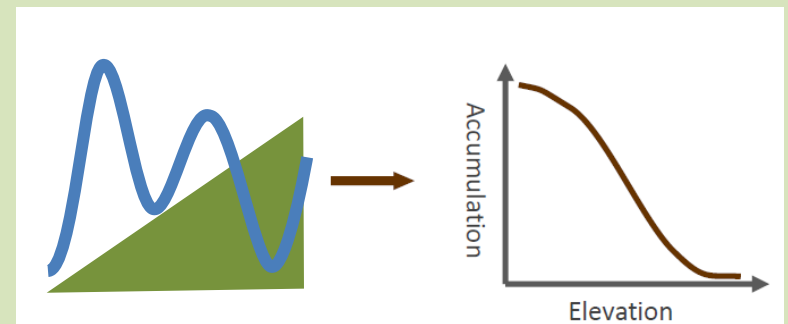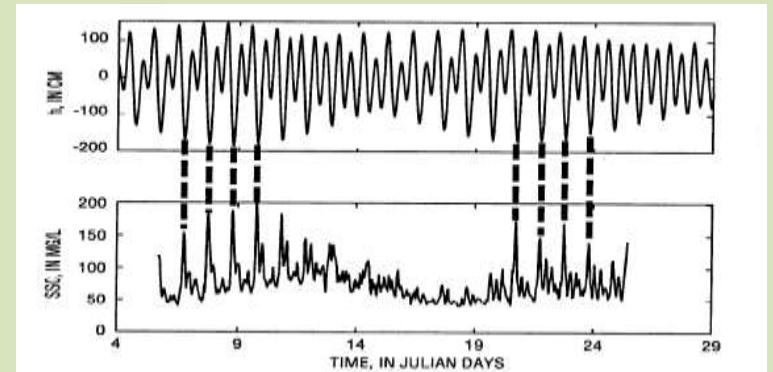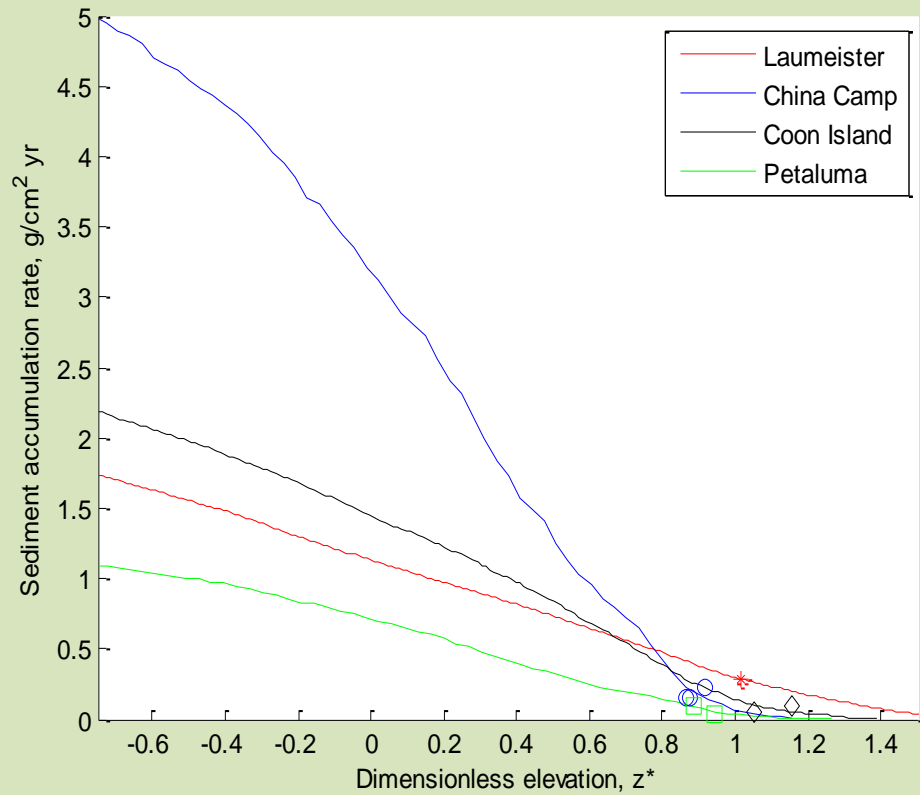
Combined models

Williams and Orr (2002)

Combined Models

Where can we make the biggest improvements?

- SSC data in or near marshes

- Spatially robust sediment accumulation rates

- Predictions of future trends in SSC

- Site-specific inundation records

- In-situ measurements of floc properties in or near marshes